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Criteria 3- Research, Innovations and Extension

3.3- Research Publication and Awards

3.3.2 Number of research papers per teachers in the Journals notified on UGC website during the last five years (10).

INDEX

		10) A study of implementation of human resource accounting in India. **-Prof. Vishal P. Barve**	83-88
		11) Impact of GST on traders and manufactures. **-Prof.Archana Y. Badhan**	89-96
		12) GST: Impact and Implications Home loan sector. **-Prof. Paresh P. Torawane**	97-105
		13) Recent's trends in digital Marketing using Artificial - Intelligence technology. **-Mr. Sachin A. Gajare**	106-115
		14) A Study on Agriculture Produce Marketing in India. **-Dr. Atul S. Gaware**	116-124
		15) A study of need of knowledge Management in education sector. **-Prof. Pranali G. Gaikwad**	125-129
		16) Recent trends in banking sector. **-Prof. Pratibha N. Suryavanshi**	130-138
		17) The study of consumer satisfacion related with online shopping in india. **-Prof. Punam Kotkar**	139-145
		18) Synthesis of a Novel, Efficient and Reusable Fe(II) Carboxymethylcellulose Catalyst and its Catalytic Activity in the Synthesis of 1,4-dihydropyrano [2,3-c] Pyrazole Derivaties. **-Dr. A. P. Rajput**	146-153
		19) Synthesis of 6- Amini-2, 4-Dihydropyrano- [2,3-c] Pyrazol-5 Carbonitriles Catalyzed by Cerium (IV)carboxymethylcellulose under Solvent- Free Conditions. **-Dr. A. P. Rajput**	154-159
		20) Synthesis of 2,2'-{[2,6-Dichloro-1-(Substituted phenyl)-1,4-Dihydropyridine-3,5-Diyl] Dimethylylidene} Dipropanedinitrile Using Green Catalyst L-Proline-Fe3O4 MNP **-Dr. A. P. Rajput**	160-164
3.	2017-2018	1) Analysis of e-Commerce and M-Commerce and analysis of security issues. **-Prof. Jayashree Rokade**	165-168
4.	2016-2017	1) Feasibility of private sectors investment in road sectors under BOT in Maharashtra: A case study of Mumbai Nashik Expressway. **-Dr. Anuradha D. Nandurkar**	169-177
5.	2015-2016	1) Synthesis and characterization of 2,6-dichloro-1-(nsubstituted phenyl)-1,4-dihydropyridine-3,5-dicarbaldehydes and their transformation into effective antifungal 4-thiazolidinone derivatives. **-Dr. A. P. Rajput**	178-183

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R.B.Joshi
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PHYTOCHEMICAL ANALYSIS AND BIOLOGICAL ACTIVITIES OF SOYMIDA FEBRIFUGA (ROXB.) JUSS (MELIACEAE): AN OVERVIEW

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ABSTRACT: *From old historical era plants are considered as a biosynthetic innovative, which can able to produce primary and secondary metabolites. Many primary metabolites such as, proteins carbohydrates, lipids and secondary metabolites like glycosides, alkaloids, flavonoids, tannins, volatile oils etc., which are therapeutically useful in human beings and animals are obtained from these solar energy biosynthetic laboratories. In Soymida febrifuga roxb Adr. Juss various complex chemical substances of different compositions are found as secondary metabolites in one or more parts of these plants such as root, bark, stem bark, heart wood, leaves, flower, fruit and seed etc. These secondary metabolites have ability to alter biological processes, which can reduce the risk of chronic diseases in human beings such as diabetes. A large number of modern drugs have been isolated from natural sources which were used in traditional medicines such as tribal medicine in the form of crude drugs. Hence, it is essential to isolate and identify active constituents from the extracts and to verify their therapeutic activity and specify dose-response relationship. Along with the developments in synthetic chemistry, higher plants are still a source of the medicinal constituents. For exploring traditional medicines and to investigate their scientific applications an endemic medicinal plant Soymida febrifuga Adr. Juss which has been used as a traditional folklore medicine. The present review is therefore gives an idea about the detailed survey of literature on its Pharamacognosy, phytochemistry as well as traditional and pharmacological uses.*

Key Words: *Soymida febrifuga, root bark, stem bark, heart wood, leaves, flower, fruit and seed traditional folklore medicine, Pharamacognosy, Phytochemistry, Pharmacological.*

Introduction

Medicinal plants are used to treat illness and diseases for thousands of years. They have gained economical importance because of their application in pharmaceutical, cosmetic, perfumery and food industries. The interest in herbal systems of medicine is growing day-by-day because nature can cure many diseases.[1]

Medicinal plants of commercial significance include poppy, Isabgol, Senna, Cinchona, Ipecac, Belladonna, Ergot, Amla, Chirata, Kalmegh, Safed musli, Ashoka, Ashwagandha, Bael, Shatavari, Tulsi, Brahmi, Chandan, Pippali etc. If endemic plants are not protected, they may become extinct.The Govt of India has recognized some plant species which need to be conserved, they include: *Azadirachta indicia, Aegle marmelos, Andrographis paniculata, Asaparagus racemosus, Bauhinia vahlii, Emblica officinalis, Holorrhena antidysenterica, Gymnema sylvestre, Litsea glutinosa, Mallotus philippenensis, Pterocarpus marsupium, Soymida febrifuga, Strychnos potatorum, Sapindus emarginatus, Strychnos nux-vomica, Terminalia bellerica, Terminalia chebula.*[2]

The Government of India has mounted a programme of Vanaspathi Van Project to promote Indian System of Medicine and for development of medicinal plants in degraded forests[12].

Diabetes is one of the major culprits responsible in degrading the health of a person in this stressful life. During world war-II when insulin was not available in many countries, search was made for a substitute for insulin from plant sources. Moreover drugs used in Type-2 have a number of limitations as they produce severe adverse effects and high rate of secondary failure[3].

Many plant species in folk medicine were used for their hypoglycemic properties and therefore used to treat diabetes[4]. Some of the plants with anti- diabetic activity include *Allium cepa, Coccinia indica, Ficus glomerata, Gymnema sylvestre, Momordica charantia, Pterocapus marsupium, Rauwolfia serpentina, Syzyygium cumini*[5].

Plants with proven hypoglycemic effects were found to contain compounds like terpenoids[6],glycosides[7,8],Alkaloids[9], and saponins[10] etc.

Liver is major functional organ in the body and its diseases causes serious health problems which are encountered very commonly in present era. The cause for these problems may be harmful drugs, chemicals, alcohol, environmental pollution etc. Conventional medical therapy for many common liver disorders,

including non alcoholic fatty liver disease and viral hepatitis has limited efficacy and potentially life threatening side effects[12].

Various medicinal plants are used in traditional medicine for their hepato protective effects. The most commonly used medicinal plants for management of liver diseases include *Phyllanthus spp (Euphorbiacae) Silybum marianum, Glycerrhiza glabra* etc[5]. Plants are considered to be biosynthetic innovatives, which produce primary and secondary metabolites.

Many primary metabolites like carbohydrates, proteins and lipids and secondary metabolites like glycosides, alkaloids, tannins, volatile oils etc., which have therapeutic effects in human beings and animals are obtained from these solar powered biosynthetic laboratories. Secondary metabolites have been shown to alter biological processes which may reduce the risk of chronic diseases in humans. An impressive number of modern drugs have been isolated from natural sources. Many of these isolations were based on the uses of the agents in traditional medicines[11]. Modern research has made it possible to isolate and identify active constituents from the extracts and to verify their therapeutic activity and specify dose-response relationship. Inspite of developments in synthetic chemistry, higher plants are still a source of the medicinal compounds. With a view to explore traditional medicines and to investigate their scientific applications, an endemic medicinal plant *Soymida febrifuga* Adr. Juss, which has been used as a traditional folklore medicine[12].

Habitat:

It grows well in dry forests of W. Peninsula. Extending northwards to Merwara, the Mirzapur hills and Chota Nagpur, Ceylon, dry deciduous forests of India, A.P. It is found in N. Circars from Ganjam to Godavari, on laterite hills and in the forests of Deccan from Kurnool to Mysore and hills of Chingleput. It is found in Rajamundry, Tirupathi, Pakhal regions of A.P. Grows well on lime soils, black cotton soils, and dry stony hills. It is also found in dry forests of Kerala, Gujarat, U.P. Bihar, Ceylon, Karnataka, Madhyapradesh, Maharashtra, Orissa, Rajasthan, Tamilnadu, Srilanka[13]**.** It is also found in Manu Devi, region of satpuda ranges of northern Maharashtra.

Classification[12] (Zipcodezoo.com)

Domain : Eukaryota
Kingdom : Plantae
Sub-Kingdom : Viridaeplantae
Phylum : Tracheophyta
Sub-phylum : Euphyllophytina
Infraphylum : Radiatopses
Class : Magnoliopsida
Sub-class : Rosidae
Super order : Rutanae
Order : Rutales
Sub order : Melineae
Family : Meliaceae
Subfamily : Solanoideae
Tribe : Solaneae

Vernacular names[13]

Bengal : Rohan, Rohira,
Bombay : Rohing
Central Provinces : Rohini, Rohun,
Deccan : Rohunna, Rouen, Ruhina
English : Bastard cedar, Indian red wood, Rohan tree.
Gond : Somi
Gujarati : Rohani, Rohina
Hindi : Rakat rohan, Rohunna.
Khond : Soniangi
Lambadi : Ronero
Marathi : Potar
Merwara : Rohan

Sanskrit : Agniruha, Atiruh, Chandravallabha, Kashamansi
Lomakarani, Mahamansi, Mansarohini,
Praharavalli, Patranga, Suloma, Vasa, Vikasha,
Viravali, Vritta,
Tamil : Sem, Somadanam, Sombu, Sumi, Surakkali,
Telugu : Sevamanu, Somi, Somida, Somili
Urdu : Rohan
Uriya : Karwi, Sohan, Sonhan, Suam.

Ayurvedic Properties:
GUNA(Quality) : Laghu (light to digest), Ruksh(dryness)
RASA (Taste) : Kashay- astringent, madhura-sweet, Katu(pungent)
VIPAK (Metabolism) : Katu-undergoes pungent test conversion after digestion
VIRYA (potency) : Sheet
PRABHAV (Impact) : Angmard-prashman,aphrodisiac improves vigor.

Morphology of *Soymida febrifuga*: It is a tall tree. Leaves 23-45 cm long, crowded towards the ends of branches. Leaflets 3-6 pairs, opposite, elliptic (or) oblong, obtuse, glabrous, penni nerved, nerves are numerous and conspicuous beneath. Base is rounded in equilateral i.e. the lower side generally extending further down the petiole than the upper. Petioles are red in colour. Flowers in large terminal (or) auxillary divaricately branched panicles often equaling the leaves, they are greenish white and appear in February-May. Sepals 5, rotund, margins membranous, slighty lacerate, petals 5, obovate, 6mm long, clawed, often notched at the apex. Staminal tube is about half as long as the petals, slightly urceolate, anthers, attached by the middle of the back. Ovary is glabrous, stigma large, discoid. Ovary is supplied only by carpellary ventrals. Ovules show attachment to parietal placentae. Fruit ripens in May-June. The capsules are 2.5-6.3 cm long, 5-celled and 5 valves separating from dessipinents which remain attached to thick spongy axis. Numerous seeds in each cell, flat, winged at both ends, with a soft felly covering. Bark slightly red, scale like[14].

Pharmacognostic review of *Soymida febrifuga* Leaves[15]: Literature Survey revealed the Pharmacognostic study of leaves of *Soymida febrifuga*.Transverse section of leaves showed the presence of:
Upper Epidermis: Single layered, covered with thick cuticle. The cells are thin walled, polygonal in shape and large in size.
Palisade tissue: It is arranged in two layers, first layer is large in length. This layer is followed by spongy parenchyma and intracellular space. Colouring matter is seen in palisade cells & spongy parenchyma. Crystals of calcium oxalate are also present in spongy tissue. Vascular strands are present.
Lower Epidermis: It is single layered. The cells are similar in shape to upper epidermal cells but small in size. Mid rib is very prominent on both surfaces. It has ridges which are composed of collenchymatous cells. Vascular bundles occupy the middle region. This is surrounded by sclerenchymatous cells (3-5 layers).Ground space of mid rib is filled up by spongy parenchyma. The xylem vessels and sclerenchymatous fibres are lignified. Starch is absent[12, 15].

Powder Characteristic of leaves[15]:
The powder is dull greenish in colour. Odour and taste is characteristic aromatic. Powder shows fragments of epidermal cells, palisade cells, spongy Scleride cells are fibre like with tapering ends. parenchyma along with calcium oxalate crystals, spiral vessels and few epidermal cells with cicatrix.
Higher value of acid soluble ash indicates larger numbers of calcium oxalate crystals while lower value of acid insoluble ash indicates cleanliness of drug. Methanolic extract value is higher which indicate higher amount of polyphenolic, carbohydrate and glycoside type compounds.
Preliminary chemical test confirms that petroleum ether extract contains sterol and triterpene type compounds. While methanolic extract confirms sugars, flavonols, glycosides and tannin type compounds. TLC of petroleum ether extract shows blue and white fluorescence spots indicate sterols and triterpene type compounds. TLC of methanolic extract, after spraying with $FeCl_3$ shows spots with reddish brown colour may be of tannins and gray green colour may be of flavonols compounds[15].
The walls are thick having wide lumens and pits are canal like and simple. They are lignified. Here also druses and prismatic type crystals are found. Druses (A group of crystal like calcium oxalates, silicates or carbonates) are scattered in powder, prismatic crystals occur is strands[12, 15].

Powder characteristic of root bark[16]:

Organoleptic Characters: Organoleptic Characters of root bark powder shows colour brownish red, odour astringent, taste astringent ends sweet and touch is smooth.

Powder microscopy: Diagnostic character of root bark powder shows stone cells, Oil globules, Starch grains Simple and compound, Prismatic crystals of calcium oxalate, Lignified fibers, Crystal fibers and Pitted stone cells.

Traditional uses:-

Soymida febrifuga bark extracts are used in treatment of rheumatoid arthritis[17], asthma and good for ulcers[13]. The decoction of the bark has bitter resin used in vaginal infections, rheumatic pains and stomach pains. Bark is used as anti-cancer remedy, used in wounds, dental diseases, uterine bleeding and haemorrhage[17]. It is used as an acrid, refrigerant, anthelmintic agent, aphrodisiac, laxative, good for sore throat, removes vata and cures tridosha fevers, cough, asthma[18].Removes blood impurities, good for ulcers, leprosy, dysentery and it has anti inflammatory activity. The bark is used in intermittent fevers and general debility, in advanced stages of dysentery and diarrhea. It is a good anti malarial like cinchona. It has antimicrobial activity. The bark is astringent to bowels and used in fevers in Yunani medicine, decoction is a good substitute for Oak-bark used for gargles, vaginal infections & enemas. The bark is a bitter tonic. A decoction of bark 1 in 20 was given in one ounce doses three times a day in cases of malarial fever[13]. Decoction of bark is used in tongue sores, fixing loose teeth, gum infection. The bark is crushed and used with water and administered in cough[19].

Leaves:

Leaf extracts were found to be potent antioxidant, antimicrobial, anthelmintic and anti-ulcerogenic potential[20, 21, 51]. Recently it has been reported against periodontal disease causing microorganisms[29]. Leaf juice is used to control over bleeding in menstruation[22].

Stem and root Bark

Bark contains a resinous bitter principle and is acrid, refrigerant, anthelmintic, aphrodisiac, laxative; good for sore throat; removes vata; cures tridosha fevers, cough, asthma[13]. Bark crushed with water and administered for cough and dysentery[23,24]. Bark is used in Ayurveda to remove blood impurities; good for ulcers, leprosy, dysentery and anti-inflammatory in action[25]. Decoction of stem bark (½ cup) is given orally in snake bite[26]. Fresh or dried bark is boiled in water to make paste, it is tied on swelling for 3 days. The bark is credited with antiperiodic properties, astringent to the bowels and useful in fevers (Unani), bitter tonic, febrifuge, particularly prescribed in malaria. The decoction of the bark is well adapted for gargles, vaginal infections, enemata, rheumatic swellings and stomach pain. The bark is said to be used for blood coagulation, wounds, dental diseases, uterine bleeding and haemorrhage[18].

The powdered bark is applied as a poultice and is used for leucorrhoea and leucoderma (Maurya and Dongarwar, 2012). Remarkably *S. febrifiuga* is well known to treat fever/malaria among 80 plants analyzed for antiplasmodial activity[27,28]. Decoction of inner bark possesses *in vivo* antitumour activity against transplantable rat carcinosarcoma and rat yoshida sarcoma[29]. Extract of *Soymida febrifuga* were cytotoxic and was found to kill human pancreatic cancer cells[30,31].Antioxidant, 5-lipoxygenase inhibitory and anticancer activities of the bark extracts were recently reported[32]. Further recent reports also demonstrate that bark extracts were found to be hypoglycemic and antihyperglycemic suggesting its mode of action as hepatoprotective and antidiabetic nature. Strikingly, decoction of stem bark is used to increase sexual vitality in women and mixture along with sugar cane juice is used to regularize menstruation (Jain A,Katewa et al., 2004).

Root callus:

Methyl angolensate, which is a natural tetranortriterpenoid isolated from *Soymida febrifuga* root calluses was responsible for anti cancer activity. It was active against T-cell leukemia, and chronic myelogenous leukemia[33].

Phyto-constituents:

Bark:

Previous investigations of the various parts of the *Soymida febrifuga* led to the isolation of lupeol, sitosterol, methyl angolensate, deoxyandirobin & two tetranortriterpenoids with a modified furan ring from the bark.[17, 34, 35, 36]

Root and Stem heartwood:

Obtusifoliol and the flavonoids syringetin and dihydrosyringetin have been isolated from the root heartwood[37].1972 the tetranortriterpenoids febrifugin[38] and febrinins A and B together with the flavonoids naringenin, quercetin, myricetin and dihydromyricetin are reported to be isolated from the heartwood[39].

Root callus:

Methyl angolensate and Luteolin -7 Oglucoside were isolated from callus cultures of root[40].

Leaves:

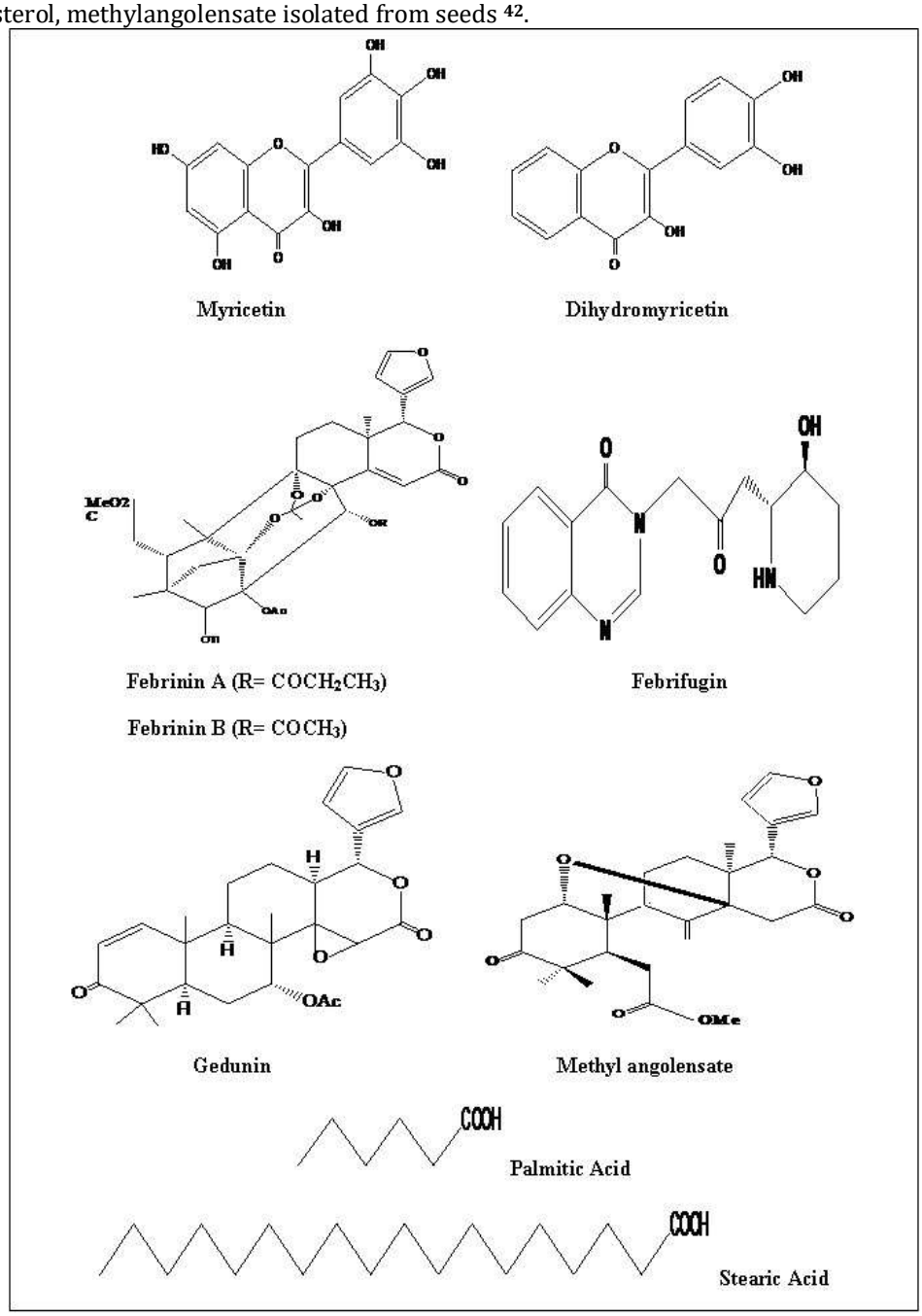
Quercetin 3-0-rhamnoside and quercetin 3-0- rutinoside have been isolated from the leaves[42].

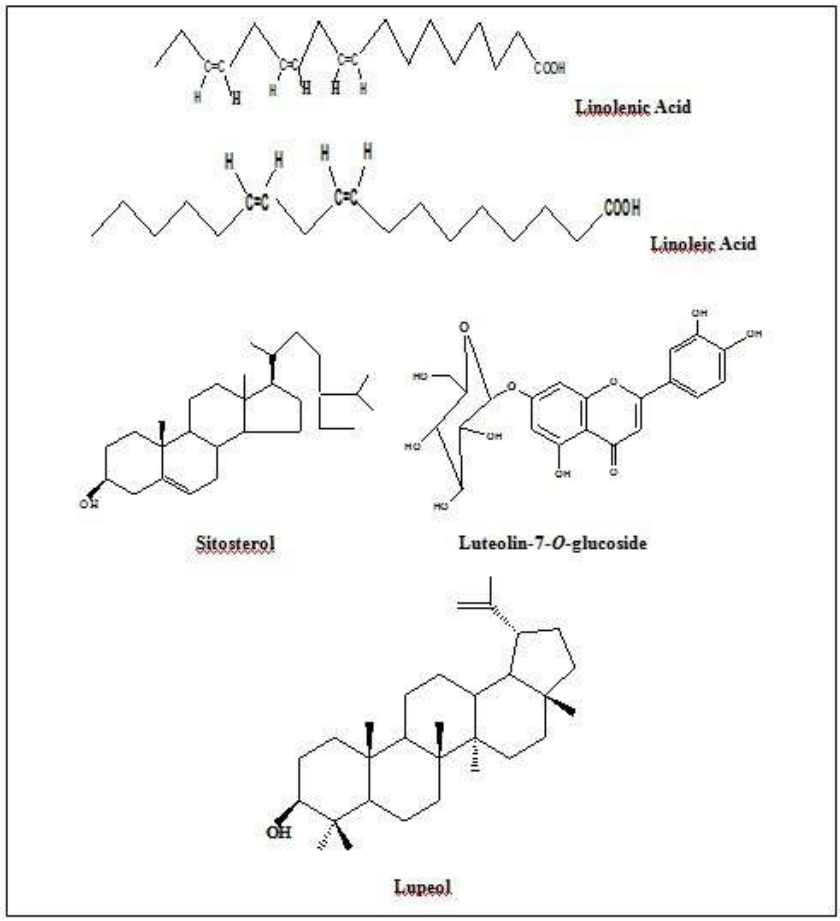
Fruit:

Three new tetranortriterpenoids, epoxyfebrinin-B,14,15dihydroepoxyfebrinin B and febrinolide together with deoxyandirobin, 17b-hydroxy-6a- acetoxyzadiradione (Connolly et al., 1979) methyl angolensate and sitosterol were reported to be found in the fruits (Mallavarapu et al.,1984).

Seed:

Lupeol, sitosterol, methylangolensate isolated from seeds [42].





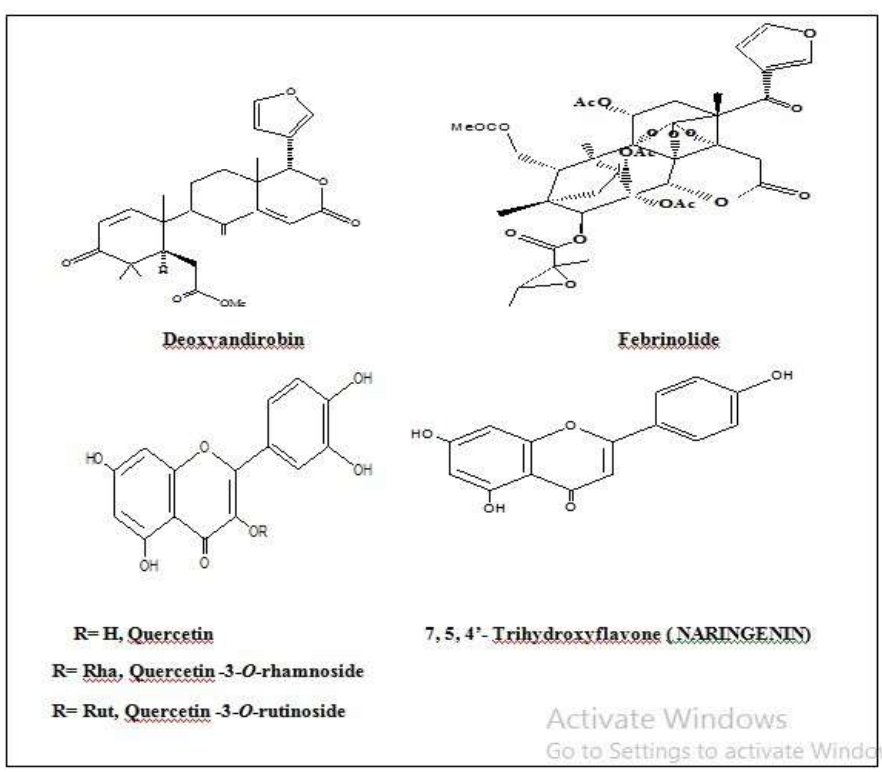


fig: - chemical structures of phytochemical active constituents of *soymida febrifuga* leaves.

BIOLOGICAL ACTIVITY:-

These chemical constituents were reported to be cytotoxic and strikingly are antimalarial, anti inflammatory, antioxidant, antidiabetic, antiallergic, antifungal, antiulcer, spasmolytic, insect antifeedant, antihelminthic, antibacterial and anticancer in action[12].

Antioxidant, 5-Lipoxygenase inhibitory and anticancer activities:

Varicola Karunasree, Ciddi Veeresham,.et.al have investigated the antioxidant, 5-lipoxygenase (LOX) inhibitory and anticancer activities of the bark extracts of this plant. Their results revealed that the polar methanol and aqueous extracts are potent in their antioxidant and 5-LOX inhibitory activities showing comparable or better effects than the reference compounds used. Conversely, despite showing a weak radical scavenging action, the relatively nonpolar chloroform extract exhibited better anticancer effect than the polar extracts against MCF-7, A-431 and HT- 1080 cell lines43. G. Veda Priya et.al. evaluated the hydro alcoholic bark extract of *S. febrifuga* produced a dose dependent inhibition of free radical generation of superoxide anion, hydroxyl radical and DPPH radical *In vitro* antioxidant activity[44].

Hepatoprotective activity:

Ravi Teja M et.al. studied that the ethanolic extract of leaves has hepatoprotective activity against paracetamol and rifampicin induced hepatic damage model, and it showed very good hepatoprotective activity[45].

Antihistaminic activity

Ananta Krushna Palei et.al. investigated that the samples which partially antagonist is an agent which serve to inhibit the release or action of histamine. The drug can be described as a histamine antagonist[46].

Antidiabetic activity:

Varicola Karunasree et.al.studied that the various column fractions obtained from the bark extract of *S. febrifuga* showed significant hypoglycaemic and antihyperglycaemic activites in normal healthy and alloxaninduced diabetic rats, respectively. At a dose of 200 mg/kg, the 20% chloroform in acetone eluate showed the maximum activity that was comparable to that of glibenclamide[32].

Antibacterial activity:

Sandhya Bhoyar and Sharad Biradar have concluded that the antibacterial activity of acetone and methanol leaves extract shows maximum inhibition against pathogenic bacteria like *Klebsiella pneumonae* (38mm) and *Pseudomonas aureginosa* (37mm) at its higher concentration. The distilled water extract also showed more activity against *Pseudomonas aureginosa* (35mm) at 10mg/disc[47]. K.Riazunnisa et.al. evaluated that antibacterial activity of the extracts selected for major human pathogenic bacterial strains like Bacillus substilis, Escherichia coli, Klebsiella pneumonia, Proteus vulgaris, and Staphylococcus aureus by agar well diffusion method. The results of antibacterial activity revealed that the extracts showed excellent inhibitory activity against all the tested pathogens and the Soymida extract showed comparatively better activity than the other H. indicus extract48.

Antiperidontal activity:

Ninad Moon et.al. concluded that MeOH extracts of and *S. febrifuga* have excellent antibacterial activity against multi drug resistant strains of *Porphyromonas gingivilis* and *Prevotella intermedia*[49].

Antifungal activity:

Shubhangi Sharad Bhide et.al. investigated antifungal activity on *Candida albicans, Aspergillus Niger* and *Aspergillus flavones.* They have reported that methanol, water and total aqueous extracts showed prominent antimicrobial activity against all microorganisms[50].

Anthelmintic activity:

S.A.Gangurde et.al. evaluated anthelmintic activity of bark extracts on earthworm with albendazole as standard. According to their study methanol extract of bark showed comparable anthelmintic activity[21].

Conclusion:

This review might be of great interest for researchers for further studies in principle biologically active compounds which have not been investigated specially from leaves for the invention of their potential pharmacological benefits. The present study review gives an idea about phytoconstituents and their uses for different diseases. Proper investigations of the phytochemicals will make this plant species a special wonder in the world of medicines.

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Section A: Herbal Chemistry

Research Article

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Isolation and Characterization of Phytoconstituents obtained from Ethanol Extract of Leaves of *Boswellia serrata* Roxb.(Family: Burseraceae)

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Abstract: Plant metabolites like phytosterols, flavonoides, triterpenoide, alkaloids are very important for many pharmacological activities. Aim of the present study was to identify and characterize the plant metabolites present in *Boswellia serrata* Roxb. leaves. For the isolation of the compounds from the leaves of *Boswellia serrata* Roxb, powder of dried leaves of the plant was subjected to cold maceration with ethanol as solvent and for column chromatography. Two compounds were identified. These compounds were Decanoic acid and Dodecanoic acid respectively. These compounds were identified by their chemical tests, RF values, elemental analysis, melting point, IR, ^{1}H- NMR, ^{13}C-NMR, UV and mass spectroscopy.

Key words: *Boswellia serrata* Roxb. Plant metabolites, Decanoic acid, Dodecanoic acid , cold maceration.

INTRODUCTION

In medicinal plants, there is occurrence of a variety of complex chemical substances of diverse compositions, which have curative properties due to which they are found as secondary plant metabolites in one or further parts of these plants. On the origin of their compositions, these plant metabolites are classified as flavonoids, alkaloids, glycosides, essential oils etc.[1]

Boswellia serrata is one of the medicinal plants of Burseraceae family. In the plant kingdom, there are 17 genera and 600 species of Burseraceae family broad spread in all tropical regions. Genus *Boswellia* contains near about 25 identified species. Most of them found in north eastern coast of Africa, Arabia, and India[2].

A Sanskrit name "*Gajabhakshya*" from time to time used for *Boswellia* which shows that elephants enjoy this herb as their diet[3,4]. Salai guggal contains 20-23% gum, 8-9% essential oil and about 50 % resin[5]. *Boswellia serrata* is used in Ethno medicine for use in many purposes. The bark of this tree has sweet in taste, cooling effect and tonic. It is good for dysentery, ulcers *Pitta,* asthma, and skin diseases[6]. Bark is also useful in diarrhea and piles[7].

The exudate of oleo-gum resin application in urinary disorders, goiter, gout, piles, rheumatism and nervous diseases[8-10]. Effect observed in Alzheimer, arthritis, allergy, asthma, boil, bursitis, cancer, cough, Crohn's disease, skin, carbuncle, colitis, convulsion, dyspepsia, vaginosis, wound, wrinkle, edema, fever and inflammation[11,12].

Collection and Authentication of Plant Materials: Green and fresh leaves of *Boswellia serrata* Roxb. were collected from Laling forest in Dhule district (MS); India in the month of November 2014. The plant was taxonomically identified and authenticated by professor Dr.S.R.Kshirsagar, Taxonomist, Department of Botany, S.S.V.P.S's L.K. Dr. P.R. Ghogrey Science College, Dhule (MS). Powder of dried leaves was subjected to cold maceration with ethanol at room temperature[13].

Isolation and Purification of compounds: A small amount of ethanol extract was dissolved in ethanol. This solution was marked on TLC plate. Readymade pre coated TLC plates (Merck) of silica gel 60 F 254 were used for spotting. Analytical grade chemicals and reagents were used for TLC. After checking different solvent systems, n-Hexane: Ethanol: Acetic acid (5:4:1) was used as solvent system. Eight gram of ethanol extract was subjected to column chromatography on silica gel (60-120 mesh size) with gradient elution using n-Hexane: Ethanol: Acetic acid[14-17].

Two fractions screening single spots with clear resolution were subjected to PTLC and the isolated pure compounds were named as compound-1 and compound-2 respectively.

Test for Spectroscopic Characterization: Structures from compound-1 and compound-2 were elucidated using different spectroscopic techniques like UV, IR, ^{1}H- NMR, ^{13}C- NMR and mass. The UV spectra was recorded on Cary 60 UV-Vis (Agilent Technology) and the IR spectrum was recorded on FT-IR spectrum Two (Perkin Elmer, USA) at SIPS, Sandip Foundation, Nashik (India).The ^{1}H- NMR and ^{13}C- NMR spectra were recorded on a Bruker Avance (II)400 M Hz. at SAIF, Panjab University, Chandigarh (India). The ^{1}H- NMR and ^{13}C- NMR spectra were recorded using $CDCl_3$ as solvent. Mass spectrum was recorded on Waters Micromass Q-TOF micro at SAIF, Panjab University, Chandigarh (India).

RESULT AND DISCUSSION

1. Spectroscopic data of compound-1:[19-25]

White crystals, **M.P:** 32-34 ^{0}C, **Yield:** 95 mg. **CHN Analysis Found:** C = 70.438 %, H = 11.673 %

Calculated for $C_{10}H_{20}O_2$: C = 69.72 % , H = 11.70 % , O = 18.58 %;**UV:** 205 nm, **Mass:** 173.75 g/mol, **RF:** 0.67; **The IR Spectra (ranges in cm^{-1}):** 2918.99 cm^{-1}(O-H stretch.), 2851.50 cm^{-1}(O-H stretch.), 1701.49 cm^{-1}(C=O stretch.), 1410.94 cm^{-1}(O-H bend.), 1295.36 cm^{-1}(C-O stretch. Vibra.), 933.29 cm^{-1}(O-H bend.).; **The ^{1}H NMR (400 MHz, $CDCl_3$) (Chemical shifts in δ ppm) :** δ 11.5607 (s, -OH), δ 2.3401 (m, 2H), δ 1.6669 (m, 2H, H-3), δ 1.6482 (m, 2H, H-4), δ 1.6303 (m, 2H, H-5), δ 1. 6117 (m, 2H, H-6), δ 1.5930 (m, 2H, H-7), δ 1.3054 (m, 2H, H-8), δ 1.2723 (m, 2H, H-9), δ 0.8800 (m, 2H, H-10).

^{13}C NMR (100 MHz, $CDCl_3$)(Chemical shifts in δppm): δ 180.52 (C-1), δ 34.13 (C-2), δ 31.86 (C-3), δ 29.40 (C-4), δ 29.26 (C-5), δ 29.06 (C-6), δ 24.66 (C-7), δ 24.66 (C-8), δ 22.65 (C-9), δ 14.04 (C-10).

Compound-1 was isolated as white crystals having melting point in the range of 32-34 ^{0}C. Yield of the compound was 95 mg. **The UV spectrum** of compound-1 in chloroform showed absorption band (**λ_{max}**) at 205 nm.

Elemental Analysis of compound-1 was found to be, **Found:** C = 70.438 %, H = 11.673 % ;**Calculated for $C_{10}H_{20}O_2$:** C = 69.72 %, H = 11.70 %, O = 18.58 %; The molecular formula of Compound-1 was determined to be $C_{10}H_{20}O_2$ by elemental analysis which corresponds to molecular weight $[M+H]^-$ 173.75 g/mol.

The mass spectrum of Compound-1 showed base peak at 173.75 $[M+H]^-$ which deduced molecular formula $C_{10}H_{20}O_2$. Ion peaks were also observed at 75.74, 130.65, 159.83, and 173.75.

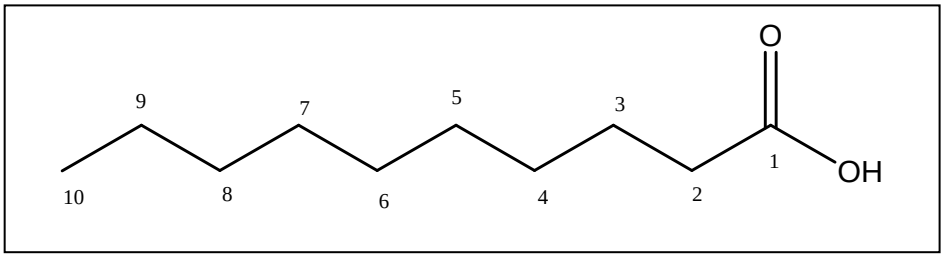
The IR Spectrum of compound Compound-1 showed very broad band of O-H stretching in the region 2700- 3100 cm^{-1} and its center is 2950 cm^{-1}.This broad O-H stretching is of carboxylic acid O-H stretching because it is very broad and strong with broad O-H band superimposed on the sharp C-H stretching bands of carboxylic acid is broad because carboxylic acids usually exist as hydrogen bonded dimers. The carbonyl stretching vibrations of (C=O) carboxylic acids appear as an intense signal at 1701.49 cm^{-1} The C-O stretching vibration appear at 1295.36 cm^{-1} and the O-H bending vibrations appears at 1410.94 cm^{-1} and 933.29 cm^{-1}. The C-H bending vibrations may not distinguishable as O-H bending vibration at 1410.94 cm^{-1}.

The ^{1}H NMR Spectrum of Compound-1 exhibit typical signal for aliphatic acid skeleton. This NMR signal revealed the presence of one methyl, eight methylene carbon signals. In ^{1}H NMR spectrum methyl group resonated at δ 0.8800 (3H, t). Typical methylene signals were resonated as multiplet for eight methylene hydrogens at δ 2.3401 (2H, m) ,δ 1.6669 (2H , m) , δ 1.6482 (2H , m) , δ 1.6303 (2H, m) , δ1.6117 (2H, m) , δ 1.5930 (2H, m) , δ1.3054 (2H, m) and δ 1.2723 (2H, m) assigned to be H-2, H-3, H-4, H-5, H-6, H-7, H-8 and H-9 respectively. The more downfield signal in ^{1}H NMR spectrum at δ 11.5607 ppm (s , 1H) indicates the presence of carboxyl acidic proton.

The ^{13}C NMR spectrum of Compound-1 showed signals for ten carbons. The ^{13}C NMR spectrum showed signals for eight methylene carbons, one terminal methyl carbon and one quaternary carbon.

The signal at δ 180.52 confirms the presence of carbonyl carbon. The signal at δ14.04 ppm showed the presence of CH_3-Carbon (C-10) and eight methylene carbons appeared at δ 34.13, δ 31.86, δ 29.40, δ 29.26, δ 29.06, δ 24.66, δ 24.66, δ 24.65 for C-2, C-3, C-4, C-5, C-6, C-7, C-8 & C-9 respectively.

By Considering phytochemical and spectroscopic assignments following structure is deduced for Compound-1 which is in good agreement with the structure of **Decanoic acid.**



Decanoic acid

2. Spectroscopic data of compound-2[19-25]

White powder, **M.P:** 43-44 ^{0}C, **Yield:** 91 mg.; **CHN Analysis: Found:** C = 71.568 %, H = 13.606 % **Calculated:** C = 71.957 %, H = 12.08 %, O = 15.97 %;**UV:** 212 nm, **Mass:** 200 g/mol., **RF:** 0.63

The IR Spectra (ranges in cm^{-1}) 2915.56 cm^{-1}(O-H stretch.), 2848.58 cm^{-1}(O-H stretch.), 1694.28 cm^{-1}(-COOH stretch. Vibra.), 1410.68 cm^{-1}(O-H bend.), 1193.02 cm^{-1}(-C-O stretch. Vibra.), 936.68 cm^{-1} (O-H bend.).**The ^{1}H NMR (400 MHz, $CDCl_3$) (Chemical shifts in δ ppm):**δ11.9881(s, -OH), δ 2.3407(m, 2H, H-2), δ1.67(m, 2H, H-3), δ1.6517(m, 2H, H-4), δ1.6340 (m, 2H, H-5), δ1.6155 (m, 2H, H-6), δ 1.5968 (m, 2H, H-7), δ1.3086 (m, 2H, H-8), δ1.2713(m , 2H, H-9), δ 0.9020 (m, 2H, H-10), δ 0.8853(m, 2H, H-11), δ 0.8677 (t, 3H, H-12).**^{13}C NMR (100 MHz, $CDCl_3$)(Chemical shifts in δppm)** δ 180.69 (C-1), δ 34.12 (C-2), δ 31.90 (C-3), δ 29.63 (C-4), δ 29.47 (C-5),δ 29.37 (C-6), δ 29.28 (C-7), δ 29.28 (C-8), δ 29.28 (C-9), δ 24.68 (C-10), δ 22.69 (C-11), δ 14.04 (C-12).

Compound-2 was isolated as white powder having melting point 43 to 44^{0}C and yield of the compound is 91 mg.The UV Spectrum of compound Compound-2 showed absorption band **(λ_{max})** at 212 nm .

Elemental Analysis of compound -2: Found: C = 71.568 %, H = 13.606 % ; **Calculated:** C = 71.957 %, H = 12.08 %, O = 15.97 %; The molecular formula of Compound-2 was determinate to be $C_{12}H_{24}O_2$ by elemental analysis which corresponds to molecular weight 200 g/mol.

Mass spectrum of Compound-2 showed base peak at 199.78 $[M-H]^+$ g/mol which deduced molecular formula $C_{12}H_{24}O_2$ Ion peaks were also observed at 73.53, 129.78, 147.49, 157.67, 199.78, 200.45

The IR Spectrum of compound Compound-2 showed very broad band of O-H stretching in the region 2650-3100 cm^{-1} and its centre is 2915.50 cm^{-1}.This broad O-H stretching vibration is due to carboxylic O-H group. It is very broad and strong with broad O-H band superimposed on the sharp C-H stretching bands because due to O-H stretch band of carboxylic acid is so broad and exist as hydrogen bonded diamers. The carbonyl stretching vibration of (-COOH) of carboxylic acids appear as intense signal at

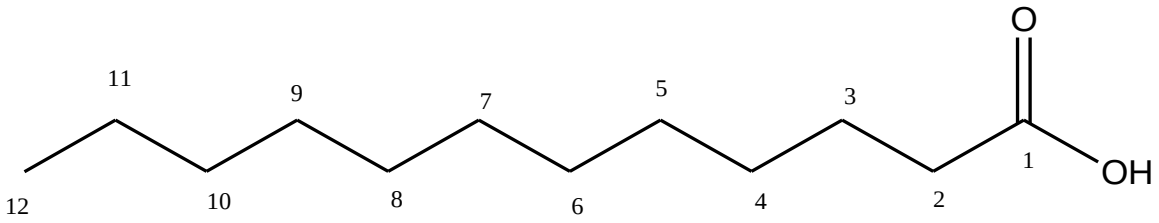
1694.28 cm^{-1}. The -C-O stretching vibration appear at 1193.02 cm^{-1} of O-H bending vibrations appears at 1410.68 cm^{-1} and 936.68 cm^{-1}. The C-H stretching vibrations may not distinguishable as O-H bending vibration at 1410.68 cm^{-1}.

The ^{1}H NMR Spectrum of compound Compound-2 exhibits typical signal for aliphatic acid skeleton. The spectrum revealed the presence of one methyl and ten methylene carbon signals.

Signal at δ 0.8677 (t, 3H, H-12) indicates presence of methyl group. Typical methylene signals were resonated as multiplets for ten methylene hydrogen at δ 2.3407 (m, 2H, H-2) , δ 1.67 (m, 2H) , δ 1.6517 (m, 2H) , δ 1.6370 (m, 2H) , δ 1.6155 (m, 2H), δ 1.5968 (m, 2H) , δ 1.3086 (m, 2H) , δ1.2713(m, 2H), δ 0.9020 (m, 2H) & δ 0.8853 (m, 2H) assigned to be H-2, H-3, H-4, H-5, H-6, H-7, H-8, H-9 and H-10 respectively.In ^{1}H NMR of compound showed a broad singlet at δ 11.9881 indicates presence of O-H proton.

The ^{13}C NMR Spectrum of compound Compound-2 showed signals for ten carbon singles. The ^{13}C NMR spectrum shows signals for ten methylene carbons, one terminal methyl carbon and one quaternary carbon. ^{13}C NMR spectrum of compound Compound-2 shows signal at δ 180.69 confirms presence of carbonyl carbon. The signal at δ 14.04 showed presence of CH_{3}- carbon and ten methylene carbons appeared at δ 34.12, δ 31.93, δ 29.63, δ 29.47, δ 29.37, δ 29.28, δ 29.28, δ 29.28, δ24.65, δ 22.69 for C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, C-10 and C-11 respectively.

By considering phytochemical and spectroscopic assignments following structure is deduced for the compound Compound-2 which is in good agreement with structure of **Dodecanoic acid.**



Dodecanoic acid.

CONCLUSION

Isolation of phytoconstituents present in *Boswellia serrata* leaves extract by cold maceration method using ethanol as solvent resulted in to two compounds Decanoic acid and Dodecanoic acid respectively. These compounds were analyzed by using physical, chemical and spectroscopic analysis. These active medicaments can be studied further in future for their biological activities.

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Isolation and Characterization of Phytoconstituents obtained from Chloroform Extract *Boswellia serrata* Roxb. Leaves

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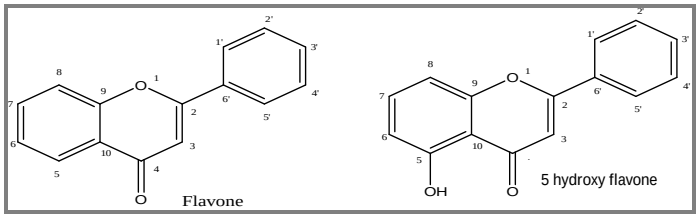
ABSTRACT

Plant metabolites like phytosterols, flavonoids, triterpenoides and alkaloids are very important for many pharmacological activities. Aim of the present study was to identify and characterize the plant metabolites present in Boswellia serrata Roxb leaves. For the isolation of the compounds from the leaves of Boswellia serrata Roxb, powder of dried leaves of the plant was subjected to cold maceration with chloroform as solvent and for column chromatography. Two compounds, compound-1 and compound-2 were identified. These compounds were found to be flavone and 5-hydroxy flavone respectively. These compounds were identified by their chemical tests, RF values, elemental analysis, melting point, IR, ^{1}HNMR, ^{13}CNMR, UV and mass spectroscopy.

Graphical Abstract



Structures of Flavone and 5-hydroxy flavone.

Keywords: *Boswellia serrata* Roxb. plant metabolites, Flavone, Cold maceration.

INTRODUCTION

Boswellia serrata is Indian frankincense tree. This tree is commonly found in Oman, Yemen, West Asia, Southern Arabia, South Africa and many parts of India. In India, it is found in Madhya Pradesh, Bihar, Orissa, Western Himalaya, Rajasthan, Gujarat and Maharashtra [**1, 2**]. Its English word comes from old French frankincense (i.e. high quality incense) and it is used in perfumes and incenses [**3**]. A Sanskrit name "*Gajabhakshya*" sometimes used for *Boswellia* which suggest that elephants enjoy this herb as their diet [**4, 5**]. *Boswellia serrata* Roxb. or salaiguggal contains 20-23% gum, 8-9% essential oil and about 50% resin [**6, 7**].

MATERIALS AND METHODS

Preparation of Plant Material: Green and fresh leaves of *Boswellia serrata* Roxb. were collected from Laling forest in Dhule district (MS); India in the month of November 2014. The plant was taxonomically identified and authenticated by Professor Dr.S. R. Kshirsagar, Taxonomist, Department of Botany, S.S.V.P.S's L.K. Dr.P.R. Ghogrey Science College, Dhule (MS). 3 kg powder of dried leaves was subjected to cold maceration with chloroform at room temperature [**8**].

Isolation and Purification of compounds: A small quantity of chloroform extract was dissolved in chloroform. This solution was spotted on TLC plate. Readymade precoated TLC plates (Merck) of silica gel 60 F 254 were used for spotting. Analytical grade chemicals and reagents were used for TLC. After checking different solvent systems, chloroform:ethylacetate:formic acid in the proportion of 6:3:1 was used as solvent system. Eight gram of chloroform extract was subjected to column chromatography on silica gel (60-120 mesh size) with gradient elution using chloroform:ethyl acetate:formic acid [**14, 15**].

Two fractions showing single spots with clear resolution were subjected to PTLC and the isolated pure compounds were named as compound-1 and compound-2 respectively.

Preliminary Phytochemical test for flavonoids: Both the compounds, compound-1 and compound-2 were subjected to Shinoda, Zinc hydrochloride and alkaline reagent test. These tests showed presence of flavonoids in both the compounds [**8, 9**].

Spectroscopic Characterization: Structures of compound-1 and compound-2 were elucidated using different spectroscopic techniques like UV, IR, ^{1}HNMR, ^{13}CNMR and mass. The UV spectra was recorded on Cary 60 UV-Vis (Agilent Technology) and the IR spectrum was recorded on FT-IR spectrum Two (Perkin Elmer, USA)at SIPS, Sandip Foundation, Nashik(India).The ^{1}HNMR and ^{13}CNMR spectra were recorded on a Bruker Avance (II)400 M Hz. at SAIF, Panjab University, Chandigarh(India). The ^{1}H- NMR and ^{13}CNMR spectra were recorded using $CDCl_3$ as solvent. Mass spectrum was recorded on Waters Micromass Q-TOF micro at SAIF, Panjab University, Chandigarh (India).

RESULTS AND DISCUSSION

Spectroscopic data of compound-1: White powder, **m.p:** 98-100°C, **Yield:**87 mg, **CHN Analysis:** Found: C = 81.187%, H = 4.633%,(calc. for $C_{15}H_{10}O_2$, C = 81.07 %, H = 4.54 %, O = 14.4 %), **UV:** 304 nm, **Mass:** 223.45, **RF:** 0.78, **IR**(KBr)**:** 2853.37 cm^{-1}, 1712.43 cm^{-1}, 1608.11 cm^{-1}, 1382.81 cm^{-1}, 1254.77 cm^{-1}, 1076.78 cm^{-1}, 953.85 cm^{-1}, **^{1}HNMR**(400 MHz, $CDCl_3$)**:** δ 6.8148 (s, H-3), δ 8.2110 (m, H-5), δ 7.4202 (d, H-6), δ 7.6838 (d, H-7), δ 7.6621 (d, H-8), δ 7.9033 (m, H-2'), δ 7.5195 (m, H-3'), δ 7.5397 (m, H-4'), δ 7.5195 (m, H-5'), δ 7.9033 (m, H-6'), **^{13}CNMR**(100 MHz, $CDCl_3$)**:**δ 163.38 (C-2) , δ 107.52(C-3), δ 178.44 (C-4), δ 129.05 (C-5), δ 125.24 (C-6), δ 133.81 (C-7), δ 118.11(C-8), δ 156.312 (C-9), δ 123.92 (C-10), δ 131.64 (C-1'), δ 126.27 (C-2'), δ 129.05 (C-3'), δ 131.70 (C-4'), δ 129.05 (C-5'), δ 126.27 (C-6').

Spectroscopic data of compound-2: Yellow crystalline powder, **m.p.:** 174-176°C, **Yield:** 90 mg, **CHN Analysis:** Found: C = 75.160 %, H = 4.394 % (calc. for $C_{15}H_{10}O_3$, C = 75.62 %, H = 4.23 %, O = 20.15 %), **UV:** 246 nm, **Mass:** 239.54 $[M+H]^+$, **RF:** 0.71, **IR**(KBr)**:** 3185.78 cm^{-1} , 2974.45 cm^{-1}, 1711.96 cm^{-1}, 1610.15 cm^{-1}, 1496.49 cm^{-1} , 1395.85 cm^{-1}, 1225.83 cm^{-1} , 1098.69 cm^{-1}, 960.85 cm^{-1}, **^{1}HNMR**(400 MHz, $CDCl_3$)**:** δ 7.1070 (s, H-3), δ 6.8070 (m, H-6), δ 7.6901(dd, H-7), δ 7.2115 (d, H-8), δ 7.9120 (dd, H-2'), δ 7.5687 (m, H-3'), δ 7.6838 (m, H-4'), δ 7.5687(m,H-5'), δ 7.9120 (m, H-6'), δ 12.1670 (s, OH-5), **^{13}CNMR**(100 MHz, $CDCl_3$)**:** δ 163.38 (C-2), δ 107.52(C-3), δ 183.13(C-4), δ 160.38(C-5), δ118.11(C-6), δ 133.81 (C-7), δ 107.52(C-8), δ 156.22 (C-9), δ 118.11 (C-10), δ 131.64(C-1'), δ 126.27 (C-2'), δ 129.05 (C-3'), δ 133.81 (C-4'), δ 129.05 (C-5'), δ 126.27 (C-6')

Structure elucidation

Compound-1: Compound **-1** was isolated as white crystalline powder of melting point 98-100°C. The UV spectra of compound-**1** showed absorption band λ_{max} at 304 nm. Elemental Analysis of compound-**1**found C = 81.187 % and H = 4.633 %calculated for $C_{15}H_{10}O_2$.The molecular formula ofcompound-**1** was determined to be $C_{15}H_{10}O_2$ by elemental analysis which corresponds to molecular weight 222.4 gm. Mass spectrumof compound-1 showed the peak at m/z 223.45 $[M]^+$ which deduced the molecular formula $C_{15}H_{10}O_2$. Ion peaks were also observed at 150.46, 224.10, 245.43, 246.15 and 247.15

The IR spectrum of compound-**1** showed intense peak at 2980.71 cm^{-1} due to presence of aromatic C-H stretching frequencies. C-H bending vibrations appear at 953 cm^{-1}. The most intense peak absorbed at 1712.43 cm^{-1} showed stretching frequency due to presence of carbonyl (>C=0) group. Peak observed at 1608.11 cm^{-1} due to presence of $H_2C = CH_2$ structure. In IR the absorption band at 1254.77 cm^{-1} showed due to presence of C-O-C structure. The ^{1}HNMR spectrum of compound-**1** showed signals for nine aromatic protons and one acyclic proton. A signal corresponding to H-3 is due to cyclic unsaturated ketone system. The ^{1}H NMR spectrum displayed sharp aromatic protons signals at δ 7.4302 (d, H-8), δ 7.6838 (d, H-7), δ 7.6621 (d, H-8) which suggested a flavone skeleton. The ^{13}CNMR spectrum of compound-**1** showed the presence of 15 carbon signals. The signal corresponding at δ 178.44 is the most downfield peak; which was assigned to ketone group (C-4). The signal δ 163.38 is next downfield signal corresponding to C-2 i.e. C-O structure. The ^{13}CNMR already shows 15 carbon atoms in the molecule those at C-2' and C-6' are equivalent as are those at C-3' and C-5' due to free rotation around the C-2/C-1' bond in accordance with expected number of carbon signal. This permitted the tentative assignment of most intense signal at δ126.27 and δ129.05 ppm. Some other tentative assignments could also be made. The carbonyl carbon (C-4) was observed to the lowest field signal at δ178.44 ppm. C-2 and/or C-9 at δ163.38 and/or δ156.322, C-10 and/or C-1' at δ131.64 and/or δ123.92 ppm, and C-3 to the highest field signal δ107.52 ppm since it is confirmed that sp^2 C-H group is present. By considering phytochemical and spectroscopic assignments following structure is deduced for the compound-**1** which is in good agreement with structure of flavone (Figure 1) [**10, 11**].

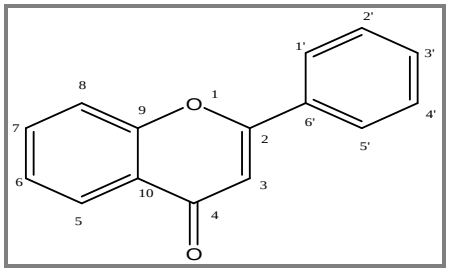


Figure 1. Structure of Flavone.

Compound-2: Compound-2 was isolated as yellow crystalline powder of melting point 174-176°C. The UV spectra of compound-**2** showed absorption band λ_{max} at 246 nm. Elemental Analysis of compound-**2** found C= 75.160 % and H = 4.394 %. Calculated for $C_{15}H_{10}O_3$ .The molecular formula of compound-**2** was determined to be $C_{15}H_{10}O_3$ by elemental analysis which corresponds to molecular weight 238.24 gm. Mass spectrum of compound-**2** showed base peak at 239.54 $[M+H]^+$ which deduced the molecular formula $C_{15}H_{10}O_3$. Ion peaks were also observed at 150.46, 224.10. The IR spectrum of compound-**2** showed broad peak at 3185 cm^{-1} which is characteristic for O-H stretching suggesting presence of hydroxyl group which was substantiated by chemical identification tests. The absorption band at 2974.45 cm^{-1} corresponds to CH_2 stretching. In IR spectrum the intense peak at 1711.96 cm^{-1} showed stretching frequency due to presence of carbonyl (>C=O) group.1610.15 cm^{-1}

stretching frequency showed presence of CH = CH group. The absorption band at 1225.82 cm^{-1} is due to presence of C-O-C stretching.

The ^{1}HNMR spectrum of compound-**2** showed signals for eight aromatic protons, one allylic proton and one hydroxyl proton. The ^{1}HNMR spectrum of compound-**2** showed presence of aromatic proton signal of δ H in range between δ 6.81ppm -δ 7.9120 ppm. The ^{1}HNMR signal at δ12.6704 ppm was observed due to presence of C-OH group i.e. Hydroxyl proton. The ^{1}H NMR signal at δ 6.807 (d) and δ 7.2115 (d) ppm showed due to presence of H-6 and H-8 of two protons, H-6 can show cross peak with hydroxyl protons so that δ 6.81 ppm signal should be for H-6 and not for H-8. As a result H-8 can be assigned δ 7.2115 ppm.

The ^{13}C NMR spectrum of compound-**2** showed the presence of 15 carbon signals. The signal corresponding at δ 180.13 ppm is the most downfield peak which was due to presence of (>C = O) ketonic group. The ^{13}CNMR signal at δ 160.38 is next downfield signal corresponding to group C-O structure. The signal at δ 160 ppm is due to presence of C-OH group at C-5, the downfield signal is due to electron withdrawing group (-OH) is present at carbon atom .The singlet peak absorbed at δ 118.11 ppm was assigned to C-10 because C-6 and C-8 could not be a singlet. Two ^{13}C peaks at δ 118.11 and δ 107.52 ppm observed were attached to the ^{1}H NMR peaks at δ 6.8070 and δ 7.2115 ppm respectively. ^{13}CNMR spectrum showed the presence of 15 carbon signals but out of 15 carbon atoms in the isolated molecule, those at C-2$^{'}$ and C-6$^{'}$ are equivalent as are those at C-3$^{'}$ and C-5$^{'}$ due to free rotation around the C-2/C-1$^{'}$ band in accordance with expected by considering the phytochemical and spectroscopic assignments following structure is deduced for the compound-**2** which is in good agreement with the structure of 5-hydroxy flavone (Figure 2)[**12-19**].

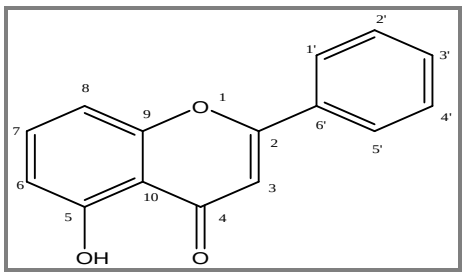


Figure 2. Structure of 5- hydroxy flavone.

APPLICATION

Flavonoids have beneficial effects on health. Some of them work on intracellular replication of viruses while others inhibit the infectious properties of the viruses. They can inhibit angiogenesis and also can inhibit cytosolic and membranal tyrosine kinase. Some of the flavonoids show considerable cytotoxicity at higher concentration.

CONCLUSION

Isolation of phytoconstituents present in *Boswellia serrata* leaves extract by cold maceration method using chloroform as solvent [20a-e] resulted in to two compounds (flavone) and (5-hydroxy flavone) respectively. These compounds were analyzed by using physical, chemical and spectroscopic analysis. These active medicaments can be studied further in future for their biological activities.

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Study On Production Of Plant Growth Promoters And Mineral Solubilization Ability Of Indigenous Rhizobacteria Isolated From *Allium Cepa* (L.).

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Abstract

Onion is an important vegetable crop of India. Chemical fertilizers have a harmful effect on properties of soil and its microflora. The use of plant growth promoting rhizobacteria (PGPR) proves more effective in improving soil quality as well as the crop. PGPR promotes the plant growth by various direct and indirect methods. The aim of the present study was to explore potentiality of PGPR isolated from *Allium cepa* plant rhizosphere. The screening was carried out in vitro condition to study multifunctional plant growth promotion traits like phosphate, zinc solubilization, ammonia production, IAA production and exoenzyme production. Total 16 isolates were obtained from onion cultivar rhizospheric soil in Nashik district, Maharashtra, India. These isolates showed phosphate solubilization, zinc solubilization IAA production and enzyme producing ability. N15 and N2 show highest IAA production. Isolates N15 and N13 showed highest mineral solubilization. N15 isolate showed multiple PGPR activity, these isolates have potential application of plant growth stimulation and promotion.

Keywords: *Rhizobacteria; Rhizosphere; PGPR; Phosphate solubilization; Zinc mobilization; IAA*

Introduction

Agriculture plays an important role in the economic development of India. Onion is the major vegetable crop cultivated throughout the world. India is the second largest onion producing country. The major onion producing states are Maharashtra, Madhya Pradesh, Karnataka, Gujarat, Rajasthan etc in the country. Onion is preferred for its flavor and pungency which is attributed to the presence of volatile oil “allyl propyl disulphide”. Onion bulb is rich source of carbohydrate, protein, vitamin C, phosphorous, calcium and also possesses good medicinal properties. The Plant growth-promoting rhizobacteria (PGPR) are naturally occurring soil bacteria that colonize plant roots and benefit plants by providing growth promotion (Prathap *et al*., 2015). *Azotobacter sp*. has the greatest effect on the hypocotyls length, length and mass of the onion. PGPR especially, if inoculated on the seed before planting, can establish themselves on the crop roots and this is suitable possible with onion crop as it is re-planted. The purpose of manipulating crop rhizosphere microbial populations by inoculation of beneficial bacteria to increase plant growth (Phale, 2018). Importance of

IAA production by PGPR has been widely acknowledged as it can stimulate plant cell elongation or cell division. Plant growth promoting rhizobacteria (PGPR) affect plant growth directly or indirectly by producing growth substances such as indole-acetic acid (IAA), gibberelic acid (GA) and cytokinins (Verma *et al*., 2010), fixing

dinitrogen from the atmosphere and providing the plant with this element (Boddey and Dobereiner, 1995) moreover it is also antagonistic towards phytopathogenic microorganisms (Velivelli *et al*., 2012). PGPR are broadly classified into three categories: (1) those that colonize the root surface and the close neighborhood (rhizobacteria), (2) those that establish a symbiotic relationship with plants (symbiotic bacteria), and (3) those that can enter into the root interior and colonize inside the plant (endophytic bacteria) (Bacon and Hinton, 2006).

Materials and Methods

Sampling

Composite method was used for collection of samples. Four different sites were selected for sampling around onion plant were bulk soil, rhizospheric soil ectorhizosperic and endorhizosperic soil.

Screening for PGPR traits

Characterization of isolates

The taxonomic attributes of selected isolates was determined using routine morphological (colonial, Gram staining and motility) and biochemical (catalase, oxidase, amylase and gelatinase) criteria**.**

Indole Acetic acid production (IAA)

The bacterial capacity to produce Indole acetic acid (IAA) was detected as described by Gorden and Paleg (1957). Nutrient broth was inoculated with loop full of bacterial suspension and incubated for 48 hours at 30±2°C. The broth was centrifuged at 10000 rpm for 10 min and two drops of orthophosphoric acid was added to 2mL of cell free supernatant and development of color was observed. After for 30 min in dark development of pink colour indicated IAA production.

Ammonia production test

The ammonia production was detected by Cappuccino and Sherman (1992) method using Nessler's reagent. Overnight grown bacterial cultures was inoculated in 3mL, 1%peptone broth and incubated at room temperature for 24 h at 120 rpm. After incubation 0.5 mL Nessler's reagent was added to the broth. The development of faint yellow to dark brown color indicated the production of ammonia.

Mineral solubilization

Phosphate solubilization:

The phosphate solubilization test was performed on Pikovaskay's agar plates as described by Pikovaskay (1948). The 24 hour old cultures was spot inoculated on these plates and incubated for 72 h at room temperature. Phosphate solubilization was observed as clear zone around the colonies.

Zinc solubilization:

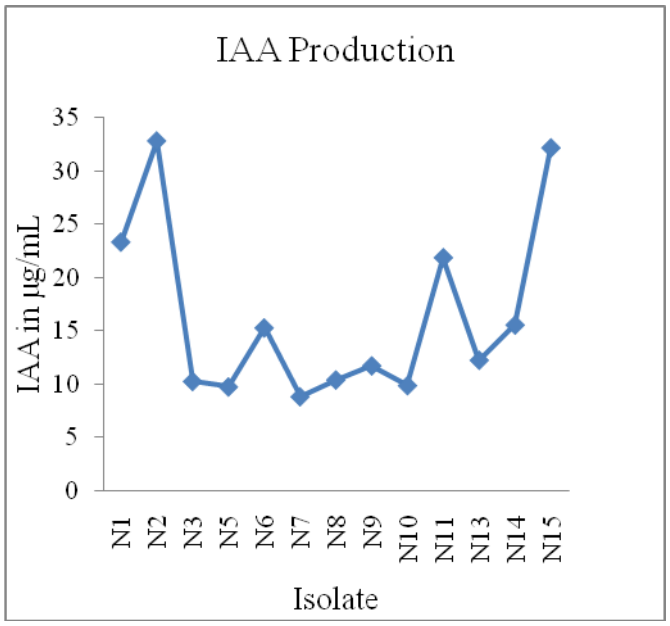
The isolate was spot inoculated on medium containing 0.1% Zinc oxide (Goteti *et al*.,2013). After the two days incubation clear zone around the bacterial colony indicated zinc solubilizing ability of bacteria.

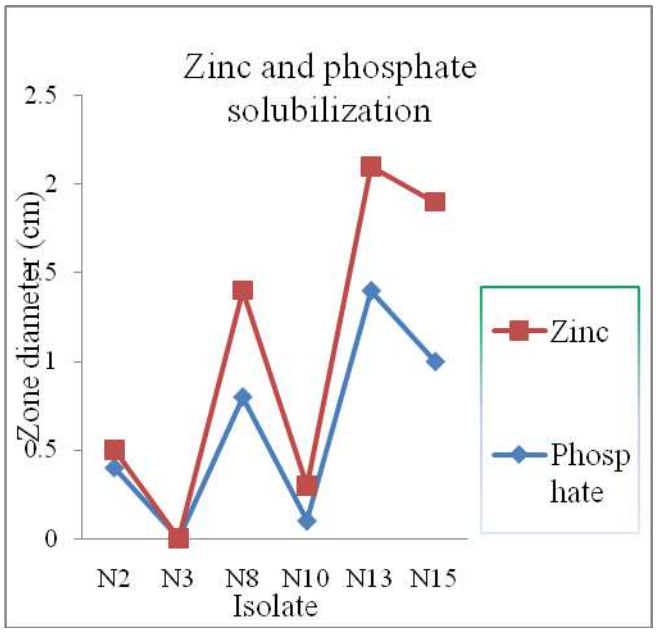
Result and Discussion

Indole Acetic Acid and Nutrient solubilization: ND: Not Detected

Sr.No.	Isolate	IAA Quantitative (µg/ml)	Phosphate solubilization (Zone diameter in cm)	Zinc solubilization (Zone diameter in cm)
1	N1	23.29	ND	ND
2	N2	32.76	0.4	0.1
3	N3	10.26	ND	ND
4	N4	ND	ND	ND
5	N5	9.74	ND	ND
6	N6	15.26	ND	ND
7	N7	8.82	ND	ND
8	N8	10.39	0.8	0.6
9	N9	11.71	ND	ND
10	N10	9.87	0.1	0.2
11	N11	21.84	ND	ND
12	N12	..	ND	ND
13	N13	12.24	1.4	0.7
14	N14	15.53	ND	ND
15	N15	32.11	1	0.9
16	N16	..	ND	ND

Table:1 IAA production and nutrient solubilization





Reetha *et al.*, 2014, studied indole acetic acid production by *Pseudomonas fluorescens* and *Bacillus subtilis* from rhizosphere of onion plant and their effect of on plant growth of onion plant. Niranjan *et al*., 2016 showed multifunctional PGPR activities such as IAA, ammonia production, zinc and phosphate solubilization by isolates from onion rhizosphere. In **(Table: 1)**, the potential of 16 bacteria isolates in mineral solubilizing activity and IAA production is shown. Isolates N2, N11 and N15 showed highest IAA production among all isolates and N8, N13 and N15 shows highest phosphate and zinc solubilization.

Ammonia and enzyme production:

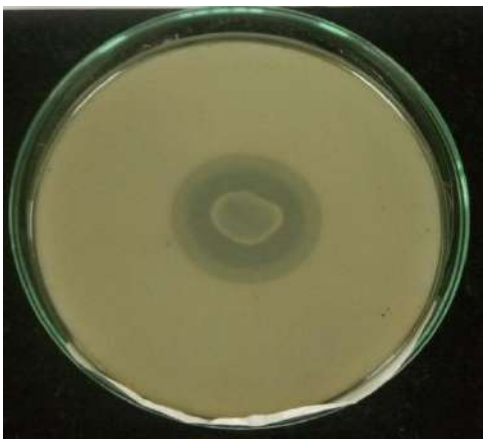
PGPR possess ammonia and different enzyme producing ability. In the present study majority of isolates from onion rhizosphere showed ammonia and enzyme production (**Table: 2**), many previous studies have emphasized these aspects of PGPR activity for bio control and biostimulation.

Conclusion

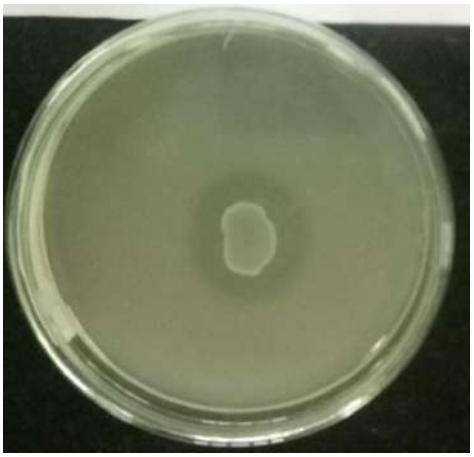
In present work sixteen isolates having plant growth promoters, nutrient solubilization, ammonia and enzyme production ability were isolated. Most of isolates showed multiple positive traits. Such organisms can be used as biofertilizer by formation of microbial consortium to be used to increase plant growth and productivity.

Sr. No.	Isolate	Ammonia Production	Enzyme Production			
			Amylase	Catalase	Gelatinase	Oxidase
1	N1	+	+	+	-	+
2	N2	+	+	+	-	+
3	N3	+	-	+	-	+
4	N4	+	+	+	+	+
5	N5	+	+	+	-	+
6	N6	+	+	+	+	+
7	N7	+	-	+	-	+
8	N8	+	-	+	-	+
9	N9	+	-	+	-	+
10	N10	+	-	+	-	+
11	N11	+	+	+	+	+
12	N12	+	+	+	+	+
13	N13	+	+	+	+	+
14	N14	+	+	+	+	+
15	N15	+	-	+	-	+
16	N16	+	-	+	+	+

Table:2 Ammonia and enzyme production



Zinc solubilization



Phosphate solubilization

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3. Corporate Social Responsibility and Environmental Accounting & Reporting Practices in India

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Abstract

Due to the increasing number of business activities and its negative impact on society, today the performance of an organization is not only judged on the basis of its financial results, but also with regard to its involvement in protecting the environment. Environmental accounting is an attempt to widen the scope of the accounting frameworks used to assess economic performance, to take review of elements that are not recorded in public or private accounting books. In this scenario, the need for accounting and reporting on the environmental issues and their disclosure in the annual reports has become an important part of corporate accounting and reporting system. There are various approaches to environmental accounting. It is important to consider the economic welfare and also the losses or damage caused to environment due to economic activity. Many companies undertake various activities to protect the environment in which they are functioning, but the question remains as to whether they account for their activities in monetary terms and report it in their financial reports. It is not mandatory for the corporates to disclose the environmental related cost and benefits except with respect to certain industries. In India, such disclosures are of voluntary nature and are guided by corporate social responsibility norms. In this paper, an attempt is made to discuss the theoretical foundation of environmental accounting and reporting practices with special reference to India. Hence, the present study is undertaken with the objective of analyzing the accounting and the reporting practices of some companies relating to environmental reporting. The study is based on secondary data collected from the companies' reports through internet.

Key words: Environmental accounting, Environmental Policy, Corporate Social Responsibility.

Introduction

As the entire world continues its rapid move towards industrialization, the ecological balance is disturbed. The activities of industries and business make significant impact on nature and human beings. The industrial wastes cause environmental pollution on large scale. .

Economic development without environmental considerations brings about environmental problems and makes a bad impact on the quality of life of present, as well as future generation damaging the ecology. The role of corporate sectors is very important for controlling the environmental degradation. For this maintaining account of such environmental and natural resources is important. The awareness and acceptance of importance of environmental control has motivated the development of the branch of "Environmental Accounting". For the sustainable development of mankind, a healthy environment is indispensable. Gradually, therefore, in many countries including India, environment matters are being given top most priority. Accounting and disclosure of environmental matters have been increasingly manifesting as an important dimension of corporate accounting and reporting practices. But, as conventional accounting deals with mainly non-living things, the formulation of valuation, and measurement and accounting techniques for incorporating environment-related matters in the corporate financial statement creates problems for the accountant. Due to the growing public concern regarding industrial activities, today the performance of an organization is judged not only on the basis of its financial results, but also with regard to its contribution to protecting and improving the environment. In this scenario, the need for accounting and reporting on the environmental issues and their disclosure in the annual reports has become an important part of corporate accounting and reporting system. Many companies undertake various activities to protect the environment in which they are functioning, but it is not stated in monetary terms in the financial reports of the companies. Hence it is important to study the reports of the companies and study the percentage of companies maintaining the records.

Meaning of Environmental Accounting

Environmental accounting is entirely an emerging and dynamic concept. Environmental accounting is concerned with the accounting for environment encompassing a business. Environmental accounting is an attempt to broaden the scope of the accounting frameworks used to assess economic performance, to take stock of elements that are not recorded in public or private accounting books. In other words, environmental accounting attempts to make the best possible quantitative assessment of the costs and benefits to an enterprise for activities specifically directed to environmental preservation. Thus, environmental accounting refers to the measurement and communication of information about the environmental responsibility performance of an organization to interested parties. It is also popularly referred to as "green accounting". It can be defined as the generation, analysis, and use of financial and non-financial information in order to optimize corporate, environmental and economic performance, achieving a sustainable business development. The ultimate objective of environmental accounting is to

indicate the environmental cost of each process, separating the non environmental costs from the environment costs. In short, it records and summarizes the value of environmental goods and services in monetary terms. This branch of accounting provides organizations with the cost of their products and processes, thus leading to resourceful decisions and sustained profitability.

Objectives of study

1. To study environmental accounting and reporting policies adopted in India.
2. To make a brief review of accounting Regulations and Government rules relating to Environmental Accounting.
3. To study is the corporate practices relating to measurement, recognition and disclosure of environmental costs and benefits.

Data and Research Methodology

The present study is exploratory in nature. It is based on secondary data collected through the Books, research work published, Annual reports of selected companies and internet to analyze the environment disclosure practices.

Literature Review

Kumar and Kaushik (2015) have studied the environmental disclosure & policies adopted by Mahatatna companies as BHEL and SAIL which did environmental reporting in their Annual Reports. Makori(2013) studied the relationship between environmental accounting and profitability of selected companies which showed it as negative and also suggested that environmental accounting should be made compulsory in India and Govt. can give Tax credit to the organizations complying with laws. Lungu et al.(2011) proposed strategies for social and environmental accounting. Caterjee and Mir (2008) have observed that there is significant disclosure of environmental information. Kumar (2005) studied the methodological issues pertaining to shadow pricing, environmental, voluntary non-marketable benefits from environmental resources, environmental regulations in water polluting industries with special reference to the case study of sugar industry in India. Oza (2004) observed that environmental accountability by a corporate citizen needs change in mindset of people within the supervisory staff, and front line and floor people. It should be proactive rather than reactive in fulfilling the environmental accountability to attain that ultimate aim of sustainable development. Ghosh, Mishra and Gagula (2003) studied the environmental reporting pattern of Indian Companies and compared it with 25 major companies across the six continents of the world which are global bench marks in environmental accounting. The comparison showed that Indian companies stood poorly in this sphere. Sharma and Upadhyay (2002) observed that all the companies present

environmental statements, and information on pollution control and environmental protection under the provisions of various acts, but they often appear in their annual reports. Verma (2002) studied the environmental accounting policies of six companies, where it is showed that these companies made policy statements in director's report but did not disclose any quantitative figures on expenditures incurred on targets set and achieved in respect of natural resources. It is observed from various studies that the percentage of companies disclosing environmental information is very less. Murthy et al. suggested that environmental values are necessary for designing economic instruments and environmental policies. It is observed from the various studies that corporate sector in India has become environmental conscious and steps are being taken to mitigate the adverse impact on the environment due to their activities, but there is no attempt to reduce in money terms the impact of their operations on the environment so that cost of their operations could be assessed in terms of resources only.

Legal Framework for Environmental Accounting in India

India has a Union Ministry of Environment for coordinating among the states and the various ministries, the environmental protection and anti pollution measures. Various legislations to ensure the protection of environment have been passed. The latest Companies Act, 2013 also incorporates a stress on green initiatives. The various laws directly pertinent to environmental protection in the country are as follows:

a. Water (Prevention and Control of Pollution) Act, 1974
b. Water (Prevention and Control of Pollution) Cess Act, 1977
c. Air (Prevention and Control of Pollution) Act, 1981
d. The Forest Conservation Act, 1980
e. The Environment (Protection) Act, 1986

Importance of Environmental accounting

The conventional accounting system deals with only non-living things and their relevant transactions. But environmental accounting identifies the resources exhausted and costs imposed by a business corporation during its activities. Recording the benefits and costs rendered by the environment to a business corporation and justifying them are the prime responsibilities of environmental accounting. Environmental accounting also plays a very vital role in supporting rational decision-making. Environmental accounting helps companies and other organizations boost their public trust and confidence and are associated with receiving a fair assessment. It also encourages the consumers and helps them purchase environmentally friendly products, i.e., green products produced by the corporate, and as such, both consumers and corporate benefit. It gives importance to pollution control by the corporate sectors. Environmental accounting offers an

ea about industrial development, a nation's economic progress and social welfare and the fulfillment of responsibility towards society. Environmental accounting improves environmental performance through better management of environmental cost and thus, benefits the natural and human environments. Sustainable development is possible with the help of environmental accounting as it helps include ecological ability of enterprise. Environmental accounting has proved to be highly essential in measuring a nation's economic development, social welfare, industrial development, pollution control and in satisfying the needs of government, still the system is in its infancy and not all countries have been able to develop such a system.

Environmental accounting practices followed in India

Environmental Accounting is a new branch of accounting where no rules are prescribed by the Govt. through Accounting Standards. Generally very few companies disclose the information in their Annual Reports in Monetary and Physical terms in various forms as observed from the reports can be stated as follows:

- Accumulation of current environmental costs for current as well as past activities and products.
- Physical data related to the reduction of toxicity and waste.
- Present and future capital expenditures for pollution prevention and control.
- Energy Conservation and Control of Environmental Hazards
- Present and future costs for products as well as re-designing processes.
- Estimation of future environmental costs and benefits for waste water management and Recycle of wastes

Environmental Accounting practices followed in India

Very few corporations disclose adequate information regarding the measures taken and expenditure incurred for pollution control by them. They give the information in their reports as prescribed by law giving the details. As per the observations made from Annual Reports of various companies they include the information which includes the following points:

1. Measures taken for pollution control and devices utilized for the same.
2. Steps taken for energy saving and raw material conservation
3. Step taken for waste water management and for improvement of quality of product and services, process of production, etc.
4. A study was conducted among 80 executives of different industries by Dr. B.B. Padhan and Dr. R.K. Bal which revealed that corporate world is fully aware of the requirements of environmental reporting. They are also aware of the environmental issue. The

corporate executives have also expressed their views in favor of environment reporting by the industries. Despite their awareness and consent over environmental reporting by industries is it very poor. It is so inadequate that very little information is found in the annual report.

As per the survey conducted by Asian research consortium out of the number of 85 companies 33 companies' i.e. 38% of companies were doing environmental reporting. The various aspects considered were Environment Policy and Statement include 54%, Energy conservation include 87%, and 33% of the companies are disclosing contents such as amount spend on pollution control, ash utilization, wastewater management, etc. Disclosure about environmental hazards was found only in case of three companies.

1) Asian Paints (India) Ltd.: "Ecology and Safety: Samples of treated effluents are periodically checked for Compliance with standards"

2) Goodlass Nerolac Paints Limited : "Pollution: The company regularly monitors measures in force in accordance with the Pollution Control Act for the protection of environment and for ensuring industrial safety and complying the statutory requirements.

3) Maruti Udyog Limited: "Environment: Modification of the existing effluent treatment plant was undertaken to take care of additional effluents generated due to capacity expansion. Data on non methane hydrocarbons in Paint Shop and Engine Testing shop, ambient air quality, stack emissions and effluents are being regularly monitored and the parameters are maintained well within prescribed limits. Development of green belt around gas turbine and R&D areas was further augmented by plantation of 3000 additional saplings.

It was also revealed that most of the companies disclose the environment information in descriptive manner rather than to financial type. The percentage of companies doing reporting is increasing. Today due to Liberalization the companies have to face International Competition. The MNC's include both monetary and non monetary information in their Annual Reports including environmental accounting reports. Hence to overcome the problems the companies have to include Environmental reporting in their Annual Reports.

The awareness about environmental control is increasing and many companies provide funds for the same but the percentage of funds utilized is less. As per studies undertaken by various researchers it is observed that the top Maharatna Companies doing environmental reporting include BHEL, CIL, GAIL, NYPC, ONGC, SAIL, IOCAL, etc. Which cover the various sectors as electronic, cement, Petroleum and other sectors. Public awareness about environmental issues like environmental pollution & control is good but the disclosure done by the Indian companies in financial reports is very less.

Suggestions

To make environmental accounting as a compulsory part of accounting system some of following suggestions can be given:

1. Making the rules in accounting for the presentation of environmental accounting reports by declaring accounting standard for environmental policy.
2. Preparation of budgets for the environmental expenditures.
3. Declaring the list of various elements causing pollution due to the effluents of companies and declaring measures taken to control it by the companies.
4. Government should make it compulsory for every polluter to submit environmental audit report being done by a certified environmental auditor.
5. The necessary amendments may be made in the Company's Act to ensure the disclosures and annexure may be added to a Director's Report with necessary amendment in the Company's Act for development of pollution standards for industries.
6. All revenue expenditures incurred for the protection of the environment should be debited to Profit and Loss Account and all environmental and natural resources consumed by the business should be regarded as environmental assets and it should be the liability of the organization towards society to utilize such assets at maximum possible capacity and at minimum cost without adversely affecting society's interest.

It can be stated that the organization should report for environmental activities, the cost imposed by the organization on the environmental benefits served by the business organizations, benefits received from the environment and the costs imposed by the environment. In short, social responsibility of business will be satisfied by the reporting system.

The major burning issues and challenges with regard to environmental accounting include:

a. Identification of environmental costs;
b. Capitalization of costs;
c. Identification of environmental liabilities; and,
d. Measurement of liabilities.

Different guidelines regarding these issues have been issued by many organizations from time to time, but the guidelines are almost advisory in nature and no implementation is done continuously. For this a firm and well defined environmental policy is to be adopted to comply with the rules and regulations for the sustainable development of country. For improving the corporate image relating to socially responsible behavior, it is desirable that an increasing

number of Indian companies report their environmental performances and social issues making environmental accounting mandatory & conducting environmental audit at regular intervals. Accountants are to take a proactive role in the environmental protection process. An auditor must pay due attention to environmental aspects during the course of the audit of financial statements.

Conclusion

Environmental accounting is an important measure for understanding the role played by natural environment in the development of an economy. It provides data that contains the contribution of natural resources to economic well being as well as the costs imposed by environmental pollution and resource degradation. The lack of awareness and commitment on the part of company management about the social responsibility of the firm also keeps the firms away from reporting environmental costs and benefits. Thus, it can be concluded that the absence of a standardized environmental accounting practice and disclosure norms at national as well as international levels spur the corporate to be away from the environmental accounting practices and to shut their eyes towards the deterioration in the environment.

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5. Digital Marketing and Consumer Behaviour

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Abstract

Digital India is a Dream Project of our Nation, which is working at its best so far. For making Digital India, Digital Marketing is an Economic activity which provides opportunity to all, from a small scale homemade product to big bang company products, to compete on the same platform. The term digital marketing has grown its popularity over time. It is an umbrella term for the marketing of product or services using digital technologies mainly on the Internet but also including mobile phones, display advertising and any other digital medium. The study focuses on the growing importance of Digital marketing over traditional marketing, benefits of digital marketing to the consumers and problem faced by consumer while doing online purchases.

Keywords: Digital Marketing, Consumer Behaviour, Internet, Technology

1. Introduction

"We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next ten." -Bill Gates

Digital India is a Dream Project of our Nation and in this 21st century India is moving towards achieving the vision of Digital India, where every Indian is digitally empowered and every information is digitally available.For making Digital India, Digital Marketing is an Economic activity which provides opportunity to all, form a small scale home made product to big bang company products, to compete on the same platform. Digital marketing is the marketing of products or services using digital technologies, mainly on the Internet, but also including mobile phones, display advertising, and any other digital medium.

In Present era, Manufacturers are using digital marketing as tools to attract more & more untapped customers in urban area and rural area both.The term 'digital marketing' was first used in the 1990s. In the 2000s and the 2010s, digital marketing became more sophisticated as an effective way to create a relationship with the consumer that has depth and relevance. Digital marketing campaigns are becoming more prevalent as well as efficient, as digital platforms are

increasingly incorporated into marketing plans and everyday life, and as people use digital devices instead of going to physical shops.

2. Research Methodology

This study is based on descriptive analysis, where the data is based on the references from some secondary data available which can be used to draw the conclusion regarding Digital marketing and consumer behavior.

3. Objectives

A) To study the consumer Behaviour in digital Marketing.

B) To study the Common Problems faced by Consumers while Shopping Online

4. Benefits of Digital Marketing over Traditional Marketing

Traditional marketing has its own advantages but there is no doubt that internet marketing has set a revolution ablaze. It has some clear winning benefits over traditional marketing and some of those are mentioned below.

a) Low Cost

While newspaper, television and other such media ads cost a lot, advertising through the internet is quite affordable. This in turn means greater fraction of the budget to enhance business.

b) Real Time Result

Digital marketing has an edge over traditional marketing since it is able to give quick results, while the latter keeps you waiting for long before showing any results. With online marketing you can measure and view everything from number of visitors, conversion rate, busiest period of the day and bounce rate too with ease.

c) Brand Development

When the question of brand image arises among digital marketing vs traditional marketing, digital marketing has an added advantage. Due to the limitation of space and low frequency of advertisements as is the case with conventional marketing, it loses at the hands of the online marketing. Instead of a small column in a newspaper, you can own an entire website and showcase your ads or promote your brand whenever you want with the help of a social media page or your blog, unlike traditional marketing. This helps to build an image of your brand consistently.

d) Non-intrusive

People do not purchase a newspaper to look at the ads or watch a television to be interrupted by commercials, hence usually advertisements featured through such media go ignored. However, with online ads, one has the power to choose to see an ad or not, participate in a social media discussion group or read or ignore a marketing email. Besides, you can also target

a specific audience for these ads which. All of this makes these ads more wanted and far more likely to generate leads. Hence by being non-intrusive and non-annoying as opposed to the traditional marketing, digital marketing has more potential to give desirable results.

e) Greater Exposure

Any traditional form of marketing device, be it television commercials or a newspaper ad, can only cover a certain area or population sector of a region. As opposed to this, an online advertisement has the ability to reach out to a widespread population, even the whole of world.

f) Quicker Publicity

Owing to real time results with digital marketing, you get instant publicity and even if you do not, you can instantly know which of your ad isn't working. The debate for traditional vs. Digital marketing is out of question here since the former falls way behind in this regard due to lack of such a scope. On the other hand, the latter works like a chain reaction giving you newer audience and earning you a newer customer with every passing nanosecond.

g) Works for Every Stage or Field

Digital marketing vs traditional marketing battle often falls in the winning hands of online marketing arena with certain benefits you cannot ignore with the former. Digital marketing allows even small businesses with a handful of staff members to expand their brand presence and manage advertising and marketing front, which of course cannot be held true with traditional marketing methods which renders the small businesses and start ups at disadvantage.

h) Easy Analytics

With digital marketing measuring your marketing efforts becomes very easy and quick. You can instantly see which strategy is working and which isn't through Google Analytics, besides other aspects too such as general trend, inbound traffic, conversion rate, interested audience, bounce rate and profit. This all makes the digital marketing vs traditional marketing debate, highly unfair by putting the former on the winning side by a wide margin.

5. The benefits provided by Digital Marketing to consumers

a. **Easy payment of Tax:** The Tax calculation and its payment are made easy with the help of different applications. Provided which are secure and less time consuming.

b. **Just a Click away Banking:** Banking transactions are of great concern for every individual –as "money matters", thus to bring banking a click away is a very important facility which turned to be true through Digitalization which is best executed with the core banking facility. The selling and purchasing is no longer a time taking activity.

c. **Secure Marketing:** The secure marketing is the need of not only the consumer, but also the seller, thus providing the secure transaction with high configuration of firewall is of great concern.

d. **Easy promotions:** Promotion of the products is now no longer completely dependent on face to face interaction, printed adds, and pamphlets etc. The Digital Marketing provides easy and efficient promotional platform with different channels like social marketing, mobile marketing and also an era of online marketing.

e. **Ubiquity:-** "Mobile phones" – everybody is like becoming addicted towards mobile phones. Thus the most reachable resource for reaching the end user, with all formal proceedings made electronic.

f. **Data collection and analysis:** The Data is said to be an Asset for every organization, the toughest task for a beginner or entrepreneur. Data Warehousing and Data Mining made easy by the Digitalization Process, which thus helps in predicting and forecasting the sales and other Marketing activities.

g. **Sharing of Data:** The Data is getting centralized for reach ability, thus the need of data analysis for Digital Marketing is being fulfilled.

h. **Fast transactions:** As the Reachability is increasing through Digitalization, also increasing the competition in the market. Digital Marketing provides the benefit of fast transaction and immediate accessibility of the product with number of options and price tags.

i. **Investments Made Easy:** Digital Marketing benefits the investment by providing the feature of analysis of data, comparative study and new possibilities in future endeavor.

j. **Opportunity of Employment to all:** Digital Marketing benefits Employment through the "work from home concept" introduced for all category of people (students, house wife, retired personals etc,).

6. Insight useful for understanding the Consumer Behaviour

Digital marketing has touched new heights with boom in smart phones and tabs, so much so that the ones who were not even close to this field are now willing to use this for their brand promotion. This era has almost everybody with a social media account and the ones without such an account are literally looked down upon for business purposes. So, the query that arises is of studying the consumer behaviour in digital marketing.

The following are some insights that might be useful for understanding the consumer behaviour in Digital Marketing:

a) Consumers set their own benchmarks

With the emergence of digital marketing, it is not an easy task anymore to woo the consumers. What looks good to them is what really convinces them to go ahead with the purchase. They will make comparisons of your brand with your competitors and will go for the one that suits them the best in terms of all the elements. To match the consumer-set standards, every brand has to make sure to be on their toes and everyone has maintained its presence on the social media platforms.

b) Word of Mouth

Word of mouth has been considered as one of the most powerful marketing tools, especially in the traditional marketing, where people used to take reviews from other people having knowledge or experience about the particular product or service. In digital marketing, word of mouth is done in terms of reviews of experts and users, ratings, testimonials etc. To make a decision about a particular product or service, they will first do a research on Google, will review the sites and give a read about the brand.

c) Reduced Consumer Tolerance

Consumers expect an immediate reaction to their actions. They want a response to their queries clear and fast. It takes just a single viral post or tweet for a consumer to build or destroy a company's or brand's rapport. There are many platforms like Facebook, Twitter etc in digital marketing that consumers use to share their experiences with the brand. According to human psychology, consumers are more attracted towards the negative news/reviews and there are very few consumers who actually share positive reviews/posts. This issue of negative feedback is many times even misused by the competitors. To handle this situation, every brand should follow Online Reputation Management (ORM) Strategy, where you make interactions with the consumers to convert their negative image to the positive.

d) Consumers Are Always Experimenting

In the past era, consumers had trust issues before going for any new product or service and would trust only on the feedback provided by the experienced consumers. Era has changed and so the mindset of the consumers. Consumers are now welcoming new products with fresh and good quality features This experimenting behavior of the consumers made way for many start-up companies like Uber, Oyo, Ola, Olx etc. Thanks to digital marketing for creating awareness and having easy access to these services.

e) Consumers Becoming Switchers

Consumers in the past era trusted one particular brand in a particular industry. For example, in the mobile industry, Nokia was the only brand consumers always trusted, but now, it is nowhere seen. What make consumers switch for a new product? It is when the product

competitors come out with better product features and better marketing strategies. With so many options available in the market, it becomes difficult for the consumers to become loyal and switching becomes easy.

f) Social Media Platforms

It is the consumers that decide which social media platform the brand must use to expand its business. If the mass consumers are on Face book, Snap chat, Twitter, Instagram, LinkedIn etc., it becomes mandatory for the brands to have their presence on these platforms if they want to be close to their prospects and a step ahead of their competitors, by interacting with their consumers and creating a buzz of their brand among them.

Most Common Problems faced by Consumers while Shopping Online

Online shopping has changed the way of shopping but there are lot of problems faced by consumers in online shopping such as fake products, hidden costs etc. Though online shopping is convenient but there are issues faced by consumers.

a) Issues relating to product quality

The most common problem faced by customers in online shopping is that there is no guarantee of a product's quality. With most e-commerce websites acting as aggregators for sellers to sell their products, more fraudulent sellers are registering on these websites and selling low-quality or faux products in the name of original and branded products. Sub-par products are sold by these sellers to fool customers and increase their sales thus increasing problems of online shopping.

Quality-checks are seldom performed on these products as the magnitude of online sales has increased, especially during online sale days. Sellers sometimes refuse to replace the faulty product or refund the consumer's money, leaving the latter with a low-quality product and money down the drain. The best consumer court lawyers can help you in filing a complaint with the appropriate consumer court at district, state or national level.

b) Logistics-related problems

Another problem faced in online shopping is issues with delivery and logistics. Products are often lost or damaged while in transit, and order tracking systems are unable to accurately locate the product. People choose the same-day. one-day or two-day delivery, paying extra money to get their product delivered.

However, these products often do not get delivered within the stipulated time and consumers have to wait for days before they finally receive their product. Similar challenges are faced by consumers when it comes to returning the product. In such cases, The top consumer court lawyers can assist you in filing a complaint with the appropriate consumer court.

c) Payment issues

There are lot of online shopping problems faced nowadays. Many consumers become victims to online payment issues. Even though there are several payment methods like Net Banking, Credit or Debit Card payments and even Cash-on-delivery, there are payment failures due to website's server error, payment gateway error or issues with One Time Password (OTP). Technical glitches often deduct the payment from buyer's account or card, but the website does not receive the payment.Consumers have to file a complaint with the website's customer care to get a refund, but they have to wait for 10-15 days for any action to be taken. Consumers can also contact famous consumer court lawyers to take a legal action.

d) **Hidden costs**

Issues with online shopping have been increasing at a rapid rate. E-commerce marketplaces often charge hidden costs after the purchase is finalized by the consumer. Websites hide tax charges, additional shipping and handling charges from consumers till purchases are finalised. Websites also add an option for consumers to buy products of a particular amount to waive off the shipping charges, however, sellers add additional charges even on purchases worth more than the set amount. A consumer complaint can be filed in such case, with the help of a consumer protection lawyer.

e) Ambiguous Website Policies

Many shopping websites have no website policies at all or have unclear and confusing user, return and refund policy. Vague stipulations leave consumers confused about refund and return of products and product description problems in ecommerce. With no policies defined, sellers often reject a consumer's claim to return the product or refund the money. Some websites are also unclear with regards to warranty and guarantee on products and buyers often end up purchasing faulty products with no product warranty or replacement option. Good consumer court lawyers can help you in filing a complaint with the appropriate consumer court at district, state or national level.

8 Solutions to reduce the problems

a) To overcome the problem regarding quality of product check the reviews of customer who have purchased online from respective website.

b) Read carefully all instructions regarding product delivery terms and conditions of transportation and logistics

c) To avoid the hidden cost check the E-Bills before confirming the order.

d) Always choose official website for avoiding the problem of ambiguous website

8 Conclusion

The study reveals that in this cut throatcompetitive era the use of digital marketing is essential for success in business and to retain the target audience. The consumers are giving more preference to online purchases due to growing impact of digital marketing but still consumers face some problems while doing online purchases but it can be reduced by some solutions.

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8. Role of Digital Marketing for Effective Business Growth

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Abstract

Digital Marketing is a new era in the marketing field. It refers to the use of the internet and digital media capabilities to help sell your products or services. Digital marketing is also referred to as internet marketing, online marketing or web-marketing. As with traditional marketing, digital marketing is making a strategy that helps businesses deliver the right messages and product, goods or services to the right person, at right time, at right place and effective cost. It includes of all pursuit and processes with the purpose of finding, attracting, winning and retaining customers. It is deemed to be broad in scope, because it not only refers to marketing and promotions over the internet, but also includes marketing done via e-mail and wireless media. Digital marketing joins creative and technical aspects of the internet, including: design, development, advertising and sales. It includes the use of a website in combination with online promotional techniques such as search engine marketing (SEM), search Engine Optimisation (SEO), social medial marketing, interactive online ads, online directories, e-mail marketing, affiliate marketing, viral marketing and so on.

Key Word – Digital marketing, Internet, Digital marketing growth.

Introduction

Today's era of business is depends on technology as we say 21st century is belongs to technology and new features in the field of technology it also influences marketing too. 2014 was go down as the year of e-commerce, firing aspiration of the Indian youth and middle class while the new year will be even more promising both for consumers as also entrepreneurs, with average annual spending on online purchases projected to increase by 67% to Rs 10,000 from Rs 6,000 per person, according to an ASSOCHAM-PwC study (the Associated Chambers of Commerce and Industry of India).

Digital marketing attracting premier global firms and enjoy an edge of global consumer.

Meaning

Digital Marketing or electronic marketing refers to the application of marketing principles and techniques **via electronic media** and more specifically the Internet. The terms Digital **Marketing, Internet marketing** and **online marketing**, are frequently interchanged, and can often be considered synonymous.

Digital Marketing is the process of **marketing a brand using the Internet**. It includes both direct response marketing and indirect marketing elements and uses a range of technologies to help connect businesses to their customers.

Digital Marketing encompasses all the activities a business **conducts via the worldwide web** with the aim of attracting new Consumers and retaining current consumers and developing its brand identity

Definition

"Digital Marketing is the use of information technology in the processes of creating, communicating, & delivering value to the customers, and for managing relationships in ways that benefit the organization and its stakeholders."

Digital Marketing means using digital technologies to help sell your goods or services. These technologies are a valuable complement to traditional marketing methods whatever the size of your company or your business model.

Digital Marketing is the process of marketing a brand using the Internet.

Objectives of study

1. To describe the benefits of online marketing in India.
2. To study Role of Digital Marketing for Effective Business Growth

Methodology

The present study is descriptive and based on the secondary data collected from websites, newspapers, reports reviews, research articles and journals,

Need and scope of the study

The study is limited towards the scope of Digital Marketing and growth of business through online marketing gives the base for further research to develop strategy and continue examine the overall online marketing.

Literature Review/ Review Reports

E-commerce industry, valued at $17 billion, growing at an compound annual growth rate of about 35 percent each year and will cross $100 billion in the next five years, noted the ASSOCHAM-PwC study.

The Smartphone and tablet shoppers will be strong growth drivers, said Mr. D.S. Rawat, secretary general of ASSOCHAM while releasing the study. Mobile already accounts for 11% of ecommerce sales, and its share will jump to 25% by 2017

India's travel and tourism are second fastest growing travel and tourism industry in the world. 75% of total travel related business has migrated to e-commerce. The main businesses are online air ticket booking, train ticket, bus ticket, hotel booking, tour packages and movie booking. Among this online air ticket booking contribute the major part, adds paper.

Factors/ Reasons for growth of online marketing in India

- The effect of urbanization is one of the reasons for continues growth of online marketing in India
- Adoption of advanced technology and growth of youth population in India.
- Rise in per capita income, double income and disposable income of the people in the country.
- Government policy of foreign investment inflows in the country.
- Shift in consumer preference and demand towards online market.
- Internet revolution

Benefits of online marketing

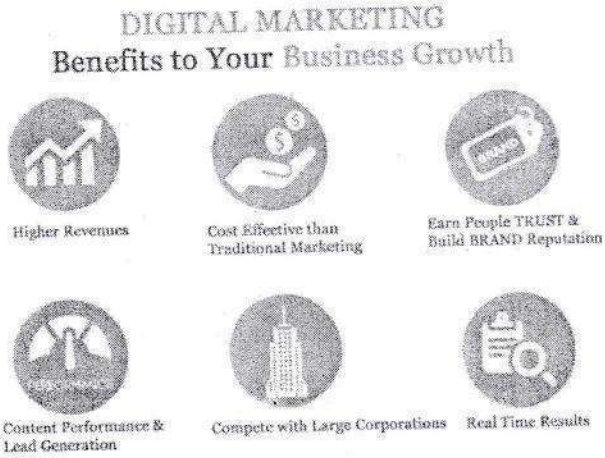
Following are some of the benefits of e-marketing for businesses:

- Wider prospect reach – the internet has become part of everyone's life. So for whatever products you offer, there is already an existing market on the World Wide Web. With E-marketing, it allows you to find new markets and potentially compete worldwide with only a small investment.
- 24/7 marketing - with a website your customers can find out about your products and make purchases even if your physical (bricks & mortar) premises are closed or you don't have physical premises at all.
- Cost-effective approach – A properly planned and effectively targeted e-marketing campaign can help your business reach target customers at a much lower cost compared to traditional marketing methods.
- Reduction in costs through automation and use of electronic media – E-marketing presents a strong business case in cost savings, particularly in the areas of transactional costs, customer service, digital media channels, print and distribution.

- Personalized one-on-one marketing - E-marketing allows you to reach people who want to know about your products and services instantly. For example, many people take mobile phones.
- Increased interactivity – E-marketing allows you to create interactive campaigns using music, graphics and videos. Through two-way communications, interactive games or quizzes, you can engage your audience and give them greater involvement and control over their web experience.
- Increased ability to track results – e-marketing makes it easier to measure how effective your campaigns are. It allows you to obtain detailed information about customers' responses to your advertising, through the use of methods such as pay per click or pay per action, etc.

However, before you get started with your e-marketing, it is very important to have some skills and know-how in order to run an e-campaign effectively. If not, you run the risk of wasting your valuable resources with a poor campaign.

Know Why Digital Marketing is vital for a Business in 2018



Source-www.digitalvidya.com

Data validation

E-Marketing in India has revolutionized since the framework of new I.T Policy 2000.

These policies led the online marketing to face the growth and contribution towards economy of the country. The following analysis helps us to understand trend in the E-Marketing.

The number of internet users in India will reach 500 million by June 2018, a report by IAMAI and Kantar IMRB says. At the end of December 2017, India had 481 million users, growing 11.34% from 2016. ... Rural India, with an estimated population of 918 million as per 2011 census, has only 186 million internet users. The penetration of e-commerce is low

compared to markets like the United States and the United Kingdom but is growing at a much faster rate with a large number of new entrants. The industry consensus is that growth is at an inflection point.

Role of Digital Marketing for Effective Business Growth

- 50+% of the organizations as of now had a well integrated Digital Marketing Plan in 2018
- Around 80% advertisers trust that conventional promotion is never again adequate and Digital Marketing will make their organization income to be expanded by 30+% before the finish of 2018
- More than 80% of organizations will expand their online advertising budget that can even surpass the IT spending plan
- Google insists in an investigation with IPSOS Hong Kong, affirming 2.8 times better revenue generations for businesses using digital marketing compared to those who don't

Role of Digital Marketing for Business Growth

Opportunities to all kinds of Businesses

It enhances businesses with online branding and advertising. Now a days Digital Marketing is common way for promoting product by any business. In current scenario the role of digital marketing in Small Medium sized Enterprises is equally important and fruitful for small and new business and well-established businesses.

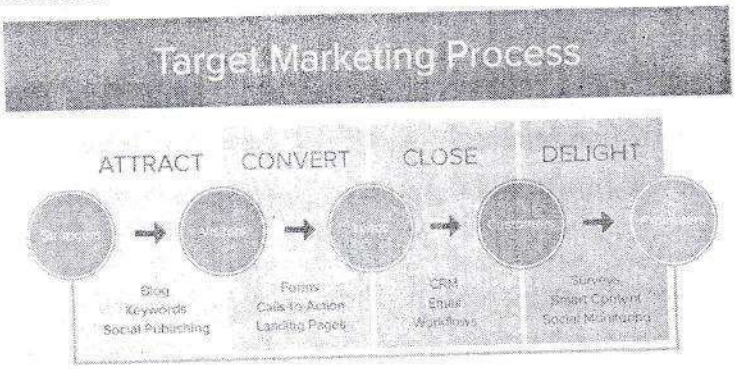
It gives equal advantages to perform online advertising and lead generations. Its capacity to connect with different clients without utilizing call centers. The lead generations and conversions related to Digital Marketing is comparatively way better than different other methods of marketing and advertising.

More Cost Effective than other ways of promotions

Individual ventures without any advantages and capitalization locate a predominant and monetarily wise advertising channel in digital advertising. Around 40% of the respondents of Gartner's Digital Marketing Spend Report claim that they are making considerable saving via the digital methods of marketing and advertising.

The report additionally proposes that 28% of organizations examined will move marketing spending allotments from conventional advertising channels and place them into digital promoting channels. Hub Spot attests this as showed up in the diagram underneath that guarantees how digital advertisers improve Cost-Per-Lead (CPL) compared to other ways of marketing.

Targeting and conversions



How Digital Marketing Targets Audiences & Convert them into Customers

Source-SocialMedia-https://d2myx53yhj7u4b.cloudfront.net/sites/default/files/styles/full_width_desktop/public/IC-GFX-Example-Inbound-Methodology.jpg?itok=OvNNxHp0

One inspiration behind the role of digital marketing in controlling over other marketing channels is the power of digital strategies to coordinate with exact target audiences and guarantee result driven engagements. Digital Marketing guarantees the commitment that your customers want to get while associating with your business. Your commitment will decide the success of your marketing strategy. Providing your customers with genuine commitment can give you learning of what your prospects require. This will give you a chance to build up the required trust with your audiences when your business begins to develop.

It also immaculate targeting is conversions. Organizations measure achievement by the rate of traffics getting converted users, subscribers, leads, endorsers, arrangements or deals. On the off chance that there happen no conversions, all your action would add up to nothing and all your advertising tries would basically go to waste. There are a couple of CRO i.e. Conversions Rated Optimization tools that you can use to optimize conversions.

Guaranteeing better Revenues

Digital marketing is main source of revenues. It provides higher returns on investments. With easy targeting, effective lead generations, powerful conversion, and notable revenue generation, small and medium organizations using digital marketing systems for enhancing their business. Digital Marketing opens the approaches to better, greater and powerful targeting in all the business sectors.

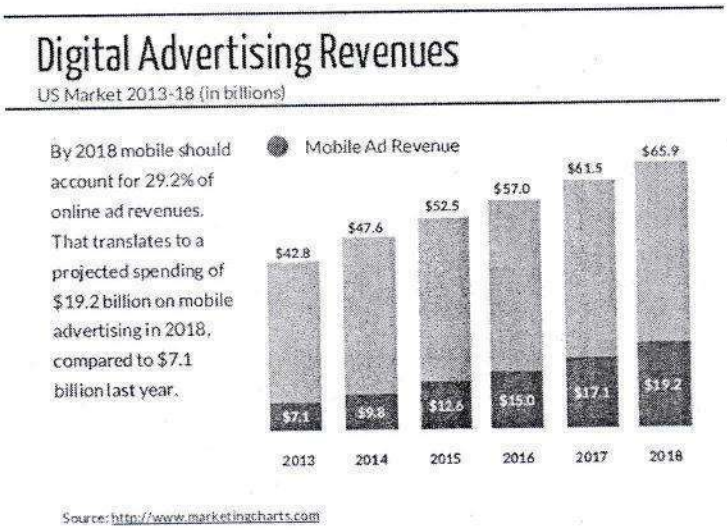
Focusing on Mobile Customers

Rapid use of smart phones, marketing on mobile phones is the most contemporary method for data and information distributing, that is additionally the fundamental communication channel. Technology is considered to be extremely important in business because it provides

ter and more efficient methods of getting a job done. mart phones are the part of life and we n't separate them.

In today's era, having digital marketing ability to target mobile consumers and getting eady for them towards achieving better improvement and speedily increase are entirely gnificant.

An eMarketer report suggests, "Mobile phones have progressed from being the option of blets and PCs, into something that is influencing clients' purchasing choices".



Role of Mobile Marketing in Boosting Digital Advertising Revenues-Source Marketingcharts.com

Trust Building

The importance of Digital Marketing lies in its capacity to attract and grab the spectators. Truly, one of the very best ways for a company to attract new customers is through digital or online marketing. Good digital marketing will help you keep new and existing customers by building their trust. The building of trust with your customers literally sets you apart from your competition.

"90 percent of respondents asserted they would trust in data about a specific brand, item or service if the information originates from individuals they know." – Nielsen Global Online Consumer Survey.

Convincing Prospects to make Productive Moves

Digital Marketing is important in strategies that will request audiences to make a fruitful progress that you expect them to take. It gives you a chance to utilize Calls to Action (CTA) that indicate what your site-guests ought to do straightaway. There are creative ways that you can use to guarantee conversions utilizing Calls to Action.

Calls-to-Action tells your guest what they can do while going to your site. They can join, download something, subscribe or make a buy. Digital Marketing gives you a chance to pick and utilize specific advances that will draw prospects make some positive moves. Forms, buttons, and messages are streamlined according to the outlines, content, designs, graphics, and color schemes of your site page to create the best results.

Conclusion

Online marketing industry is noticed to be fastest growing industry and India is one of the most attractive markets globally. Advanced technology and youth population enhances online market sale and act as employment generation indicator in future.

B2B or B2C businesses are using successfully various Digital Marketing mediums. This pattern of Digital Marketing is suit their sort of business. Different Digital Marketing practices like SEO, Paid Advertising, Search Engine Marketing (SEM), Content Marketing, e-commerce SEO, Automation Marketing, Social Media Marketing are normal practices of B2B and B2C associations. The study focused on the scope of Digital marketing is effective for business growth. Study shows that Digital marketing is an important part of promotions and advertisement of goods and services.

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11. A Comparative Study of Non-PERFORMING ASSETS (NPA) of five Private Sector Banks in India

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Abstract

In today's era banking sector has gaining the value in the economy day by day. Generally banks are one of the pillars of any of the economy of countries. In normal terms banks are providing the funds to their customers in the form of loans and advances. If anyone wants to check how efficiently banks are running their business then he should check it out the amount of Non-Performing Assets (NPA) in that bank. Higher the NPA lower the efficiency, Lower the NPA high level of progress and potentiality.

This paper having the centre idea about the connectivity of profitability and NPA. For the study purpose, five private sector banks has been taken over here and the data of NPA and Profitability for the year 2013-2017 is taken.

To increase the performance of the bank, the NPA need to reduce and controlled by the bank.

Keywords: Non-performing assets, Private sector bank.

1. Introduction

The banking system is the heart of the financial system. The major function of the financial System is the mobilisation of the public savings and its allocation in different sectors of the Economy as an investment. The conversion of financial savings in to investment is known as the process of capital formation in the economy. How this process of financial intermediation (i.e. collecting scattered savings and using it in to productive purposive) is carried out shall reflect the efficiency of the financial institutions and their role in socio-economic transformation of the nation.

The Narasimham Committee (1991) on "Financial System Reforms" introduced the concept of non-performing assets. Thestatus on non-performing assets constitutesthe best indicator of judging the health of the banking industry. The problem of NPAs is linked with the lending Procedure of banks as these are an inevitable burden on the banks. A bank gives out money upfront and earns income over a time on the promise of a borrower to repay. When loans

are not repaid, the bank loses both its income stream, as well as its capital. The major problem today faced by all the commercial banks is the increasing risk of non-performing assets, which possess challenge to their ultimate survival.

2. The specific objectives of the present study are

1. To find out the quantum of NPAs in private sector banks in India.
2. To analyse the impact of NPAs on banks' performance.
3. To analyse the reasons for mounting NPAs in banks in India.
4. To suggest ways to reduce the level of NPAs in banks in India.

3. Research Methodology

The study is primarily analytical and descriptive based on secondary data collected from bank website and RBI website, Publications, Journals, Reports and websites of public and private sector banks in India. The time period covered for the study is from 2013 to 2017.

To analyse the growth in NPAs among the five leading private sector banks in India., Bar graphs have been used to demonstrate the increase and decrease of NPA.

4. Statement of Problem

One of the important functions of Banks is to maintain the quality of assets, which requires proper selection of borrower, appraisal of his/her project, adequate credit, close monitoring, supervision and follow up. In spite of this there is always risk of accounts becoming non- performing.so, there is need to devise suitable strategy for accounts, which have gone bad and or classified as non- performing assets.

The focus of this study is on reducing the level of NPA's and further reducing the holding cost by adopting appropriate strategy for recovery, compromise and written off.

5. Literature review

According to Reserve Bank of India (RBI) explains the definition of NPAs, "an asset makes non-performing when it stops to generate income for the bank. Recently an asset was measured as non-performing asset (NPA) stand on the concept of 'Past Due'. A non-performing asset was examined as credit in respect of which interest of principal has remained 'past due' for a particular time". Siraj and SudarsananPillaisays that "NPA is a virus affecting banking sector.

The study concluded that NPA still remains a major threat and the incremental component explained through additions to NPA poses a great question mark on efficiency of credit risk management of banks in India". Debarsh and sukanyagoyal (2012) emphasized "on management of non-performing assets in the perspective of the public sector banks in India under strict asset classification norms, use of latest technological platform based on core banking solution, recovery procedures and other bank specific indicators in the context of stringent

regulatory framework of the RBI". In the seminal study on 'credit policy, systems, and culture', Reddy (2004) raised various critical issues pertaining to credit delivery mechanism of the Indian banking sector.

Reddy (2004) critically examined "various issues pertaining to terms of credit of Indian banks. In this context, it was viewed that 'the element of power has no bearing on the illegal activity. A default is not entirely an irrational decision. Rather a defaulter takes into account probabilistic assessment of various costs and benefits of his decision". The problem of NPAs is related to several internal and external factors facing the borrowers (Muniappan, 2002).

"The internal factors are diversion of funds for diversification taking up new projects, helping/promoting associate concerns, time/cost overruns during the project implementation stage, business (product, marketing, etc.) failure, inefficient management, strained labour relations, inappropriate technology/technical problems, product obsolescence, etc., while external factors are recession, non-payment in other countries, inputs/power shortage, price escalation, accidents and natural calamities". **Types of NPA**

Gross NPA

Gross NPA is an advance which is considered written off, for bank has made provisions, and which is still held in banks' books of account. Gross NPA (non-performing asset) refers to overall quantity of loans that have gone bad debts. It consists of all the nonstandard assets like as sub-standard, doubtful, and loss asset.

"Gross NPAs Ratio = Gross NPAs / Gross Advances"

Net NPA

Net NPAs are those type of NPAs in which the bank has deducted the provision regarding NPAs. " Net NPAs = Gross NPAs – Provisions / Gross Advances – Provisions"

Assets Classification

The NPAs have been classified under four categories:

(i)Standard Assets: A standard asset is a performing asset. Standard assets generate

Continuous income and repayments as and when they fall due. Such assets carry a normal risk and are not NPAs in the real sense.

(ii)Sub-standard Assets: All those assets which are considered as non-performing for a Period of 12 months.

(iii) Doubtful Assets: Those assets which are considered as non-performing for period of more than 12 months.

(iv) Loss Assets: All those assets which cannot be recovered. These assets are identified by the Central Bank or by the auditors.

Causes of NPA

Lending Practices of Banks: In 2008 the financial crisis has been happened because of bad lending practices of banks. The banks should strictly follow rules and regulations while lending loans. They should properly follow the credit policy of banks.

Business Risk: The organization may sometimes face problems with its own operational environment which may result in losses for the company.

Environmental Risk: Sometimes there may be environmental problems like cyclones, drought which does not give the required output to the farmers and Agri based businesses

6. Data Analysis and interpretations

Percentage of gross NPA and net NPA of all five banks

Kotak Mahindra Bank

Year	Profitability (%)	Gross NPA (%)	NetNPA(%)
2017	19.27	2.59	1.26
2016	12.75	2.36	1.06
2015	19.19	1.85	0.92
2014	17.13	1.98	1.08
2013	16.91	1.55	10.4

Source: Annual report and data analysed.

The above table depicts the percentageof Profitability, Gross NPA and Net NPA during the period of 2013-2017. The percentage ofprofitability has increased from 16.91 to 19.27 in 2013-17 respectively. From the above percentage it has observed the amount of gross NPA and net NPA has inverse relationship with the Profitability. Similarly, NPA percentage is also showing the rising trend from 1.55 in 2013 to 2.59 in 2017

ICICI Bank

Year	Profitability	Gross NPA(%)	Net NPA(%)
2017	18.09	7.89	4.89
2016	18.44	5.21	2.67
2015	22.76	3.78	1.61
2014	22.20	3.03	0.97
2013	20.77	3.22	0.77

Source: Annual report and data analysed

The above table shows the amount of the percentage of Profitability, Gross NPA and Net NPA during the period of 2013-2017. The percentage ofprofitability has decreased from 20.77 in 2013 to 18.09 in 2017. From the above percentage it has observed the amount of gross NPA and net NPA has been increasing from 3.22 and 0.77 in 2013 respectively and 7.89 and 4.89 in 2017

respectively. The inverse relationship of Gross NPA and Net NPA is observed with the Profitability. Similarly, NPA percentage is also showing the rising trend from 2013 to 2017.

Dena Bank

Year	Profitability	Gross NPA(%)	Net NPA(%)
2017	-8.48	16.27	10.66
2016	-8.78	9.98	6.35
2015	2.46	5.45	3.82
2014	5.52	3.33	2.35
2013	9.1	2.19	1.39

Source: Annual report and data analysed

From the above table it can be interpreted that Bank has not made enough provisions for their gross and Net NPAs. From the table we can see that of 5 consecutive years under study, in 2013 to 17 the rise in NPA which is not a good sign for bank. The bank needs to make sufficient provision in order to reduce the level of NPA.

Axis Bank

Year	Profitability	Gross NPA(%)	Net NPA(%)
2017	8.26	5.04	2.11
2016	20.06	1.67	0.70
2015	20.73	1.34	0.44
2014	20.29	1.22	0.40
2013	19.05	1.06	0.32

Source: Annual report and data analysed

It can be noted that the percentage of profitability has decreased from 9.1 in 2013 to -8.48 in 2017. From the above percentage it has observed the amount of gross NPA and net NPA has been increasing from 2.19 and 1.39 in 2013 respectively and 16.27 and 10.66 in 2017 respectively. The inverse relationship of Gross NPA and Net NPA is observed with the Profitability. As the NPA is increased the profitability showed the negative trend.

Yes Bank

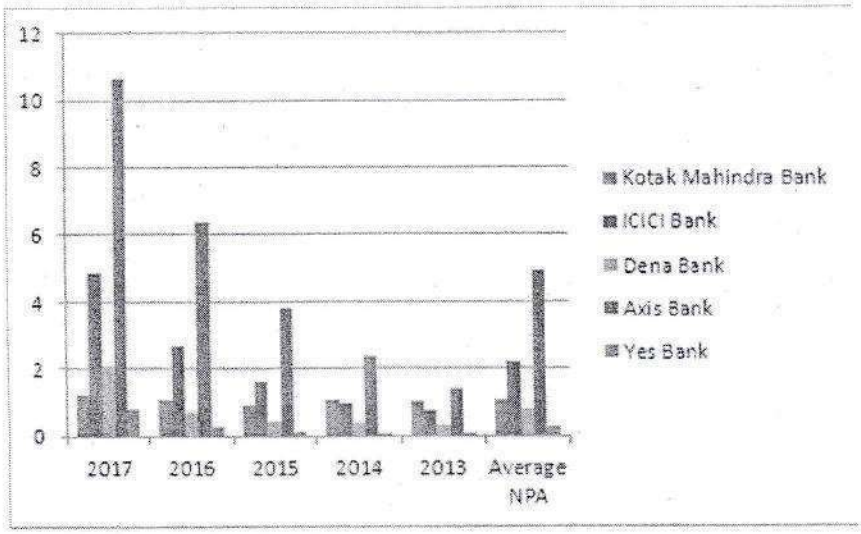
Year	Profitability	Gross NPA(%)	Net NPA(%)
2017	20.27	1.52	0.81
2016	18.076	0.76	0.29
2015	17.032	0.41	0.12
2014	16.02	0.31	0.05
2013	15.68	0.20	0.01

Source: Annual report and data analysed

From the above table it is found that the percentage of NPA is increasing but the increase in Profitability is also in the same proportions. From this we can say that bank is taking a controlled action against NPA.

Calculation of NPA

Bank Name	2017	2016	2015	2014	2013	Average NPA
Kotak Mahindra Bank	1.26	1.06	0.92	1.08	1.04	1.072
ICICI Bank	4.89	2.67	1.61	0.97	0.77	2.182
Dena Bank	2.11	0.70	0.44	0.40	0.32	0.794
Axis Bank	10.66	6.35	3.82	2.35	1.39	4.914
Yes Bank	0.81	0.29	0.12	0.05	0.01	0.256



The above figure shows the trend of Gross NPA and Net NPA in percentages for the period of 2013 to 2017.The x-axis represent the years i.e. as the period of (2013- 2017) whereas y-axis represent the amount of NPA (%). We can observe here that the Gross and Net amount of NPA has been showing an upward trend beginning from 2013 to 2017.

7. Limitations of the study

1. The study is limited to five private sector banks only.
2. The data collected is of only for 5 years of NP
3. NPAs are changing from time by time by the performance of the bank, but study does not concentrate on future consequences.

8. Conclusion

The Non-Performing Assets have always created a big problem for the banks in India. It is just not only problem for the banks but for the economy too. The money locked up in NPAs has a direct impact on profitability of the bank as Indian banks are highly dependent on income

from interest on funds lent. This study shows that extent of change in NPA always has a huge impact over the profitability of thebanking sector. NPA shows the overall performance of banking sector. It is one of the serious problems of the banks now days. It is always impossible to make the NPA ration to the zero, but it is defiantly possible to reduce the NPA ratio. It only requires proper management, enough pre cautions and timely follow up of loan repayment from customers.

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14. Work-Life Balance: It's Causes and Consequences

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Abstract

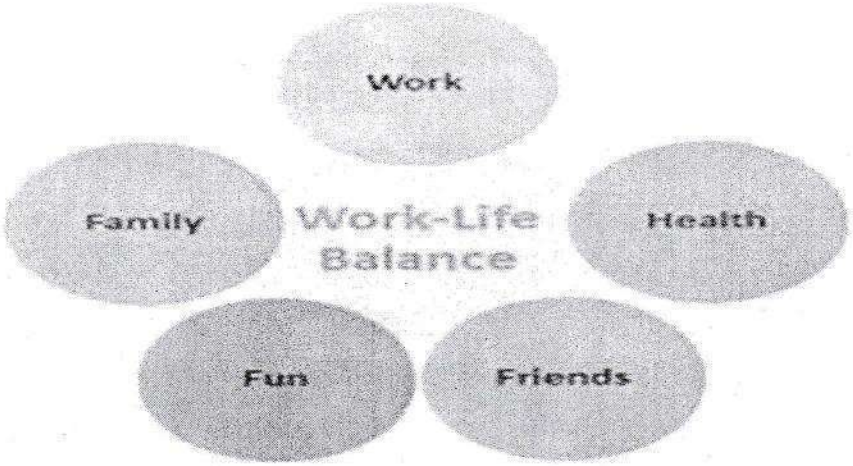
Work life balance is one of the key factors for the employees to achieve success. Extent to which one's perceived allocation of physical, mental, and emotional resources between the work and non-work domains matches one's expectations. Work Life Balance (WLB) promotes flexibility in performing work (work flexibility) and also it provides employees with sufficient non-work –related resources (eg: time, money).Organisations have devised various plans, policies, programs to help their employees to achieve the balance between their work commitments and family responsibilities. Certain policies are statutory while others are voluntarily implemented. The effectiveness of them depends on the extent of usage to the employees to achieve work life balance. The factors like overtime, travelling to work, meetings and training after the working hours impact the work life balance of the employees. Employee Work Life Balance (WLB) is a major driver in the organization that helps to achieve higher productivity. It is a healthy blend of both employee's work life and personal life. There are many factors influencing work-life balance of an employee in the organization.

Key words: Work life balance, work, life, work flexibility, employees, work commitment, organisation,

Introduction

Work-life balance was first anticipated by Johnson and Packer (1987) in their description of future changes in the work force Economic and work environment from the year 2000 and beyond. Work life balance is the interaction between the work and the other activities that includes family, community, leisure and personal development. It is about the right or the balanced combination of the individual's participation in the work and other aspects of their life and this combination doesn't remain the same it can be changed over the time. Work life balance is where the tensions between the work life and personal life is minimised by having a proper policies, systems, supportive management and provisions at work place and a good relations in personal life. Work-life balance is an important aspect of a healthy work environment.

Maintaining work-life balance helps reduce stress and helps burnout in the workplace. Work-Life Balance is the relationship between time and space of work & non-work in societies where income is predominantly generated and distributed through labor markets. Work-Life Balance is being aware of different demands on time and energy saving the ability to make choices in the allocation of time and energy knowing what values to apply.



Meaning of Work Life Balance

Work–life balance is the term used to describe the balance that an individual needs between time allocated for work and other aspects of life. Work-life balance refers to the level of prioritisation between personal and professional activities in an individual's life and the level to which activities related to their job are present in the home. It is careful synchronisation of an individual's varied pursuits that may include family, work, leisure, social obligations, health, career and spirituality.

The term work life balance (Work Life Balance) was coined in 1986 in response to the growing concerns by individuals and organizations alike that work can impinge upon the quality of family life and vice-versa, thus giving rise to the concepts of "family- work conflict" (FWC) and "work-family conflict" (WFC). The former is also referred to as work interferes with family" (WIF) while the latter is also known as "family interferes with work" (FIW). In other words, from the scarcity or zero-sum perspective, time devoted to work is construed as time taken away from one's family life.

Work life balance as an equation= mental resources + emotional resources + physical resources (including your time) =achieving your personal goals and fulfilling your responsibilities.

Objectives of the study

1. To study the importance and benefits of Work life Balance.
2. To study the causes of Work Life balance.
3. To study the consequences of work life imbalance
4. To study measures for improving work life balance.

Research methodology

The data for the research study is collected from the secondary sources. Use of e-journals, websites, e-books and personal observation method is done for the study purpose.

Scope and Importance of study

The issue is complex and difficult to tackle from an organization's perspective because it is different for every individual. The traditional definition of family is a husband who provides financial support, a wife who maintains the household. Cultural differences influence family decisions, and more and more families represent blended racial backgrounds but making work–life integration a way of corporate life is much more difficult. The change in workforce composition has been gradual, but steady.

1. **To maintain your mental health**: It's unfortunate that not all employers place enough importance on workplace. But the topic is really prevalent at the minute, as studies show the dangers and risks that could lead to a variety of issues, from stress-related illnesses to depression. Stress could be caused by a variety of things, from outrageous workloads (and no work-life balance) to simply not feeling valued for the hard work you do.
2. **To ensure your physical health and wellbeing**: As the old adage says: healthy body, healthy mind so a great way to maintain your mental health is to ensure that you are physically feeling healthy too. That includes regular exercise and eating healthy but also not overdoing it at work! Perhaps money can buy happiness in certain circumstances, but if you spend all of your time working or thinking about work then it's more than likely that it won't.
3. **It increases Productivity**: Studies reveal that those who maintain a steady work-life balance are much more productive than those who do not. A positive way of life automatically leads to amazing results. Become a more rounded Individual: If your life revolves around work, then you lose a lot of the other positive dimensions that make you

attractive to employers (and other people). Having interests outside of work will increase and improve your skills and make you a more rounded and interesting individual. You'll be able to share those experiences and knowledge with other people.

Causes of Work Life Imbalance

There are three moderators that are correlated with work-life imbalance are:

a) Gender b) Time spent at work c) family characteristics.

a) Gender differences: They could lead to a work-life imbalance due to the distinct perception of role identity. It has been demonstrated that men prioritize their work duties over their family duties to provide financial support for their families, whereas women prioritize their family life.

b) Spending long hours at work: Due to "inflexibility, shifting in work requirements, overtime or evening work duties" could lead to an imbalance between work and family duties. It has been demonstrated "that time spent at work positively correlate with both work interference with family and family interference with work, however, it was unrelated to cross-domain satisfaction" This could be due to the fact that satisfaction is a subjective measure. This being said, long hours could be interpreted positively or negatively depending on the individuals. Working long hours affect the family duties, but on the other side, there are financial benefits that accompany this action which negate the effect on family duties.

c) Family characteristics include single employers, married or cohabiting employers, parent employers, and dual-earning parents. Parents who are employed experience reduced family satisfaction due to their family duties or requirements. This is due to the fact that they are unable to successfully complete these family duties. In addition, parent workers value family-oriented activities; thus, working long hours reduces their ability to fulfil this identity, and, in return, reduces family satisfaction. As for the married and/ or dual-earning couples, it seems that "not only requires more time and effort at home but also is a resource for individuals to draw from, both instrumentally through higher income and emotionally through increased empathy and support."

d) Job Stress: In addition to these moderators that could lead to an imbalance, many people expose themselves to unsolicited job stress, because they enjoy high social recognition. This aspect can also be the cause of an imbalance in the areas of life. However, other occupational activities could also lead to such an imbalance, for example, unpaid labour such as

contribution to house and garden work, maintenance and support of family members or volunteer activities. All of these contribute to the perception of a chronic lack of time.

e) Lack of time: Lacking time leads to pressure, which is experienced differently based on the individual's age, the age and number of children in the household, marital status, the profession and level of employment and the income level. Strong pressure of time leads to increased psychological strain, which in turn affects health. Psychological strain is also affected by the complexity of work, the growing responsibilities, concerns for long-term existential protection and more.The mentioned stresses and strains could lead in the long term to irreversible, physical signs of wear as well as to negative effects on the human cardiovascular and immune systems.

f) Burden of excessive work: 67% of the respondents agree that they suffer from the burden of excessive work. Working women are often confronted with tasks involving children, home, in-laws, parents and their social circle. To add to this they must also take up multiple roles in their personal lives. With the increasing demands on the job, working women have to spend long hours of work and sometimes even carry their work home. Therefore majority of them are burdened with excessive work in both their personal and work spaces. This is a contributing factor to work life imbalance and may lead to conflict.

g) Interference of work with family life: Majority of the respondents agreed that work interfered with family life. This may be attributed to the fact that mostly work hours are not limited to 7 or 8 hours a day and the private sector employees spend 12-16 hours at work. This leaves them with very little time for family. As more that one half of the respondents are employed in the private sector, there may be interference of work with family life due to long hours spent in completing official work.

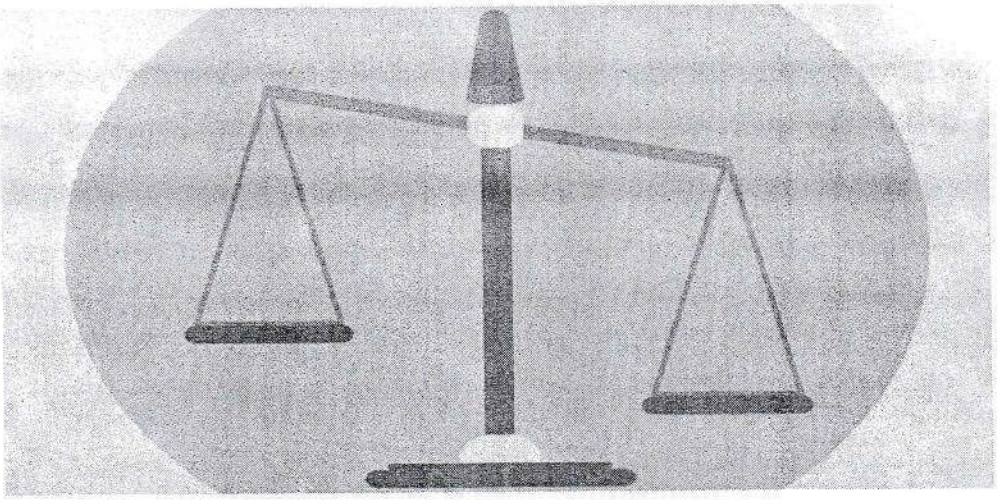
Consequences of Work Life Balance

This study states that if work life is not balanced properly it may lead to various serious consequences. The following are the various consequences of Work Life Balance.

- **Fatigue**: If you are over tired it reduces your ability to work productively and think clearly. This can take a toll on your professional reputation.
- **Health**: Long working hours can cause stress which may have adverse effects on one's immune system. Stress also puts one at risk of substance abuse.

- **No time for Family**: Working long hours or overtime might make you miss important family moments and events. This can leave you feeling left out and damage your relationships.
- **Increased Expectations**: Working extra hours might lead to you taking on extra responsibility. This can cause extra stress and challenges that one will have a really hard time facing.
- **Unethical Practices**: To handle the stress in the organisation and the family-related issues as well, employees tend to adopt unethical practices like boozing, smoking, drugs, improper relations, etc. Also there is a high probability that employees may resort to unfair means to get their work done ultimately by hook or crook.
- **Disturbed Families** -The worst hit people in the entire scenario are the families of the employees. Fighting with time to achieve the organizational targets, family is often overlooked. The number of broken families has gone up drastically. If the reasons are carefully observed, they are simple but affect the psychological being of the individual.
- **Decreased Performance** -Employees in the organization are never at peace. When they are at workplace, the personal issues are a concern and when they are at home, the professional issues are a concern. They try to balance both but in vain if there is no organizational support. Unknowingly, the employees get into a frustrated mode and cannot give their best to their profession.
- **Organization in Jeopardy** -It all starts with stress and ultimately the employee ability and performance is at crossroads. The output of this situation may be that the organization may not achieve its goals or the employee is no longer satisfied with the organization. In either case, the entire organization is in jeopardy. The role of HR in achieving work-life balance HR Managers therefore, need to take a strategic approach tothe whole issue of work/life balance.
- **Hangover**-Working for long hours in the office, increases employee interaction. Like "Alice in Wonderland" employees tend to stay in their professional world (mentally) though they are physically at home. Not only this, the effect of professional anger is also carried on to their personal life. For example, if there is a conflict in the organization, the irritated behavior of the individual may reflect in the family thereby igniting manynegative effects in the family.

Measure for improving work life imbalance



- Give employees information about what a healthy work-life balance should look like, the importance of ensuring you have this balance and how to achieve it.
- Allowing employees to work from home, instead of having to come into the office. If this is not suitable for your company or you have concerns, consider allowing employees to work from home one day a week, for example.
- Provide flexible working hours, for example, an employee must work a certain number of hours each week, but it is up to the employee how and when they work these hours throughout the week.
- Placing a restriction on work hours, for example, not allowing employees to work past a certain time or over a specific number of hours in a week. Some companies will even have a feature on their emails preventing new email from coming into the inbox during out-of-work hours.
- Focus on employee productivity instead of hours worked, for example, instead of making your staff work for eight hours, simply asks them to stay until the job is done.
- Make sure that employees all take regular breaks and follow the health and safety guidelines regarding breaks from computers etc. Even a short break will help an employee to feel replenished and more relaxed, while also giving them time to catch up on messages from family and friends.
- Look at the business and make sure that the company isn't putting too much work on the staff, make sure there are enough staff to share the workload and that you have reasonable expectations. Here it is a good idea to familiarise yourself with some of the

processes the staff members must go through, what may appear to be a five-minute job to management may be much lengthier

- Ensure management and supervisors also enjoy a healthy work-life balance, this will show employees that it is acceptable and will not be frowned upon.
- Give employees time off for things like charity or volunteer work, this will not only reflect positively on the company, but it will also give staff a feeling of satisfaction from helping others.
- Think about how much holiday time you give your employees and whether you can give them a few more days off each.
- For parents, look at what you can do to help with childcare costs. For example, a salary sacrifice arrangement for childcare vouchers will allow employees to take advantage of tax savings and reduce their childcare bill. Also, providing enhanced and equal benefits for maternity/paternity/shared parental leave will encourage all parents to balance their working life and parenthood regardless of their gender.
- Look at implementing a Health Cash plan, this will not only provide support for staff when they are unwell but also encourage a more pro-active approach to things like health checks ups, leading to fewer staff absences
- Provide additional services that you think might save your employee time and money and reduce their stress, for example:
  - A discount for a launderette/ dry cleaner
  - Free or discounted lunches and snacks
  - Gym/fitness classes
  - Massage/spa discounts/vouchers
  - Car support, including petrol allowance, repairs and maintenance allowance/discounts and car cleaning services discounts or vouchers.
  - Tax support, providing staff help with any tax concerns, or with filing tax returns etc.

Conclusions

Thus from the above study it can be concluded that managing work life balance is in today's world is not impossible. Different measures can be used for improving work life balance. Once work-life balance has been defined and all its aspects analyzed, some

conclusions can be drawn. First of all, work-life balance is not a "one-size-fits-all" type of trend; rather it is a trend which is viewed differently by everyone because people have a unique perception of their achievements and enjoyments. Also, work-life balance is changing on a daily basis, and there is no universal formula on how to achieve a perfect balance between work and life. Rather, the work-life balance is focused more on how to achieve something in order to enjoy something. Work-life balance is all about providing employees with more flexibility when it comes to their working hours. Employees became able to manage their time working and 'living' which eventually results in greater productivity. There are different types of managing working hours and those are: compressed workweek, flextime, job-sharing, telecommuting and two-in-a-box. Even though, there are many benefits of work-life balance, there are few challenges that both employees and employers face. For example, employees deal with a so called work-life conflict which refers to an unbalanced time spent working and time spent for personal activities with family and friends. On the other hand, an organization or an employer has to deal with an issue of absence of employees.

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4. Recent Trends & Challenges in E-Commerce in India

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Abstract

E-commerce simply means electronic commerce which deals with selling & buying of services & products exclusively through electronic channels Today the internet and E-commerce have become a part of daily routine. E commerce creates new opportunities for business as well as for education and academics. E-commerce is tremendously growing both internationally & regionally due to the fast & suitable way of exchanging goods & services in the last few years. The growth was driven by rapid technology adoption led by the increasing use of devices such as smart phones, tablets, access to the internet through broadband, 3G, 4G and credibility of E-commerce companies etc, which led to an increased online consumer base. This paper gives the insights of Scenario, Recent trends & challenges of Ecommerce in India

Key Words: Technology, E-commerce, Internet, Recent trends & challenges.

II. Objectives of the Study

1. To study the concept of E-commerce.
2. To study the recent trends of E-commerce in India.
3. To study the various challenges of E-commerce in India.
4. To study the Scenario of E-commerce in India.

III. Concept of E-Commerce in India

Introduction

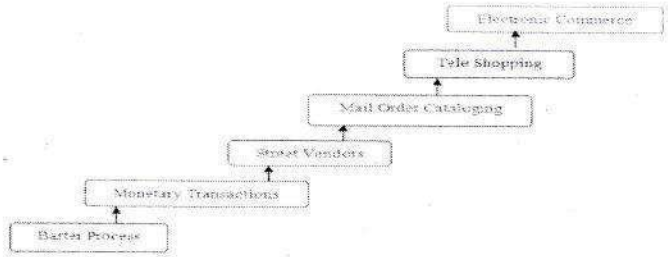
The e-commerce has transformed the way business is done in India. Propelled by rising smart phone penetration, the launch of 4G networks and increasing consumer wealth, the Indian e-commerce market is expected to grow to US$ 200 billion by 2026 from US$ 38.5 billion in 2017 Online retail sales in India are expected to grow by 31 per cent to touch US$ 32.70 billion in 2018, led by Flipkart, Amazon India and Paytm Mall. The e-commerce industry been directly impacting the micro, small & medium enterprises (MSME) in India by providing means of financing, technology and training and has a favourable cascading effect on other industries as well. The Indian e-commerce industry has been on an upward growth trajectory and is expected to surpass the US to become the second largest e-commerce market in the world by 2034. Technology enabled innovations like digital payments, hyper-local logistics, analytics driven customer engagement and digital advertisements will likely support the growth in the sector. The growth in e-commerce sector will also boost employment, increase revenues from export, increase tax collection by ex-chequers, and provide better products and services to customers in the long-term. During 2018, electronics is currently the biggest contributor to online retail sales in India with a share of 48 per cent, followed closely by apparel at 29 per cent.

E-commerce in India

- **Single Product E-commerce**: Automobiles sector portals providing selling and buying of vehicles including two wheelers, comes under this. Stocks and share market sites, also offers their services through these types of portals, with options for comparisons and research. Other major industries offering their products and services are real estate and travel and tourism.

- **Multi product E-commerce**: Some e-commerce portals provide almost all categories of goods and services under one roof, targeting customers of every possible products and services. Indian e-commerce portals provide products like apparel and accessories for men and women, health and beauty products, books and magazines, computers and peripherals, vehicles, collectibles, software, consumer electronics, household appliances, jewellery, audio/video entertainment goods, gift articles, real estate and services, business and opportunities, employment, travel tickets, matrimony etc.

IV. Evolution of E-Commerce



V. Functions of E-Commerce

Communication function Aimed at the delivery of information and/or documents to facilitate business transactions. **Example:** E-Mail.

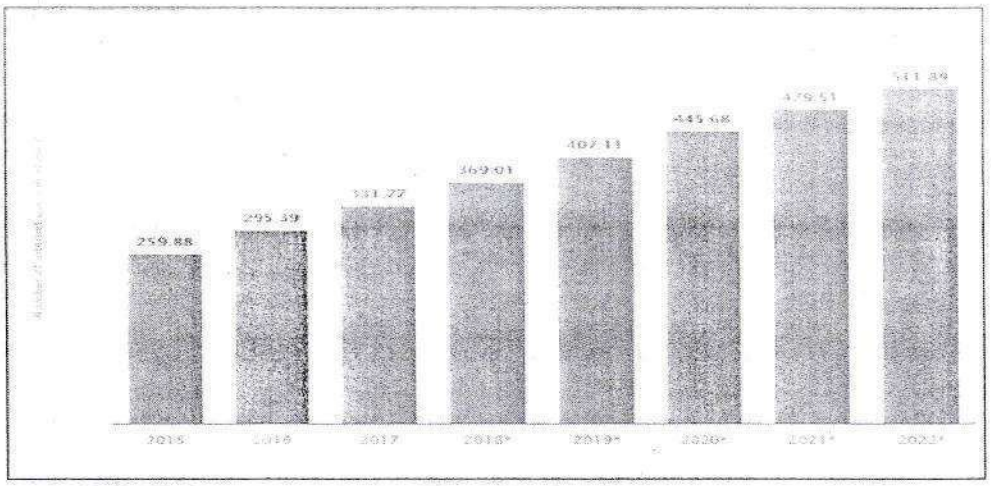
Process management function Covers the automation and improvements of business processes. **Example:** networking two computers together.

Service management function Application of technology to improve the quality of service. **Example:** Federal Express website to track shipments and schedule.

Transaction capabilities Provides the ability to buy/sell on the internet or some other online services. **Example:** Amazon.com.

VI. Scenario of E-Commerce in India

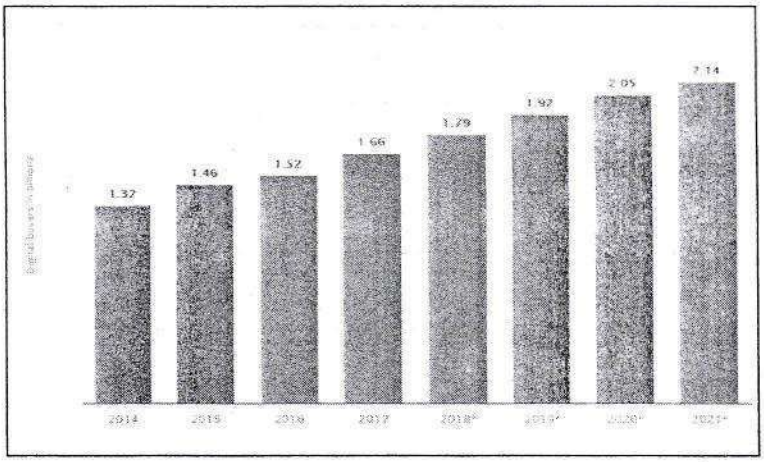
1. Internet Usage and Population Statistics



Source: Statistics Portal Statistics and Studies from more than 22,500 Sources

This graph represents the number of techno savvy will be rising from 259 million in 2015 to 511 million in 2022 resulting in to increase demand for E-Commerce

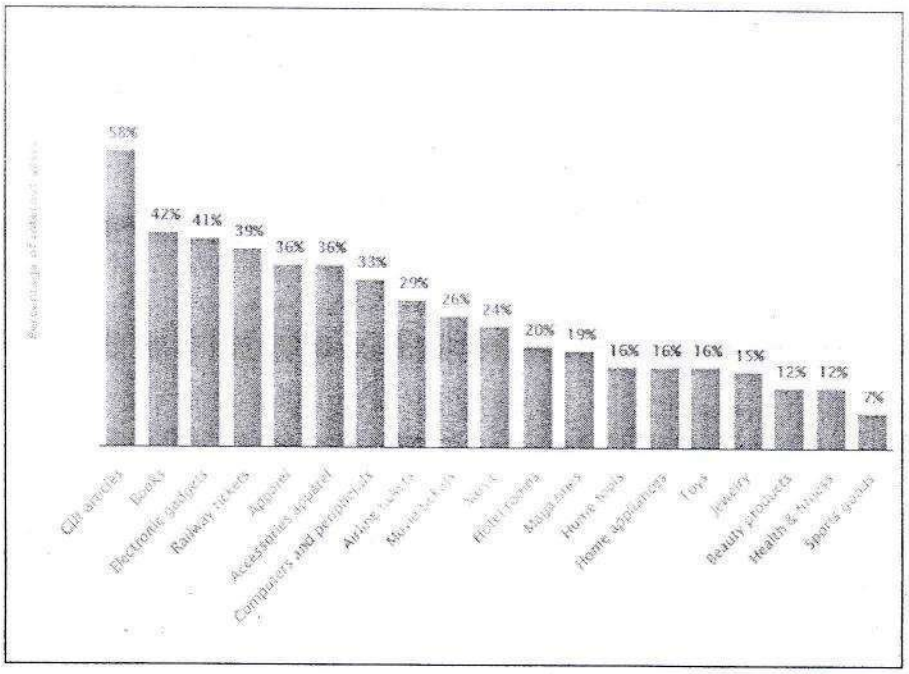
2. Number of digital buyers worldwide from 2014 to 2021



Source: Statistics Portal Statistics and Studies from more than 22,500 Sourcee

This graph represents the increase number of buyers from 1.62 billion in 2014 to 2.14 billion in 2021 along with increased number of internet users as seen in fig6.1

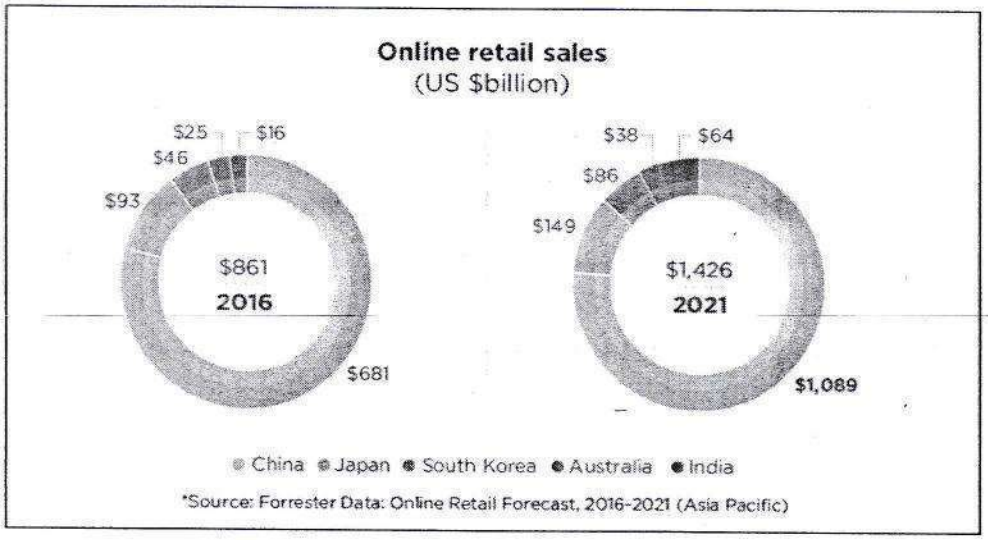
3. Most Demanded Products Online in India



Source: Statistics Portal Statistics and Studies from more than 22,500 Sources

Graph shows most demanded online product is gift articles (58%) and the least are sports goods (7%) with average demand for books, electronic gadgets, and railway tickets.

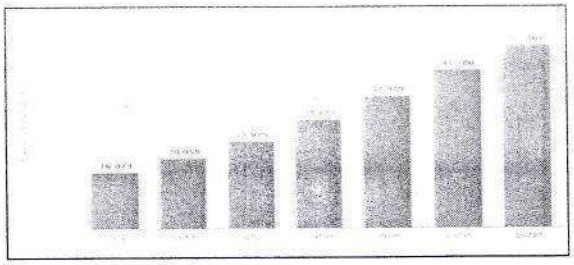
4. Online Retail Sales



Source: Statistics Portal Statistics and Studies from more than 22,500 Sources

As per the forrester data the online retail forecast for 2016-2021 retail sale is increasing for all the above mentioned countries compared to 2016 because of improvised services as people are getting more users friendly with ecommerce.

5. Online Sales in India



Source: Statistics Portal Statistics and Studies from more than 22,500 Sources

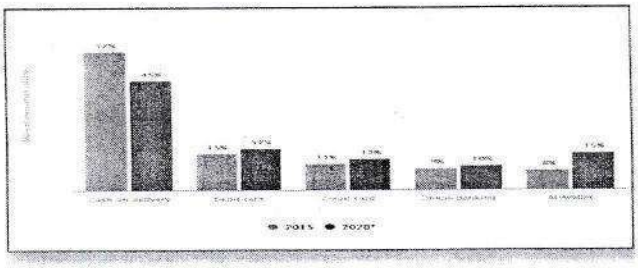
Above graph represents increasing trend in online sales from 16 million US dollars in 2016 to 52 million US dollars in 2022 because of increased demand for online products

6. Online Revenue Generation In India

Source: Statistics Portal Statistics and Studies from more than 22,500 Sources

This graph represents increased revenue generation from 17 billion US dollars in 2016 to 103 billion US dollars in 2020 through E-commerce because of increase in online sales.

7. Preferred digital payment methods in India in 2015 and 2020



Source: The Statistics Portal Statistics and Studies from more than 22,500 Sources.

Most preferred mode of payment in India is Cash on delivery in compared to other modes as people in India don't trust E-payment ways.

VII. Recent Trends in E-Commerce

As far as the world's technological landscape is concerned, 2017 has been an incredible year. E-commerce has seen shape shifting advancements in payments technology, computing and mobility. Now, as once seemingly distant science fiction terms like Artificial Intelligence and Virtual Reality take the podium, we have a lot to look forward to.

By the year 2020, India will have almost 2.14 million online shoppers. That's 6.4 times more than the estimated 50 million shoppers we had back in 2015. E-commerce is the clearly future of retail.

1. Voice Search and Purchases

Smartphones allow users to search and act online with a word. It is reported that approximately 40% of millennial have used a voice assistant prior to making a purchase. Going forward as the accuracy of voice search or voice recognition becomes more precise, consumers and ecommerce retailers will reap benefits and its popularity will continue to rise. It is predicted that by 2020, this number will pass 50%.

2. Video Content

We live in a mobile-first culture where video is the fastest growing ad format. Experts believe video will be the next big thing for ecommerce in the coming year as consumers find video content relatable, engaging and relevant. Statistics show that video marketing can boost click-through rates by 200-300% and increase purchase intent by 97%.Video will make up 80% of all online consumer internet traffic as per estimated by 2020. As the technology improves, video will be the closest you can get to a face to face conversation with your audience.

3. Big Data (visual, empathetic, qualitative) to Cloud Computing

In 2017, the idea of transformation of gathered data for better planning of all kind of business and personal activities witnessed better visualization and projection of data. While Big Data presents challenges for digital earth to store, transport, process, mine and serve the data going forward Cloud computing will offer access to data storage, processing, and analytics on a more scalable, flexible, cost-effective, and even secure basis.

4. Technological disruptors

Drones and autonomous vehicles, block chain, augmented and virtual reality, increasingly sophisticated digital assistants, machine learning (artificial intelligence, or AI) — are some of the key disruptors categorized under the list of technological mega trends that are here to stay and further grow and expand business output .

5. The Classic - Interactive Content

In 2018 too, brands need to continue to dive into creative storytelling to drive conversions and differentiate. Online retailers are more likely to adopt interesting content strategies that are shareable to stay competitive and build outstanding customer experience. While original content is the key, accurate content in the forms of recommendations, reviews and expert opinions would continue to provide the audience with valuable information about the

brand from different perspectives and this would continue to play a vital role in influencing the path to purchase as experts hold slightly higher regard in the mind of customers than a direct brand message.

6. Artificial Intelligence

Today, artificial intelligence is a part of our everyday lives. This will play a key role in e-commerce as we rely more and more on our mobile devices. While at present we have small features that suggest products based on your purchasing history, browsing history, likes etc, the coming year will offer more specificity. Hence, as technology is being redefined, the above mentioned trends, if followed, would lead the e-commerce industry to thrive wholeheartedly.

7. More Storefront Apps.

With so much focus shifting from desktop to mobile, ecommerce shopping will be further transformed this year by storefront apps. Many major retailers have offered apps for several years, and shoppers are already well-accustomed to using dedicated storefront apps to browse and shop from their mobile devices.

8. The Rise of ROPO

ROPO-Research online Purshase offline-has been observable consumer shopping habit for sometime, driven largely thrifty shoppers & eagle eyed buyer hunters looking for best offer deal. In coming years, we can expect to see a great deal more ROPO in Ecommerce sector.

VIII. Challenges for Ecommerce in India

The growth of ecommerce volumes in India is attracting the attention of players around the globe. India, the second most populous country in the world, is home to 1.2 billion people.

To put that number into perspective, consider this: the combined populations of Germany, UK, France, Italy, Netherlands, Belgium, and Greece equal one-fourth the population of India alone. Despite lower per-capita purchasing power, this still makes India one of the most attractive emerging markets for ecommerce. But India is far from being a bed of roses. Here are the top 8 challenges that ecommerce businesses face in India.

1. Indian customers return much of the merchandise they purchase online.

Ecommerce in India has many first time buyers. This means that they have not yet made up their mind about what to expect from ecommerce websites. As a result, buyers sometimes fall prey to hard sell. But by the time the product is delivered, they demonstrate remorse and return

the goods. Though consumer remorse is a global problem, it is all the more prevalent in a country like India, where much of the growth comes from new buyers. Returns are expensive for ecommerce players, as reverse logistics presents unique challenges. This becomes all the more complex in cross-border ecommerce.

2. Cash on delivery is the preferred payment mode.

Low credit card penetration and low trust in online transactions has led to cash on delivery being the preferred payment option in India. Unlike electronic payments, manual cash collection is laborious, risky, and expensive.

3. Payment gateways have a high failure rate.

As if the preference for cash on delivery was not bad enough, Indian payment gateways have an unusually high failure rate by global standards. Ecommerce companies using Indian payment gateways are losing out on business, as several customers do not reattempt payment after a transaction fails.

4. Internet penetration is low.

Internet penetration in India is still a small fraction of what you would find in several western countries. On top of that, the quality of connectivity is poor in several regions. But both these problems are fast disappearing. The day is not far when connectivity issues would not feature in a list of challenges to ecommerce in India.

5. Feature phones still rule the roost.

Though the total number of mobile phone users in India is very high, a significant majority still use feature phones, not smart phones. So, for all practical purposes this consumer group is unable to make ecommerce purchases on the move. Though we are still a couple of years away from the scales tipping in favour of smart phones, the rapid downward spiral in the price of entry-level smart phones is an encouraging sign.

6. Postal addresses are not standardized.

If you place an online order in India, you will quite likely to get a call from the logistics company to ask you about your exact location. Clearly your address is not enough. This is because there is little standardization in the way postal addresses are written.

7. Logistics is a problem in thousands of Indian towns.

The logistics challenge in India is not just about the lack of standardization in postal addresses. Given the large size of the country, there are thousands of towns that are not easily accessible. Metropolitan cities and other major urban centres have a fairly robust logistics infrastructure. But since the real charm of the Indian market lies in its large population, absence of seamless access to a significant proportion of prospective customers is a dampener. The problem with logistics is compounded by the fact that cash on delivery is the preferred payment option in India. International logistics providers, private Indian companies, and the government-owned postal services are making a huge effort to solve the logistics problem.

8. Overfunded competitors are driving up cost of customer acquisition.

The vibrancy in the Indian start-up ecosystem over the past couple of years has channelled a lot of investment into the ecommerce sector. The long-term prospects for ecommerce companies are so exciting that some investors are willing to spend irrationally high amounts of money to acquire market share today. Naturally the Indian consumer is spoiled for choice. However, this trend has reversed as investors are getting worried about slipping further down a slippery slope, and I expect more rational behaviour in 2014.

IX. Findings

1. The number of techno savvy will be rising from 259 millions in 2015 to 511 millions in 2022 resulting in to increased demand for E-Commerce.
2. The number of online buyers will increase from 1.62 billions in 2014 to 2.14 billions in 2021 along with increased number of internet users .
3. Most demanded online product is gift articles(58%) and the least are sports goods(7%) with average demand for books, electronic gadgets, and railway tickets.
4. Retail sale is increasing for all the countries compared to 2016 because of improvised services as people are getting more users friendly with ecommerce.
5. Online sales will be rising from 16 millions US dollars in 2016 to 52 million US dollars in 2022 because of increased demand for online products
6. Revenue generation shows increasing trend from 17 billion US dollars in 2016 to 103 billion US dollars in 2020 through E-commerce because of increase in online sales.

7. Most preferred mode of payment in India is Cash on delivery in compared to other modes as people in India don't trust E-payment ways.

X. Conclusion

E-commerce is changing the way of buying & selling of product & services in India.Despite of various challenges, Ecommerce is showing tremendous growth compared to previous years & Going to continue in coming years as per statistical data shown in findings. E-commerce is future of shopping. Due to E-commerce the gap has been reduced between manufacturer & consumer, leading to disintermediation. According to Indian population their vast scope for e-commerce because currently in India compared to total population number of people using internet for selling & buying goods & services is less. There is weak Cyber security Law in India that is why Indian People are facing challenges toward e-commerce. The future of e-commerce e in India would be bright in the upcoming years if all essential factors would be implemented, by establishing cyber & have their benefits as per people wish. The role of government is to provide a legal framework for e-commerce so that while domestic & international trade are allowed to expand their horizons, basic right such as privacy, intellectual property, prevention of fraud, consumer protection etc. are all taken care of. The expansion of e-commerce has been developed in rural as well as urban area in reign able cost for consumption, because of that more people are getting linked with e-commerce & the ratio of that is getting increase day by day.

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7. A Study of Implementation of Human Resource Accounting in India

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Abstract

The past few decades have witnessed a global transition from manufacturing to service based economies. The fundamental difference between the two lines in the very nature of their assets in the former, the physical assets like plan, machinery, furniture, materials etc. are utmost importance. In contrast in the latter, knowledge and attitude of the employees assume greater significance. For instance, in the case of an IT Sector the value of its physical assets is not so important compared with the value of knowledge and skill of its employees. Similarly in academic institutions, hospitals, consulting firm etc., the total worth of the organisation depends mainly on the skill of its personnel and the services they render. Hence the success of these sectors is contingent on the quality of their Human Resource its knowledge, skills, competence understanding the organizational culture and motivation. Human Resource accounting is very important for service sector. This present study also focuses on the human resource accounting.

Key Word: Human Resource, Accounting, Assets, Acquisition Cost, Separation Cost

Introduction

To growth and development of any organisation is depend on efficiency of people without human resource organisation cannot work effectively hence men, money, material, machines and methods are very essential factors for an organisation. These resources are mainly classified into two categories. The success of an organisation is depends on how effective use of physical assets by human. Human Resource Accounting means accounting for people as an organizational resource. It is the measurement of the cost and value of the people to an organization. It is necessary that some method of quantifying the worth of knowledge, motivation, skills and contribution of human elements as well as that of the organizational processes, like recruitment, selection, training etc. which are used to build support these human aspects is developed. Human resource accounting (HRA) denotes just this process of measurement/ quantification of the human resource.

In IT Sector the value of its physical assets is not so important compared with the value of knowledge and skill of its employees. Similarly in academic institutions, hospitals, consulting firm etc., the total worth of the organisation depends mainly on the skill of its personnel and the services they render. Hence the success of these sectors is contingent on the quality of their Human Resource its knowledge, skills, competence understanding the organizational culture and motivation. Human Resource accounting is very important for service sector. This present study is also focus on the human resource accounting.

Objective of the Study

1. To study development of the concept of Human Resource Accounting.
2. To study objectives of Human Resource Accounting.
3. To study the different methods or approaches of Human Resource Accounting.

Research Methodology

For the present study secondary data is utilized data was collected from various sources like website, research papers and books & journals.

Review of Literature

Patra (2005) studied the human resource accounting system in Bharat Heavy Electricals Limited (BHEL), India, to examine its usefulness in organizational achievements. This study also attempted to measure how far HRA system was useful to mitigate industrial conflicts and motivate employees.

Parameswaran and Jothi (2005) observed in their study that the quantitative information about the value of human resources generated by the HRA system influences the top management in taking decisions regarding the adequacy of human resources. Again, based on these insights, the decisions regarding recruitment and selection of personnel were taken.

Narayankutty (1997) in his doctoral dissertation showed the magnitude of HR investment in Cochin port Trust and examined the efficiency levels of its human resources on the basis of their contribution and the investment made in human resources.

Analysis/ Discussion

Definitions of HRA: As per The American accounting association's committee on Human Resource accounting: **"Human Resource Accounting is the process of identifying and measuring data about human resources and communicating this information to interested parties."**

Stages of Historical Developments of HRA

The development of HRA as a systematic study of human resources, this development divided into five stages. These are follows:

1. **First Stage (1960-66)**

This marks the beginning of academic interest in the area of HRA.

2. **Second Stage (1966-71)**

The focus here was more on developing and validating different models for HRA. These models covered both costs and monetary and non-monetary value of HR.

3. **Third Stage (1971-76)**

This period was marked by a widespread, interest in the field of HRA leading to a rapid growth of research in the area. The focus in most cases was on the issues of application of HRA in business organization.

4. **Fourth Stage (1976 -1980)**

This was a period of decline in the area of HRA primarily because the complex issues that needed to be explored required much deeper empirical research than was needed for the earlier simple models.

5. **Stage Fifth (1980 onwards)**

Different types of models to suit the specific requirements of the organizations have been developed incorporating both the tangible and the intangible aspects. Also, larger number of organisation actually began to use HRA as part of their managerial and financial accounting practice.

Purposes of HRA

1) **To Furnish Effectiveness:** It furnishes cost/value information for making management decisions about acquiring, allocating, developing, and maintaining human resources in order to attain cost-effectiveness;
2) **To monitor Effectiveness:** It allows management personal to monitor effectively the use of human resources;
3) **To Provide Control :** It provides a sound and effective basis of human asset control, that is, whether the asset is appreciated depleted or conserved;
4) **To develop management principles:** It helps in the development of management principles by classifying the financial consequences of various practices.

The Significance of HRA:

1) Management Tools

Basically, HRA is a management tool which is designed to assist senior management in understanding the long term cost and benefit implications of their HR decisions so that better business decisions can be taken. If such accounting is not done, then the management runs the

risk of taking decisions that may improve profits in the short run but may also have severe repercussions in future

2) Information Provider

HRA provides information for managing the human resources efficiently and effectively. Such information is essential for acquiring, developing, allocating, conserving, utilizing, evaluating and the total human from 'row' inputs to outputs in the form of goods and services..

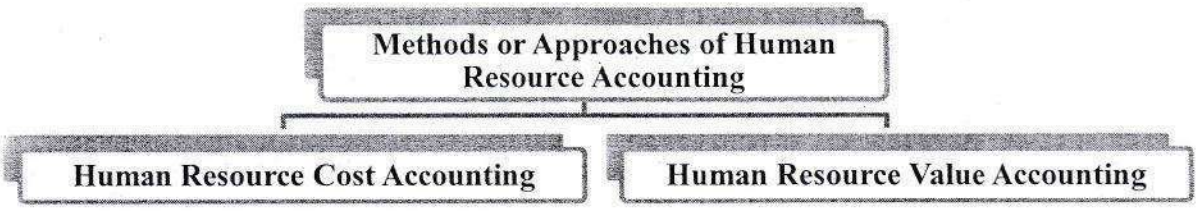
3) Helpful for Decision Making

Investors make investment decisions based on the total worth of the organisation. HRA provides the investors with a more complete and accurate account of the organization's total worth, and therefore, enables better investments as "expenditure". Consequently, their income statement projects expenditures to acquire place and train human resources as expenses during the current year rather than capitalizing and amortizing them over their expected service life.

4) Gives Information about Organisation Operation in Social Responsibilities

Furthermore, in a business environment where corporate linked to rewards and, therefore, the performance of all groups/departments/functions needs to be quantified to the extent possible, HRA helps in measuring the performance of the HR function as such.

Methods or Approaches of Human Resource Accounting



Human Resource Cost Accounting

1. Historical Cost Method

This method is propounded William C. Pyle and R. G. Barry Corporation of U.S.A in 1967. The valuation of human Resources under this method is similar to valuation of any physical asset. All expenses incurred on recruitment, selection, hiring, training and development of human resources, of the organization will be capitalized.

2. Replacement Cost Method

This method was developed by Renis Likert and Eric G. Flamholtz. Under this method, the human resources are valued at their present replacement cost. If a new organization has to be started now, the cost of recruiting, selecting, hiring, training and developing human resources to their present efficiency level will be considered as the value of human resources of the organization.

3. **Opportunity Cost Method**

The method was initiated by Heikimian and Jones. Under this method, the value of human resources will be ascertained on the basis of its alternatives use, i.e., on the basis of ability of performing other jobs. If an employee has no alternative use, he has no value.

4. **Standard Cost Method**

This method has been developed by David Watson. Under this method, the standard cost per grade of employee, for recruiting, selecting, hiring, training and developing will be ascertained year after year. The standard cost so arrived for all employees of the organization gives the value of human resources in the organization.

5. **Total Cost Method**

This method was suggested by Prof. N. Dasgupta Under this method the value of an employee of an organization will be equal to the total of the cost incurred by the employee, the state and the organization towards the education, training etc.

Human resource Value Accounting

1. **Un purchased Goodwill Method**

This method is propounded by Hermanson. Under this method, the value of human resources of an organization is equal to the amount obtained by capitalizing profits in excess of normal profits.

2. **Present Value Of Future Earnings Method**

This method was developed by Lev and Schwartz. Under this method, the value of human resources is ascertained by capitalizing the Salary considering along with the age of retirement.

3. **Rewards Valuation Method**

This method was suggested by Flamholtz, and it is an important over the present value of Future earnings Method. The method considers the probability of an employee leaving the organization before retirement or dying before retirement or moving into another position.

4. **Net Benefit Method**

This method was advocated by Morse. Under this method, the value of human resources is equivalent to the present value of net benefits derived by the organization.

5. **Total Payment Method**

This method was propounded by Prof. S. K. Chakraborty. Under this method, the valuation of human resource must not be done individually, but in aggregate.

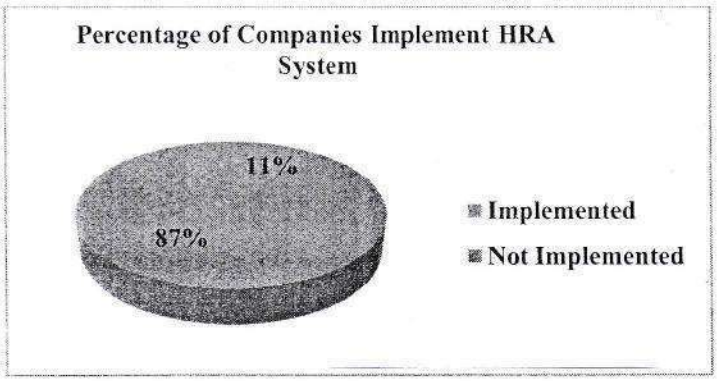
List of Companies Implemented HRA System

Sr. No.	Name of the Company
1	Infosys Limited
2	Bharat Heavy Electricals Ltd. (BHEL)
3	Steel Authority of India (SAIL)
4	The Minerals & Metals Trading Corporation of India Ltd.(MMTC)
5	Southern Petrochemicals Industrial Corporation of India Ltd. (SPIC)
6	Madras Refineries Ltd.
7	Hindustan Zinc Ltd.
8	Engineers India Ltd.
9	Oil & Natural Gas Corporation of India Ltd (ONGC)
10	The Associated Cement Companies Ltd.
11	Cement Corporation of India Ltd (CCI)

Table1.1 (Source- https://en.wikipedia.org/wiki/List_of_public_sector_undertakings_in_

Graph 1.1 Percentage of Companies Implement HRA System in India

As on 13 September 2017 there are 8 Maharatnas, 16 Navratnas and 74 Miniratnas



Conclusion

Growth and development of any organization is depending on efficiency of people engaged, without human resource organization cannot work effectively hence men, money, material, machines and methods are very essential factors for an organization. These resources are mainly classified into two categories. Human and intellectual capitals are perceived to be the strategic resources and therefore, clear estimation of their value has gained significant importance. The increased pressures for corporate governance and the corporate code of conduct

13. Impact of GST on Traders and Manufacturers

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Abstract

The Goods and Services Tax (GST), implemented on July 1, 2017. GST was planned to be implemented in April 2010, but was postponed due to political issues. The primary objective behind development of GST is to subsume all sorts of indirect taxes in India like Central Excise Tax, VAT/Sales Tax, Service tax, etc. and implement one taxation system in India. The principle used in GST taxation is Destination Principle. It is levied on the value addition and provides set offs. As a result, it avoids the cascading effect or tax on tax which increases the tax burden on the end consumerThis paper highlights advantages, objectives and history of GST & study on the concept of goods and service tax and impact on Indian economy.

Key words: VAT,GST

Introduction

The Goods and Service Tax (GST) have changed the whole scenario of current indirect tax system. GST helps the Indian economy to grow in more efficient manner by improving the tax collection as it is charged via single tax rate around the whole country. GST is a comprehensive indirect tax on manufacturer consumption and sale of goods and service throughout the India to replace taxes levied by central government and state government. GST would be levied and collected at each stage of sale or purchase of goods and services. GST is applied on goods and services at the place where actual consumption happens. By merging a large number of Central and State taxes into a single tax, GST is expected to significantly ease double taxation and make taxation overall easy for the industries. For the end customer, the most beneficial will be in terms of reduction in the overall tax burden on goods and services.

Objective of Study

1. To study the impact of GST on Traders & Manufacturers.
2. To study ensure the availability of input tax credit across the value chain.

Research Methodolgy

The present research study uses the most recent available published secondary data. Secondary data is also collected from the various National and International Research Journals

which are related to Commerce, Management. Secondary data is also collected from various websites.

Literatural Review

Tripathi, (2011) The authors have discussed the concerns faced in India post the implementation of VAT, the learning we could take from it, the effects on the social order in India. All this is discussed in the background of the impending GST in India. The authors have discussed the various issues around VAT, how it impacts the different sections of society. VAT is present in all goods produced and GST would be present in all goods and services produced making it a tax payable by all sections of the society. Thus it is a tax which though good to increase the revenue impacts even the poorer sections of society. **Sundar, (2013)** Value Added Tax is a tax which is all-pervading in goods and services and thus affects every individual and business. The authors have studied the significance of VAT in the context of the Indian economy and effect of VAT on the common man and industry in India using secondary data made available by the Government. One of the recommendations of the authors is to achieve more transparency in VAT compliances in India.**Tamizi, (2013)** The authors examine the advantages and complexities of the VAT system implemented in Iran during 2009-2012. The study is split into two parts; the first examines the difficulties in implementing VAT in Iran given the political scenario there. The second part examines the benefits/disadvantages of the said implemented VAT system. The study is conducted using T Value on data collected using questionnaire.

Meaning of GST

The main reason to implement GST was to abolish the cascading effect on tax, with GST there is only simplified and cost saving system as procedural cost reduces due to uniform accounting for all types of taxes. Only three type of account; CGST, SGST & IGST have to be maintained. GST implications are observed on almost all sectors, through this blog we would be looking into the Impact of GST on Trading Sector.

The salient features of GST are as under

1. GST would be applicable on sale of goods and services as against the present concept of tax on the manufacture of goods.
2. GST would be destination based tax as against the present concept of origin based tax.
3. It would be a dual GST. The GST levied by the Centre would be called Central GST (CGST) and that to be levied by the states would be called State GST (SGST).
4. An Integrated GST (IGST) would be levied on inter-state supply of goods or services. This would be collected by the centre.

5. GST would replace the following taxes currently levied and collected by the Centre:
   a) Central Excise Duty (including additional Duties of Excise)
   b) Service Tax
   c) CVD (levied on imports in lieu of Excise Duty)
   d) SACD (levied on imports in lieu of VAT)
   e) Central Sales Tax (CST)
   f) Excise Duty levied on Medicinal & Toiletries preparations.
   g) Surcharges and cesses.
6. State taxes that would be subsumed within GST are:
   a) VAT/ Sales Tax
   b) Entertainment Tax
   c) Luxury Tax
   d) Taxes on Lottery, betting and gambling.
   e) Surcharges & Cesses.
7. GST would apply to all goods & services except Alcohol for human consumption, Electricity and Real Estate.
8. The list of exempted goods & services would be kept to a minimum and would be harmonised for the Centre and States as far as possible.
9. The credit would be permitted to be utilised in the following manner:
   a) ITC of CGST allowed for payment of CGST & IGST in that order.
   b) ITC of SGST allowed for payment of SGST & IGST in that order.
   c) ITC of IGST allowed for payment of IGST, CGST & SGST in that order.

What are the components of GST?

There are 3 taxes applicable under this system: CGST, SGST & IGST.

- **CGST:** Collected by the Central Government on an intra-state sale (Eg: transaction happening within Maharashtra)
- **SGST:** Collected by the State Government on an intra-state sale (Eg: transaction happening within Maharashtra)
- **IGST:** Collected by the Central Government for inter-state sale (Eg: Maharashtra to Tamil Nadu)

Positive Impacts of GST on Traders

1. No dispute good Versus Service

In present regime of tax structure, the big issue is whether the transaction amount to sale of good or service. Though this dispute still may arise from view of time/place of supply from

good or time/place of supply of services as both are separately given. However, net impact is neutral, on either of them needs to pay GST.

2. Composition levy Increased

In current regime of taxation the limit under Composition Scheme is 40 lakhs where as under GST it is increased up to 50 Lakhs. It is beneficial as 10 lakhs in turnover is a big thing from trader point of view.

3. Credit of Excise Duty and Service tax

In current regime of taxation then a trader is not eligible to take credit of input service as well as the Excise duty. However, in GST regime he will be eligible to take all credits and it will make positive impact on trader.

4. No Margin to Disclose

Currently a trader who wants to pass on the CENVAT Credit of excise duty needs to obtain dealer registration and have to disclose the margin. But now this is no more relevant as trader is eligible to take credit as well as no requirement of separate dealer registration.

5. No Reversal of Credit on goods sent for stock transfer

Currently as stock transfer is not liable to Vat as well as CST hence, credit pertains to goods sent to stock transfer needs to be reversed. However, in GST Regime stock transfer got made taxable, hence No reversal of credit is required.

Negative Impacts of GST on Traders

1. Stock transfer made taxable

In current regime of tax, stock transfer is not taxable on being made available "Form F" where as in current regime stock transfer made taxable. Due to this Warehouse decision to be taken more appropriately.

2. No Form "C"

In current regime of tax, on being made available the Form C, CST rates charged at the rate of 2% instead of 14.5% which is local tax rate, however in GST regime interstate will be taxed at standard rate i.e. IGST.

3. Goods sent to job work are taxable

In current regime of tax, the goods sent for job work are not liable to CST on being made available of Form "H" whereas in Current GST regime it became taxable.

4. Increased burden of Compliances

Instead of 4/12 Returns (state wise vary), now a trader needs to file 37 returns in year and much more compliances.

ositive Impacts of GST on Manufacturers

1. One Tax

In present structure of tax, there is various kind of taxes such as excise duty, Service tax, VAT, Entry tax, Central Sales Tax etc. But in GST regime there is only one tax i.e. GST however, there will be three parts such CGST, SGST, IGST. This is measure relief for the manufacturer.

2. Rate of tax

In current tax regime the consumer pays approximately 25-26% more than the cost of production due to excise duty (at 12.5%) and value added tax (almost 14.5%).In GST, goods may become cheaper marginally which a good sign for manufacture to compete with international market. The Impact of rate of tax depends on industry wise, but mostly it is eneficial.

3. Reduction in Cost

In GST regime there will be reduction in cost of production as credit will be eligible of tax on purchases made from interstate purchases and no cascading effect. Hence, a manufacturer need not take the decision regarding purchase from point of view of tax implication as credit is eligible on all purchases.

4. Minimization of Classification issues

In current regime of tax there are numerous issues on classification of goods due to separate rates on different goods and exemptions on certain goods. But in regime of GST there shall be minimization of classification issues due to uniform rate and less expected exemptions.

5. CENVAT Credit

In regime of present tax, the manufacturer is unable to utilize the credit of Central Sales ax and VAT provided output is charged under Composition Scheme, which becomes the cost for him. But in Regime of GST, a manufacturer will be eligible to take Credit of SGST (VAT) as well as IGST (CST) on the purchases. There will be seamless flow of Credit in GST.

Negative Impact of GST on Manufacturers

1. Time of Supply

In current regime of tax the time of duty on manufacture attracts at the time of removal where as in GST regime it will earliest of the four such as (Date of Issue of Invoice, Date of Payment, Date of Removal, Debit in the books of Receiver).

2. Increase in Working Capital

In GST regime of tax, stock transfer has been made taxable, which requires the huge working capital because the realization of tax going to be on final supply tills that It may block the capital.

3. No Credit of Petroleum Product

Petroleum Product has been kept out of GST hence; the tax paid on Petroleum Product is not eligible as credit and same became the cost. Each industry requires the Petroleum Product such as Fertilizer Industry, Power Sector, and Logistic Sector etc.

4. Introduction of Reverse Charge on Goods

In current regime of tax structure there was reverse charge on specified services but in case of GST even the reverse charge will be applicable on goods.

5. Post supply Discount

If the discount has to be given post supply than it must be known to both the parties at the time of supply or pre-supply and the proof of being known is the clause of discount must be there either in contract or agreement or offer etc.

Challenge of GST

Challenges for Small trading manufacturers

A sizeable portion of SMEs are of the opinion that GST is not all good for the sector and their fears may not be totally vacuous. The tax neutrality that the SMEs enjoy may be one of the prominent benefits. However, reduction in duty threshold is one of the key concerns that has led them to be wary of the GST bill. Under the existing excise tax, no duty is paid by a manufacturer having a turnover of less than rupees 1.50 crores. But, post GST implementation; the exemption limit will get significantly lowered. During a speech at a news conference, Finance Minister, Arun Jaitley said, the estimate limit can be as low as rupees 25 lakh. As a result, a large number of SMEs and start-ups will be mandated to come under the tax net and will have to pay a large chunk of their earnings towards tax. Furthermore, there are other flipsides to the proposed tax neutrality. GST regime won't differentiate between luxury goods and normal goods; this will it hard for the SMEs to compete against large enterprises. GST that is ultimately levied on supply will not be available for input credit. This will lead to an increase in the cost of the products for businesses that supply directly to end users

1. **Blockage of Working Capital**

Liquidity crunch is another challenge for small businesses and particularly exporters. In GST, funds will be maintained in the form of an electronic credit ledger with the tax department. This credit ledger will keep a record of all your tax liabilities. In the case of services' sector, the

rates have been increased from 15% to 18%. This will force the taxpayers in the sector to face some blockage of working capital. Government is currently working on a solution to this problem as working capital is very important, particularly for smooth functioning of small and new businesses. For the exporters, the government is working on an 'e-wallet' system that will be created for each exporter by April 1, 2018 to ease the process of refunding their returns. Till then, the exporters will have to pay a nominal GST of 0.1%. Exporters will also receive refunds from 10th October, which would help in resolving cash flow issues.

1. **All the necessary GST compliances have to be done online**

This is proving to be a very difficult task for the small and medium businesses as most of them lack the necessary technical resources for the same. There are many ASPs that will help the small businesses ensure end-to-end GST compliance without the requirement of a continuous internet connection. To overcome this, taxpayers can opt for ASPs which can integrate with simple book keeping options, as basic as Microsoft Excel. This way, businesses can easily document details of all their transactions. An internet connection will be required for just 5 minutes so that they can upload the excel sheet on the respective ASP's platform and file their returns. The internet connection will help push the excel data from the ASP to GSTN.

2. **Goods Transport Agencies (GTAs) having trouble providing services to the unregistered persons**

In order to help the GTAs in this aspect and ease their GST compliance, the GST council decided that the services provided by a GTA to an unregistered person will be exempt from GST. Furthermore, the implementations of TDS/TCS provisions, e-way bill have also been postponed. The provision of reverse-charge also was resulting in a bias against the small service providers. The proposal to defer reverse charge compliance is also a very important and necessary relaxation as it will benefit small businesses and substantially reduce their compliance costs.

3. **Prior to the recent GST council meeting, the small dealers and manufacturers were required to pay GST on advances received**

This was proving to be very burdensome for the businesses in this sector. In order to ease their hardships, the GST council has decided that the taxpayers having an annual aggregate turnover up to Rs 1.5 crores shall not be required to pay GST at the time of receipt of advances on account of supply of goods. The GST on such supplies shall be payable only when the supply of goods is made.

Conclusion

By merging a large number of Central and State taxes into a single tax, GST is expected to significantly ease double taxation and make taxation overall easy for the industries. For the

end customer, the most beneficial will be in terms of reduction in the overall tax burden on goods and services. Introduction of GST will also make Indian products competitive in the domestic and international markets. Last but not least, the GST, because of its transparent character, will be easier to administer. Once implemented, the proposed taxation system holds great promise in terms of sustaining growth for the Indian economy.

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15. GST: Impact & Implications on Home Loan Sector

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Abstract

Goods and Service Tax (GST) is a single and a broad based tax levied on goods and services consumed in an economy. GST will have both positive and negative effect on real estate. GST is expected to create a business friendly environment as price level and inflation rate go down. The implementation of GST is expected to bring uniformity across states and centre which would make tax support policy of a particular commodity effective. Buying a home is one of the biggest milestones in one's life. And to achieve that milestone many of us opt for a home loan that not only helps in getting the desired home but also helps avail various tax benefits. With home loan interest rates being slashed and the ease of availing home loans these days, more and more people are seeking home loans to make their dream come true. As such it's really important to understand how the newly introduced Goods and Services Tax (GST) would affect real estate market, home loan and EMIs. This paper is helpful in bringing out the light on impact of GST on Home loan customers.

Key words: Goods, Services, Home Loan, Real Estate, Implementation, Economy.

Introduction

The Goods and Services Tax (GST) is a vast concept that simplifies the giant tax structure by supporting and enhancing the economic growth of a country. GST is one indirect tax for the whole nation, which will make India one unified common market. GST is being introduced in the country after a 13 year long journey since it was first discussed in the report of the Kelkar Task Force on indirect taxes. In 2003, the Kelkar Task Force on indirect tax had suggested a comprehensive Goods and Services Tax (GST) based on VAT principle."The market reality is such that consumers are particularly sensitive to pricing, something that developers can hardly afford at the moment," said Samantak Das, national director of research at Knight Frank, India.

As per the recommendations of the council, for the housing sector, there will be less incidence of GST for homes purchased under the Credit Linked Subsidy Scheme (CLSS). For under-construction homes that form a part of CLSS will now be charged GST at 8 percent instead of 12 percent, a cut of 4 percent. However, people who are not eligible for CLSS will continue to pay higher GST.

Objectives of the Study

1. To understand the concept of Goods and Services Tax.
2. To know the benefits of Goods and Services Tax to economy and business of real estate.
3. To know the Challenges in implementation of Goods and Services Tax in Real Estate.

Methodology

This study is descriptive in nature and it used the exploratory technique. The data for the study were gathered from the secondary sources such as journals, articles published online and offline on various newspapers and websites.

Literature Reviews

Srinivas K. R (2016) in his article "Issues and Challenges of GST in India" mentioned that central and state governments are empowered to levy respective taxes as per the Indian constitution which is likely to change the complete scenario of present indirect taxation system. GST will be a compressive indirect tax structure on manufacture, sales and consumption of goods and services throughout India, to replace the various indirect taxes levied by the both the governments.

Poonam (2017) in her study cleared that in the system of indirect taxation GST plays a very important role. The cascading and double taxation effects can be reduced by combing central and state taxes. Consumer's tax burden will approximately reduce to 25% to 30% when GST is introduced and then after Indian manufactured products would become more and more inexpensive in the domestic and international markets

Shefali Dani (2015) has suggested that GST administration is an irresolute endeavor to legitimize backhanded expense structure. Roughly more than 150 nations have executed GST idea. GST will disentangle its current roundabout duty framework and should expel wasteful aspects made by the current heterogeneous expense framework, just if there is a reasonable

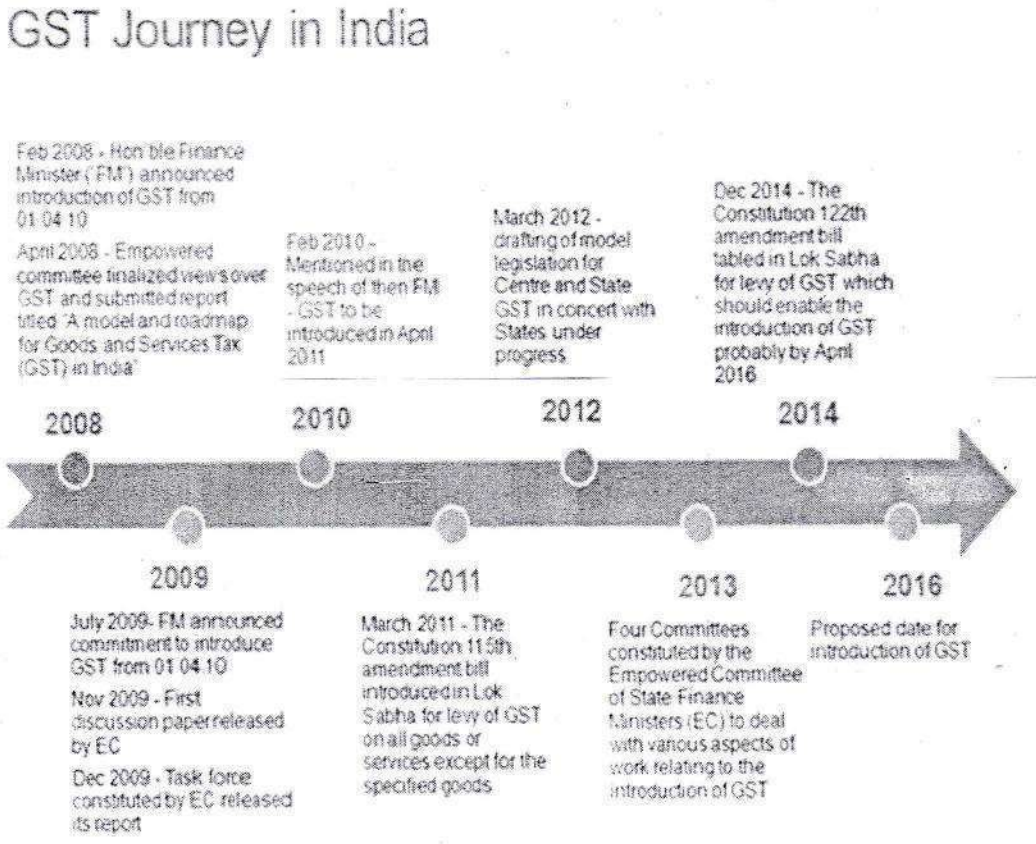
agreement over issues of edge constrain, income rate, and incorporation of oil based commodities, power, alcohol and land.

Agogo Mawuli (2014) studied "Goods and Service Tax-An Appraisal" and found that GST is not good for low-income countries and does not provide broad based growth to poor countries. If still these countries want to implement GST then the rate of GST should be less than 10% for growth.

Concept Overview – GST at a Glance

Strong case for bringing real estate under GST: Finance Minister Arun Jaitley

Finance minister Arun Jaitley, while delivering a lecture at Harvard University on October 12, 2017, has said that the real estate sector should, ideally, be brought under the ambit of the Goods and Services Tax (GST). "The one sector in India, where maximum amount of tax evasion and cash generation takes place and which is still outside the GST, is real estate. Some of the states have been pressing for it. I personally believe that there is a strong case to bring real estate into the GST," Jaitley said. The finance minister said the move would benefit consumers, as they will only have to pay one final tax on the whole product. "As a result, the final tax paid on the whole product under the GST, would almost be negligible," he said.



Goods & Service Tax- Explained

The GST Council has recommended a four-tier tax structure – 5, 12, 18 and 28 per cent. On top of the highest slab, a cess will be imposed on luxury and demerit goods, to compensate the states for revenue loss in the first five years of GST implementation. However, the Central GST (CGST) law has pegged the peak rate at 20 per cent and a similar rate has been prescribed in the State GST (SGST) law, which takes the peak rate to 40 per cent which will come into force only in financial exigencies.

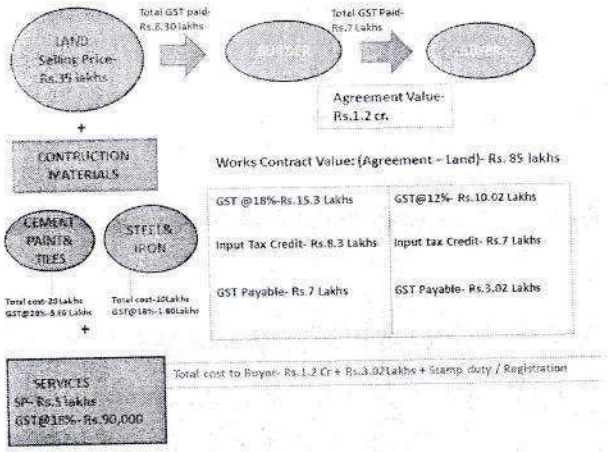
Impact of GST on Housing Finance

It is important to understand the particulars that will be impacted by the increased rates under the GST.While taking a home loan, one has to pay the interest on that money, which will not change, as there is no service tax or GST on it. Similarly, any stamp duty charged in connection with the documentation of the home loan, will not change, as stamp duty is not subsumed under the GST.

Government directs builders not to charge GST on affordable housing

The government, on February 7, 2018, asked builders not to charge any Goods and Services Tax (GST) from home buyers, as the effective GST rate on almost all affordable housing projects is eight per cent, which can be adjusted against the input credit. It said builders can levy GST on buyers of affordable housing projects, only if they reduce the apartment prices after factoring in the credit claimed on inputs.

In its last meeting on January 18, 2018, the GST Council had extended the concessional rate of 12 per cent GST, for construction of houses under the Credit-Linked Subsidy Scheme (CLSS) to promote affordable housing, which has been given infrastructure status in 2017-18 Budget. The effective GST rate, however, comes down to eight per cent, after deducting one-third of the amount charged for the house/flat, towards land cost. This provision was effective from January 25, 2018.



New GST for Housing

The concessional rate of GST of 12 percent (effective rate of 8 percent after deducting one-third of the amount charged for the house towards the cost of land) will henceforth (from January 25) be applicable for houses constructed or acquired under the CLSS for Economically Weaker Sections (EWS) / Lower Income Group (LIG) / Middle Income Group-1 (MlG-1) / Middle Income Group-2 (MlG-2) under the Housing for All (Urban) Mission / Pradhan Mantri Awas Yojna.

Apart from the cost of the home loan itself, there are several other charges like the processing fee, advocate fees, valuation charges etc., that you have to pay to your bank or the lender. Under GST, the home loan services would now attract 15 per cent, which was previously 18 per cent. This one-time additional charge would incur a marginal increase of 3% on your home loan.

To illustrate GST's effect on the processing fee

- e.g. A has taken a loan of Rs. 40 lakhs:
- Processing Fee = 0.25% – 1% of 40 lakhs = Rs. 10,000 – 40,000
- Before GST = 15% (service tax) on Rs 10,000 – 40,000 = Rs.1,500 – 6,000 After GST = 12% on Rs 10,000 – 40,000 = Rs 1,200 – 4,800
- Marginal Effect = Rs. 300 And Rs1200

Prepayment fees for Marginal Cost of Funds Lending Rate (MCLR)-linked home loans shouldn't be a problem as such loans do not charge for this service. However, a fixed-rate home loan does, meaning prepayment fees will now fall under the 12 per cent GST bracket instead of the previous 15 per cent service tax.

Again, the lenders can also charge for any Equated Monthly Instalment (EMI) default, either due to the return of the cheque or Electronic Clearance Service(ECS) return, on which you would have to pay the 12% GST. So, on any charge recovered by the lenders, you would have to pay 3% extra money under the new GST regime.And when all these marginal increase in costs are added up, the home loan would go up by all means.

The Indian real estate segment has been experiencing significant transformations recently. The new Real Estate Regulation Act (RERA) has addressed the problem of non-transparency. In India, as far as the residential segment is concerned, the implementation of GST is undeniably an affirmative sentiment booster among potential customers. The system may not be helpful in diminishing the prices of properties in the short-term. The simplicity of the system will benefit all the industry stakeholders including property developers and buyers.

GST on maintenance charges of housing societies

Under the earlier service tax regime, housing societies were required to register themselves under the law of service tax, if the aggregate of maintenance charges levied by the housing society exceeded Rs 10 lakhs in a financial year. However, under the Goods and Services Tax (GST) regime, this limit has been doubled to Rs 20 lakhs. So, if the aggregate of maintenance charges levied by the housing society exceeds the threshold of Rs 20 lakhs in a financial year, it has to register itself under the GST laws and obtain a registration number.

While computing the limit of Rs 20 lakhs, even the exempt items like recovery of property tax and electricity charges from the member, are to be taken into account. So, a housing society has to collect GST from its members, if the aggregate of the charges during a financial (whether subject to GST or not) exceeds Rs 20 lakhs. Even though the threshold limit for registration is Rs 20 lakhs for a housing society, it is not required to levy GST, if the amount of maintenance charge for each of the flat or office does not exceed Rs 7,500 for a month.

GST advantages for property developers

GST has turned out to be a better option from the stance of property developers who had to pay multiple taxes under the previous tax regime. Currently, they are taxed under the unified tax system. As far as building materials are concerned, the new tax system brings no major changes. Let's consider a few building materials. Under the previous tax system, pillars and iron rods were taxed at 20% that has been reduced to 12% currently. Cement is currently taxed at the highest rate of 28%, which is more than the previous rate. The tax rate on fly ashbricks and sand-

lime bricks has been reduced to 5% from 6%. These marginal variations can make a big difference.

GST rates for real estate – Input materials

HSN	Description of goods	Rate
Chapter 72	Steel	18 per cent
2523	Cement	28 per cent
6802	Marble and granite	28 per cent
2515	Blocks of marble and granite	12 per cent
Chapter 68	Sand lime bricks and fly ash bricks	12 per cent
2505 & 2517	Natural sand, pebbles, gravel	5 per cent
8428	Lifts and elevators	28 per cent

Data provided by: BMR

Under the tax regime, many of the construction materials are under the 18 and 28 per cent slab. For example, steel and steel products, are mostly in the 18 per cent segment and cement and prefabricated structural components for building or civil engineering, are in the 28 per cent slab. However, as the input tax credit is available on products utilised for construction, the overall tax incidence should be neutralised.

GST on under construction property

Under revised order from the government, under-construction properties will be taxed at 18% which includes 9% SGST plus 9% CGST. The government has also allowed deduction of land value equivalent to one-third of the total amount charged by a developer, thus, making the effective tax rate as 12%.

Now, it's safe to say that at this point in time, there would be some properties that are already under construction with existing buyers. Then there would also be some housing projects that would be launched soon.

For any running projects, a builder would have already paid some of the taxes in the form of excise, VAT and state entry tax and spent money on raw materials needed for the whole project. It's important to note the stage of construction while buying such properties. If the project is at an advanced stage, where substantial cost has already been incurred before the application of the GST, very little input credit will be available and very less benefit will be passed on. If the project is at an early stage, more benefits can be passed on.

Therefore, if you buy apartments in projects which are less than 60% completed, you will get more benefit. This, in turn, means you might have to pay less to the builder, so a lower home loan. But, again the difference in cost is likely to be marginal, but 2-3 lakhs less on your shoulder and a lower EMI is definitely good news for anyone.

Will GST make your home loan EMI go up?

It's still too early to predict how the GST actually affects the EMIs of housing loans. A few months from now would give us a clearer picture. But, all said and done if the price of the houses go up, it will ultimately make the home loans dearer. Additional charges like the stamp duty that differ from state to state and are applicable on both under construction and ready-to-move-in properties would have to be borne by the buyer. If the state continues with double taxation system (GST + Stamp Duty), property prices may go up and the buyer would be burdened with the price rise.

How lowering of GST helps

The GST council in its statement states: "It may be recalled that all inputs used in and capitalgoods deployed for construction of houses attract GST of 18% or 28%. As against this, most of the housing projects in the affordable segment in the country would now attract GST of 8%(after deducting value of land).

"As a result, the builder or developer will not be required to pay GST on the construction service of flats etc. in cash but would have enough ITC (input tax credits) in his books to pay the output GST, in which case, he should not recover any GST payable on the flats from the buyers. He can recover GST from the buyers of flats only if he recalibrates the cost of the flat after factoring in the full ITC available in the GST regime and reduces the ex-GST price of flats," the note added.

Conclusion

The GST is a very crucial tax reform since independence of India, so it must be better handle with utmost care and analysed well before implementing it. The government both Central and State have to conduct awareness programmes and various literacy programmes about GST to its various stakeholders. Implementation of GST is a significant step towards a comprehensive indirect tax reforms in India.GST will not increase the tax burden drastically, and in many cases total tax burden will decline due to removal of cascading effect replacement of gamut of tax systems by one tax systems. The biggest gain shall be from increase in competitiveness and ease

of doing business which GST brings with it. The overall impact is expected to be positive on economy thereby increasing the overall economic growth. Another important factor that needs to be examined, is the stage of construction. If the project is at an advanced stage, where substantial cost has already been incurred before the application of the GST, very little input credit will be available and very less benefit will be passed on. If the project is at an early stage, more benefits can be passed on.

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16. Recent's Trends in Digital Marketing using Artificial – Intelligence Technology

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Abstract

In today's era the use of Artificial Intelligence (AI) technology in digital marketing is growing fastly. AI techniques is the most powerful Tool other than digital marketing technologies as like Search Engine Optimization (SEO), Email Marketing, Content Marketing, Web Marketing. AI is a very useful algorithm for gathering & integrating data sets from various software and collection. Digital marketing companies are already incorporating AI solutions in day-to-day process.

AI Technique is heart of Information technology in Digital Marketing. Online Marketing is also known as Internet Marketing, Web Marketing, Digital Marketing and Search Engine Marketing (SEM). Online Marketing exchanged values between seller & customer and it is done through different online services. Online Marketing has sub sold traditional advertising in recent years and continues to be a high growth industry. It is very important to explore the relationship between Digital Marketing & Artificial Intelligence

Keywords: Customers, Technology, Artificial, Intelligence, Digital Marketing.

Introduction

In 2018, the world has come along with updated terms of technology. Today, AI (artificial intelligence) affects useful aspects of life in the smart devices, chat-bots, and self-driving cars. All of these aspects are designed to understand customer needs & preferences and deliver customized customer experiences.

AI has been a trending topic for new technology quite a boom & it used in different fields including digital marketing. This is mainly because use of AI digital marketing strategies can help us in delivering improvised customer satisfaction. More than that, they can help us in saving money and time.

It has started becoming a way to stand out and offer clients an added effective service value.

of doing business which GST brings with it. The overall impact is expected to be positive on economy thereby increasing the overall economic growth. Another important factor that needs to be examined, is the stage of construction. If the project is at an advanced stage, where substantial cost has already been incurred before the application of the GST, very little input credit will be available and very less benefit will be passed on. If the project is at an early stage, more benefits can be passed on.

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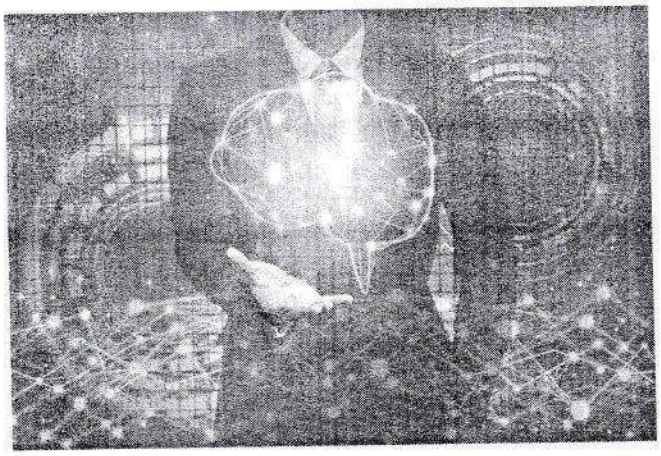


What is Artificial Intelligence?

To put the simply, artificial intelligence refers to intelligence showcased by machines. AI empowers machines to think about, respond to, and perform tasks like humans. It help to machines learn from experience and adjust to new input to the customer.

Artificial intelligence is today increasingly popular because:

It increases precision and accounts, difficulties for more accuracy and fewer errors, which means greater work efficiency& performance.

It analyzes more and deeper data for valuable uses.

It can add to the capable of various devices with its smart, useful algorithms. GPS trackers, voice assistants, and home automation systems are few examples.

With exceptional abilities to analyze data from it, AI is revolutionizing industries. Several industries have high demand for AI capabilities including medical, banking, and marketing.

Meaning

Internet has become an essential part of offices, homes, institutions etc. Number of people spend their time online all over the world. Smart marketers on the top of the scale of change and ensure their marketing strategies and touch point's mirror where the consumer is spending their time.

Digital Marketing is the most valuable term used today, so we focus on the same. In simple words Digital Marketing is "Achieving marketing objectives through applying digital technologies and media". So, digital marketing is about utilization of digital technology to achieve marketing objectives. There is no need for digital marketing to be separated from the marketing department as a whole. However now-a-days it remains a useful term because digital marketing requires a certain skill set to utilize the digital technology.

16. P

...rs need Artificial Intelligence?

...r. Marketers are dependent on tools and technologies to generate ...work and reduce manual effort. Yet, there is always been a gap ...nd quantifiable results. Intuition of customer of asking an query and ...ter must match the customer satisfaction at its peak is the only aim. ...h out to? What should I send? When should I send? Through What channel?

How AI Tools are Utilized in Modern Digital Marketing

Help to Understand Your Audience: AI analyze data to easily predict the buying behaviors and decisions of our customers.

Improve User Experience: Use of AI data to provide your audience with what they actually need.

More Effective Marketing: You can create more effective marketing strategy for our business with AI's data-driven analysis.

Increase Productivity: Using AI algorithms, you can automate a number of repetitive tasks. This can help you increase productivity and save you both time and money.

Objectives of Digital marketing with used of AI

1) Today's scenario of Digital Marketing in Information Technology.
2) To study AI in Digital Marketing in upgrading and highly developing technology world.
3) To study the future of Digital Marketing.

Research Methodology

The present research study is based on secondary data. Such secondary data is collected from various reference books on Digital Marketing, Internet Marketing, Electronic Marketing.

For the said research study the data pertaining to the above objective was collected by the review of the literature on the subject concerned. The literature was thus collected by visiting libraries and various concerned website.

Today's scenario of Digital marketing in Information technology

Today, the Internet is boon that provides endless opportunities for your small, medium or large business. Currently, more than half of the global population uses the Internet. Experts say that in coming years above 80% of the world population will be online. Therefore, digital

marketing has become an integral part of marketing. To help you understand the importance of digital marketing for your business.

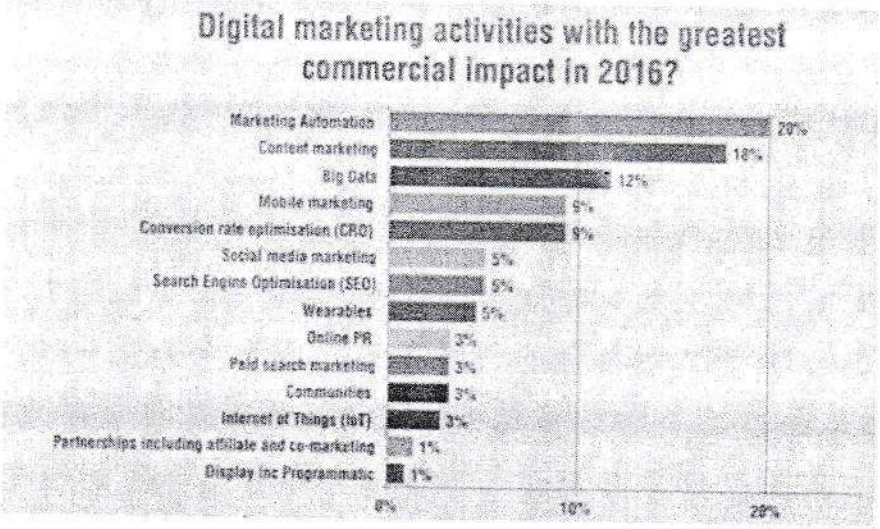
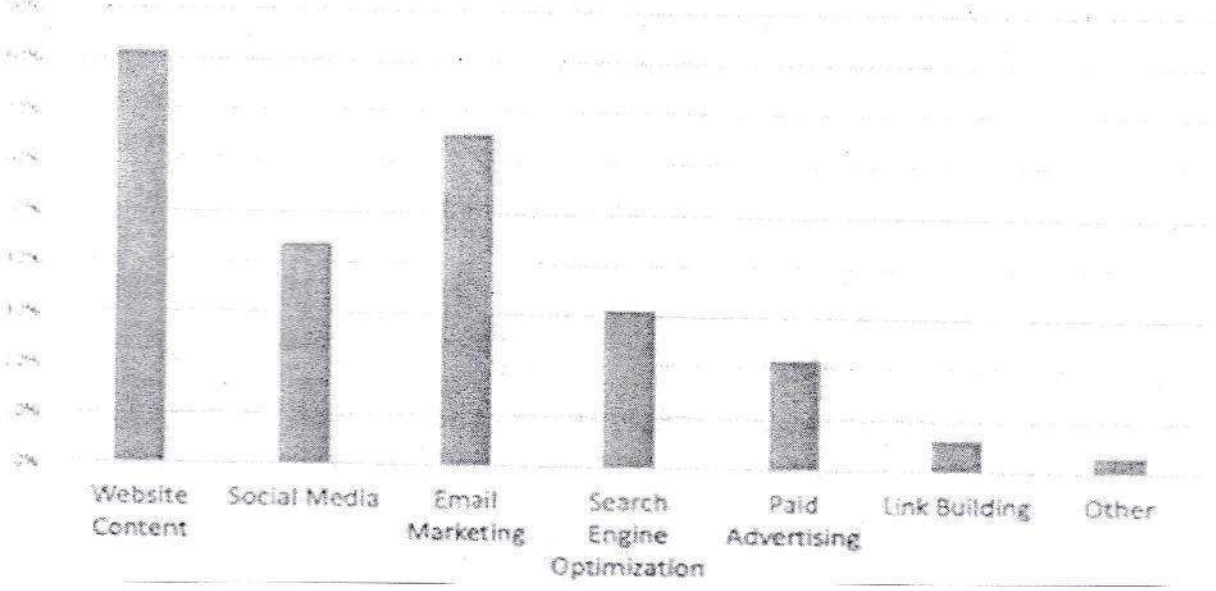


Fig. Digital Marketing Commercial Impact Source : http://www.smartinsights.com/



Online marketing platforms are getting bigger and bigger each day to come. That is when digital marketing service companies come to action today. They will help us to get the right strategy and keep growing our business.

Effective uses AI in Digital Marketing through the different tools can be analysed as follows:-

1) Search

Search improvement for E-Commerce and marketing has improved due to the same underlying factors that have improved "Search" at large including technologies like "Elastic

Search" which is allowing any small e-commerce store to search and get the satisfaction beyond the matching keywords.

Other misc improvements, such as: Software to detect common misspellings is now more preferable and repeated at many places, and can calibrate for misspellings by context (for e.g: "Season cikets" can be understood to mean "season tickets", while "cikets" alone might be more difficult to discern without context)

2) Recommendation Engines

Recommendation engines are a rarity in the world of digital marketing in this marketing technology are often appreciated and even loved by customers. Amazon's book or product recommend ate are excellent, Specify knows your taste is well, this kind of "discovery idea" amongst the millions of different choices available in markets for companies with huge inventories (both digital and physical).

3) Programmatic Advertising

Simply stated, programmatic advertising is the automated process of buying and selling ad inventory through an exchange, connecting advertisers to publishers in agencies. This process uses AI technologies and real-time bidding for inventory across mobile, display, video and social channels – even making its way into television in the whole world.

AI technology is the algorithms that analyze a visitor's behavior allowing for real time optimizations towards an audience more attractive or convictive.

4) Marketing Forecasting

This section is to be referred as "Insight from Marketing Data," a much broader topic. However, one of the most straight-forward marketing applications of business intelligence data lies in its ability to aide in predictions, a capability much more enhanced by developments in AI.

Companies like Rapidminer, Birst, Sisense, and others tools becoming industry standards for business intelligence.

5) Speech / Text Recognition

Beginning in 2018, a way of viewable speech and chat interfaces are into the marketing world – and some of them showed grand promise. Here few of examples used:

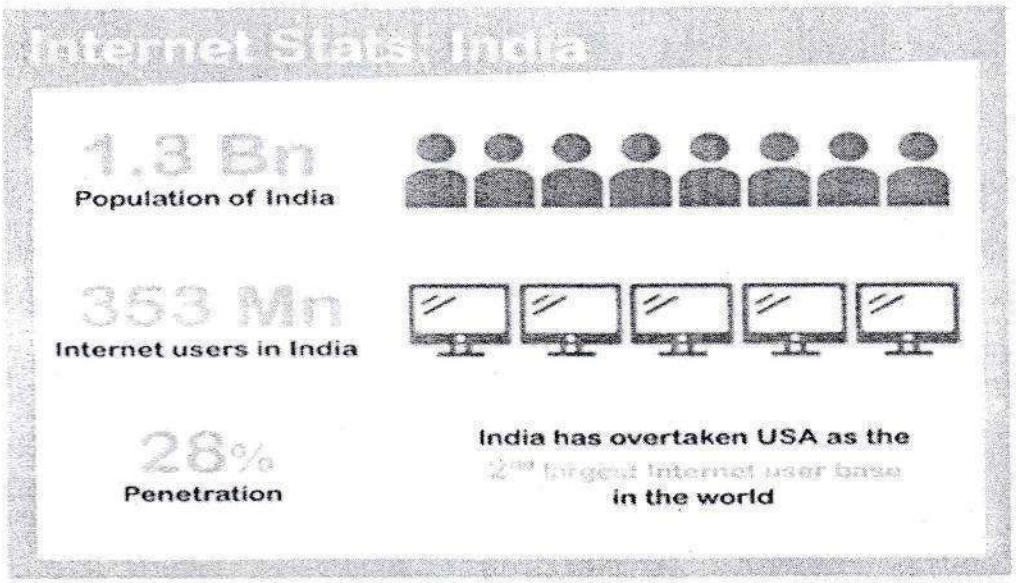
1. Amazon Echo – Echo has been a remarkable success in internet of things into a reality… for users to make purchases simply by speaking to the machine. You can order an Uber car or a Domino's pizza with speech alone is one of the best.

Facebook Messenger – Aiming to model the "online to offline" strategy of chat-based purchases, Facebook Messenger allows users order flowers (and soon, much more) via chat alone is another one best example

Future of Digital Marketing in India

Digital Marketing has amazing future in India more than 15% of India's population already using internet in various types and sizes of device, it is imperative that growth and consumption of content, ecommerce etc., is going to be huge

By 2017, India will have more than 350 million Smartphone users. Inexpensive Smartphone's and the rollout of 3G and 4G broadband infrastructure are rapidly growing together to traditional distribution and demo's online access.



The figure shown above showing the growth of the mobile and internet users in India while world. That today's Internet users are rising rapidly in India. With this rise the scope of digital marketing is also growing.

Major factors affecting Digital Marketing/ limitations of Digital Marketing

a) India's literacy rate is at 74.04%. Kerala is the most literate state in India is 93.91% literacy. Out of Six Indian states account 70% of all illiterates in India: Uttar Pradesh, Bihar, Madhya Pradesh, Rajasthan, Andhra Pradesh and West Bengal. Thus increasing literacy positively effecting today's the digital marketing growth in India.

b) Expensive technology: The mobile and internet rates are very competitive and are not affordable by the common man living in the rural area of country.

c) Cost of advertising: The cost of advertising is very low to our product marketing. One can have its own website in just Rs. 5000 in India. Anyone can promote product on Google with Google AdSense with just Rs.1000 a month.

d) Inherited limitation of Technology: In India the youth is very adaptable towards technology but still large population is not so friendly with electronic gadgets because of major illiteracy in India.

e) Unavailability of Infrastructure facilities in India: The internet connectivity is still not working properly in Indian rural areas because of lack of infrastructure facility.

f) Traditional business practices: The small businessman running its business in a small area and only focusing on that particular area will be preferable by him, these are the traditional ways of Promotion as it finds more visible to the people around.

g) Inform Online Business Experience: Lack of awareness about the digital marketing is also a major limitation in the growth of the digital market area.

Conclusion

In today's era, business is depends on technology with the help of technology, marketer can easily enhance their profit. Technology has its benefits and limitations but sound technology eliminates maximum errors and can drive new way of business.

Suggestions

Many retail and ecommerce brands use AI technology to tracking customers' preferences, needs, and buying behaviour. These insights help to suggestions on products and services in their customers may be interested.

Knowing your customers' buying habits can help you more effective marketing strategy. This can promote products that our customers actually want to purchase a Product.

AI digital marketing and data analysis strategies are more accurate than any human capability.

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17. A Study on Agricultural Produce Marketing in India

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Abstract

Indian agriculture has moved towards commercialization. Directly or indirectly agriculture in India has continued to be the source of livelihood to majority of the population. Indian agriculture has seen changes in structure from time to time when needed. India has performed well in agricultural production. Government of India has put agricultural development as its prime responsibility as the producer/farmer must get a maximum share in the consumer Rupee. The present paper highlights some of the organizations and institutions that provide direct and indirect agricultural marketing and allied services for the ease and accessibility to the producer/farmer on one side and the consumer on the other. The alternative services available in agricultural marketing in India that could provide additional value in the agricultural development. In the end the paper provide some suggestions that could help to make agricultural marketing services better, more valuable and economical for the producer/farmer, the consumer and the country as whole.

Keywords: Agricultural Marketing, Agri-Business, Agricultural Cooperatives, Agricultural Development

Introduction

India is an agricultural country and one third population depends on the agricultural sector directly or indirectly. Agriculture remains as the main stray of the Indian economy since times immemorial. Indian agriculture contribution to the national gross domestic product (GDP) is about 25 per cent. With food being the crowning need of mankind, much emphasis has been on commercialising agricultural production. For this reason, adequate production and even distribution of food has of late become a high priority global concern.

Agricultural marketing system is an efficient way by which the farmers can dispose their surplus produce at a fair and reasonable price. Improvement in the condition of farmers and their agriculture depends to a large extent on the elaborate arrangements of agricultural marketing.

Marketing systems are dynamic; they are competitive and involve continuous change and improvement. Businesses that have lower costs, are more efficient, and can deliver quality products, are those that prosper. Those that have high costs, fail to adapt to changes in market demand and provide poorer quality is often forced out of business.

Meaning

According to the National Commission on Agriculture (XII Report, 1976), agricultural marketing is a process which starts with a decision to produce a saleable farm commodity, and it involves all the aspects of market structure or system, both functional and institutional, based on technical and economic considerations, and includes pre- and post-harvest operations, assembling, grading, storage, transportation and distribution.

Objective of Study

1) To understand the agricultural marketing services.
2) To know the functions in agricultural marketing.

Methodology

Research methodology is totally based on Secondary data from newspaper, magazines, books, E- journals.

Agricultural Marketing in India

There are several challenges involved in marketing of agricultural produce. There is limited access to the market information, literacy level among the farmers is low, multiple channels of distribution that eats away the pockets of both farmers and consumers. The government funding of farmers is still at nascent stage and most of the small farmers still depend on the local moneylenders who are leeches and charge high rate of interest. There are too many vultures that eat away the benefits that the farmers are supposed to get. Although we say that technology have improved but it has not gone to the rural levels as it is confined to urban areas alone. There are several loopholes in the present legislation and there is no organized and regulated marketing system for marketing the agricultural produce. The farmers have to face so many hardships and have to overcome several hurdles to get fair and just price for their sweat.

Globalisation

The globalization has brought drastic changes in India across all sectors and it is more so on agriculture, farmers and made a deep impact on agricultural marketing. It is basically because of majority of Indians are farmers. It has brought several challenges and threats like uncertainty,

rbulence, competitiveness, apart from compelling them to adapt to changes arising out of technologies. If it is the dark cloud there is silver lining like having excellent export opportunities for our agricultural products to the outside world.

Agricultural Market Reforms

Below are the certain measures that can be affected to bring out the reforms in agricultural marketing so as to ensure just and fair price for the farming community.

1. Provide loans to the farmer at low rate of interest so that they will be freed from the clutches of local moneylenders who squeeze them. It is said that farmer in born into debt, lives in debt and dies in debt. Right from the beginning of the life, the poor farmers approach money lenders for investing into cultivation who levies very high rate of interest and who takes away the maximum amount of the share from the produce. In case if the crop fails due to natural calamities then the situation would be worse as the farmer is not in a position to pay his loans. And ultimately he is forced to sell the land at throw away price to the money lender.
2. It is essential to provide subsidized power supply and loans to the farmers as the expenses towards power consumption takes considerable amount of investments.
3. Generate a new distribution network that connects the farmers directly to the consumers to get maximum returns as the present channel of distribution involves multiple mediatory who take away the major portion of profits which otherwise the farmers is supposed to get.
4. Elimination of the existing loopholes in the present legislations is warranted.
5. There should be stringent action against black marketers and hoarders who buy the stocks from farmers at cheap prices and create artificial demand and then sell the stocks at higher prices.
6. Creating local outlets at each village where the farmers sell their stocks directly to the consumers or the authorized buyers at fixed prices would help to a great extent. Intervention of government in this network is essential to bring the fruits to the farmers.
7. At the village level there should be counseling centers for farmers about the worth of their stocks so that they can get fair price. The crucial role of Non-Governmental Organizations (NGOs) is needed in this context.

8. The existing legislations are outdated and are not in tune with the changing trends and technological inventions and the same need to be updated forthwith.

Agricultural Marketing Services in India

This part of the study explores various organizations and institutions that provide direct or indirect assistance to agricultural marketing in India are as follows:-

Food Corporation of India

The Food Corporation of India under the Department of Agriculture and Cooperation Government of India was set up to provide price support to producers, to distribute food grains at concessional prices through to the poor trough the Public Distribution System (PDS) and to ensure national food security by carrying buffer stocks. The operation of the Food Corporation of India has been facilitated by various government policies such as concessional credit and transport, budget support and freedom from movement controls. The poverty line is price inelastic. Given the price inelasticity of demand an increase in food prices, ceteris paribus, would erode the real income of population and particularly that of the poor who spend a major share or their income on food. Also fluctuations in prices would affect adversely the long term investment and production decisions of producers and lead to a suboptimal allocation of resources. Therefore the government concluded intervention in food grain markets as a trader was warranted.

Directorate of Marketing & Inspection (DMI)

It is an extension of Department of Agricultural and Cooperation, Ministry of Agriculture, Government of India; The Directorate provides consultancy and technical services to prospective entrepreneurs in construction, maintenance and operation of cold storages. The DMI acts as a nodal agency to promote cold storages in the country by coordinating Research & Development in cold storage, facilitate collection and dissemination of information related to better price realization by the farmers, to sensitize and orient farmers to new challenges in agricultural marketing by using ICT as a vehicle of extension, to improve efficiency in agricultural marketing through regular training and extension for reaching region specific farmers in their own languages, to provide assistance for marketing research to generate marketing information for its dissemination to farmers and other market function are is to create an ambience of good marketing practices in the country.

Agricultural & Processed Food Products Export Development Authority (APEDA)

The Agricultural and Processed Food Products Export Development Authority (APEDA) was established by the Government of India under the Agricultural and Processed Food Products Export Development in December, 1985. It is another organization that is related to agricultural trade in India. A Trade portal on Agri Exchange exists, where online trading is done, in its stride, joint collaboration of United Nations Conference on Trade and Development (UNCTAD) and Ministry of Agriculture has given the portal a shape. Globally buyers and sellers in the agri-business world have been given a platform to offer negotiate and perform a deal. Apart from this, it has been loaded with latest information of 550 products related to APEDA and the World. Agri exchange thrives to provide information matching the needs of the stakeholders of the agricultural economy in general and agricultural commodities trade in particular. The only vision is to cater the Agri business community and see them growing day and day by taking the benefit of the portal.

National Cooperative Development Corporation (NCDC)

The National Cooperative Development Corporation (NCDC) was established in 1963 as a statutory Corporation under the Ministry of Agriculture. Planning, promoting and financing programmes for production, processing, marketing, storage, export and import of agricultural produce, food stuffs, certain other notified commodities e.g. fertilizers, insecticides, agricultural machinery, soap, kerosene oil, textile, rubber etc., supply of consumer goods and collection, processing, marketing, storage and export of minor forest produce through cooperatives, besides income generating stream of activities such as poultry, dairy, fishery, sericulture, handloom etc.

National Agricultural Cooperative Marketing Federation (NAFED)

NAFED was established 1958. NAFED is registered under the Multi State Co-operative Societies Act. NAFED was setup with the object to promote Co-operative marketing of Agricultural Produce to benefit the farmers. Agricultural farmers are the main members of NAFED. The objectives of the NAFED are to organize, promote and develop marketing, processing and storage of agricultural, horticultural and forest produce, distribution of agricultural machinery, implements and other inputs, undertake inter-State, import and export trade, wholesale or retail as the case may be and to act and assist for technical advice in agricultural production for the promotion and the working of its members and cooperative marketing, processing and supply societies in India.

State Agricultural Marketing Boards (SAMBS)

State Agricultural Marketing boards (SAMBs) occur as a government agency and/or constitutional organisation having the function of intervening in the marketing process, with a view to serving the cause of efficient and orderly marketing. Less frequently they are intentional organisations established by farmers/producers. Marketing boards tend to be born out of government policy rather than by agreement among commercial parties. Their chief object is to improve the income of the smallholder, grower, and/or livestock farmer. Marketing boards do not normally provide marketing services to large estates or plantations. Prior to the adoption of structural adjustment and market liberalization nearly all Marketing boards served as price stabilizing boards. Another characteristic of marketing board's is their focus on durable products. Marketing boards are normally given authority for 'controlled' or 'scheduled crops'. The crops controlled are millet, sorghum, rice, wheat, maize, groundnuts and palm oil and 'colonial' crops such as cocoa, cotton, coffee, tea, tobacco and rubber. In some cases, the marketing board performs all of the marketing functions itself but in others it cooperates with private enterprise by, for example, hiring storage facilities or appointing local buying agents.

Agriculture Produce Marketing Committee (APMC)

Regulated markets are established as per the provisions of the 'Agricultural Produce marketing Committee Acts' (APMC Act) of state Government. The royal commission on agriculture 1928 studied the problem and suggested beginning with the regulated markets and consequently various market committees were incorporated in different states. These regulated markets function under the market committees as per the regulations in the APMC act. Most of the wholesale markets and some of the rural primary markets have been brought under the regulation.

Central Warehousing Corporation (CWC) & State Warehousing Corporations (SWCS)

CWC was established during 1957. It is the largest public warehouse operator in the country. Apart from storage, CWC also offers services in the area of clearing and forwarding, handling and transportation, distribution, disinfestations, fumigation and other ancillary services like safety and security, insurance, standardization and documentation. CWC operates 66 Custom Bonded Warehouses with a total operated capacity of nearly 0.42 million Mts. These bonded warehouses are specially constructed at a seaport or airport and accept imported

commodities for storage till the payment of customs duties by the importer of the commodities. Different States have set up their own warehouses in the country called State Warehousing

Functions of Agricultural Marketing

The major marketing functions involved in agricultural marketing are:

- Concentration
- Grading
- Processing
- Warehousing
- Packaging
- Distribution Concentration

The foremost function to be performed in agricultural marketing is to collects the agro produce ready to sale in a central place for economic buying purpose.

Grading of Agro Produce

Grading is the process of segregating the huge amount produce into different categories on the basis of variety, quality, size, etc. This can help to establish standards for those produce.

Processing

It is the stage where the farm products are transformed into consumable products. For example: paddy into rice processing.

Warehousing

Warehousing is storing the products from production till its final consumption. This helps to preserve the products from spoil, contamination, etc.

Packaging

Packaging of products is another essential function for easy handling, preventing from deterioration, attracts customers, etc.

Distribution

The last function performed in all marketing is distribution of products from the place of warehouse to retail outlet for final consumption.

Suggestions

1) Enhancement of farmers income

Agricultural services plays vital role in enhancement of farmers income. By giving them proper advice of crop pattern latest technology etc.

2) Increase in minimum support price

Farmers basic demand is very clear, they want minimum support price for their produce. Govt may look in to this issue.

3) Storage facility

Agriculture produce needs special care in handling and storing of food and food grains. If increase in total storage capacity of particular commodity will enhance the life of produce.

For example cold storage in grapes produce.

4) Active participation of market committee in price determination

Farmer is backbone of any nation. If farmers survive then automatically nations population will survive. Farmers are real hero of economy too. For that purpose minimum support price has to decide for their products. It will increase their per capita income and they will happy with their services.

Conclusion

India has become self sufficient in the agricultural production especially in the food grains, India stands among the top agricultural producing nations of the world today. No doubt India is an exporter of various agricultural commodities but there are some constraints in agricultural marketing. The paper although highlighted the primary agricultural marketing institutes and organizations providing agricultural assistance in India at large, still much of the agricultural produce is getting spoiled due to inefficient storage facilities, overtime delivery and mismanagement. So much more is needed as; India has huge potential for agricultural production, because it has a wide geographical range. As most of the rural people in India are engaged in agriculture and its allied activities, more and more provisions must be made available to integrate the marketing systems for agriculture, which must be available all over the country.

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18. A Study of Need of Knowledge Management in Education Sector

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Abstract

As we know the term knowledge Management is a Combination of two things one is Knowledge that Refers the Fact or condition of knowing something with Familiarity gained through experience or association and another management is nothing but the Planning, Controlling, and Organizing&Directing. This paper discuss about an Need & importance of Knowledge Management in Education. In now days the education filed is become very competent. To match up with flow of world it is important to keep ourselves as well as our knowledge updated. Thus aséance of it education field is also bring new changes in their conventional methods.As the technology is everywhere like we can get any Commodity or service at home on just one phone call and we know that everyone is very much egger to get update themself in regards to the new technology. Then why not it is same with Education?

Key Words: Knowledge, Management, Education, Organization

Introduction

The role of knowledge professionals and managers in developing KM in the educational institute is to coordinate the information related activities and clustering the data properly. Butthe main challenge is to capture tacit knowledge and manage it in developing repository. Copyright issue is also to be taken into consideration while capturing and presenting Knowledge. The knowledge professionals (librarians and KM Committee) needs to capture different skills like information retrieving, evaluation, analysis, organization, collaboration and security and safety of data and ICT skills etc for proper management of knowledge. Various skills are also required like data capture, data analysis, data categorization, data mining, data mapping, knowledge mapping, concept mapping, indexing, linking and repackaging are only reared by library professionals hence every academic organization shoulder this task to library professionals for effective use of tacit knowledge. But proper support from management, administration, technical advisors, computer experts, software developers should coordinate with library professionals in

this activity. Further, motivation factor is also to be considered by the management. Various practices and trends are also useful for knowledge management purpose like generation of IR, data repositories, digital repositories, web tools (RSS Feed, Blog, Twitter, Facebook, social networks', Moodle, Drupal Blackboard, etc.), development of portals, knowledge gateways, links to search engines and web/Internet based information resources, user groups, subject groups, expert groups, grey literature. An organization can develop its own portal or webpage giving links to internally developed databases and links to different institutional repositories.

Objective of Study

1. To study meaning and concepts of knowledge management.
2. To study and understand the needs of knowledge management in education sector.

Research Methodology

For the present study secondary data is utilized it was collected from books, journals, magazines& websites etc.

Literature Reviews

'The capabilities of the educational organizations in making use of tacit knowledge' by Fatma Ozmen (2010), suggests that Knowledge management is the core subject of organizations in today's challenging world and a major focus of knowledge management is on transforming tacit knowledge into explicit one.

The article 'Design and development of an academic portal' by Heila Pienaar (2003), suggests about the factors that must be considered during the design and development of an academic portal. A Web portal can be defined as a Web site that aggregates an array of content and provides a variety of services including search engines, directories, news, e-mail and chat rooms. Portals have evolved to provide a customized gateway to Web information.

The article 'Building a scientific knowledge web portal: The Nanoport experience' by Michael Chau et al (2004), describes that there has been a tremendous growth in the amount of information and resources on the World Wide Web that are useful to researchers and practitioners in science domains.

Discussion

Need of Knowledge management in Education

Getting people motivated: Overcoming organizational culture challenges and developing a culture that embraces learning, sharing, changing, improving can't be done with technology. There is no use in launching a tool if there is no drive to share the knowledge.

Keeping up with technology: Determining how knowledge should be dispensed and transferring it quickly and effectively is a huge challenge. Constantly changing structures mean learning how to be smart, quick, agile and responsive – all things a KM tool must be able to accomplish.

Measuring knowledge: Knowledge is not something that can be easily quantified, and is far more complex because it is derived out of human relationships and experience. The focus should be on shared purpose rather than results or efforts.

Overcoming shared leadership: KM tools allow others to emerge as voices of power within an organization. Workers are given a "voice", which can sometimes cause internal conflict.

Keeping data accurate: Valuable data generated by a group within an organization may need to be validated before being harvested and distributed. Keeping information current by eliminating wrong or old ideas is a constant battle.

Interpreting data effectively: Information derived by one group may need to be mapped or standardized in order to be meaningful to someone else in the organization.

Making sure information is relevant: Data must support and truly answer questions being asked by the user, and requires the appropriate meta-data to be able to find and reference. Data relevancy means avoiding overloading users with unnecessary data.

Rewarding active users: Recognizing the users who actively participate and contribute to a knowledge database will not only encourage them to continue contributing, but will also encourage other users to join.

Purpose of Knowledge Management

Knowledge Management is about converting available raw data into understandable information. The information is then placed in a reusable repository for the benefit of any future need based on similar kinds of experiences. Knowledge management contributes towards streamlining the ideas problems, projects and deployment driving towards productivity. But, it's

more than just knowing everything your organization knows, it's creating a synthesis between the people and the information to the point that the whole is more than the sum of the

Meaning

Knowledge management (KM) therefore implies a strong tie to organizational goals and strategy, and it involves the management of knowledge that is useful for some purpose and which creates value for the organization. Expanding upon the previous knowledge management definition, KM involves the understanding of: Where and in what forms knowledge exists; what the organization needs to know; how to promote a culture conducive to learning, sharing, and knowledge creation; how to make the right knowledge available to the right people at the right time; how to best generate or acquire new relevant knowledge; how to manage all of these factors so as to enhance performance in light of the organization's strategic goals and short term opportunities and threats.

Definition

'Knowledge management is the systematic management of an organization's knowledge assets for the purpose of creating value and meeting tactical & strategic requirements; it consists of the initiatives, processes, strategies, and systems that sustain and enhance the storage, assessment, sharing, refinement, and creation of knowledge'

Collaboration of Educational Institutes, Industrial Organizations and Government in Knowledge Sharing

To share knowledge means to learn, understand, extend and repeat the information, the ideas, the views and the resources with each other, connected with, on a specific ground. Due to globalization and use of ICT the whole world has become one village and communication has become fast. Globalization demands that our society needs to move faster, work smarter and take more risks than at any time in our history. Earlier due to communication gap in research area duplication of research occurred. But now with open access moment everyone is sharing his knowledge with others through internet media and so it is obviously good for research development. Universities, publishers, libraries and individual researchers started sharing knowledge in the form for consortia, associations, groups with all. The changing research culture playing important role in knowledge sharing as day by day knowledge is adding new dimensions from the corners of the world in every field. Collaboration between Universities, Industrial

organizations and Government can play an important role in the field of knowledge sharing. Knowledge becomes meaningful when it is utilized on practical ground.

Conclusion

With the help of this study we conclude that the knowledge management is need of each sector especially in education because this is a place where the optimum delivers of Knowledge lies. Knowledge, learning and sharing come from people and their relationships with one another, not necessarily from the tools, databases and technological aids used. However, with the proper technology in place you can facilitate better communication and overcome these challenges to have an up-to-date, secure and organized knowledge base.

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12. Recent Trends in Banking Sector

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Abstract

Indian banking sector is playing very important role ineconomic development of country. Banking sectors growths depend upon the several services which is provided to customer. Growth of economy has several parts and banking sector is the one of the major part of it. Today's services provide by banks are also very rapidly enhancing growth of banking sector like Internet, Mobile banking, NEFT, RTGS. This will lead the Indian banking scenario and also help in economical growth of India.

Key Words: Banking Services, Mobile Banking, RTGS.

I. Introduction

The banking system in India is extensively different from other Asian nations because of the country's unique geographic, social, and economic characteristics. India has a large number of population and extreme disparities in income, which are marked among its regions. There are high levels of illiteracy among a large percentage of its population but, at the same time, the country has a large reservoir of managerial and technologically advanced talents.

The available research on recent trends in banking mainly focuses on quantifying the updated technology used by people around the country in modern way in more secured manner. The present study examines not only the relationship of customer and banker but how dependant the customer is on new updated technology. The study can be immense for future to foresee the need of customer and the updation of technology.

II. Objectives

1. To study the Recent Trend in Banking sector
2. To identify the problems of Recent trends in Banking

III. Research Methodology

Secondary Data

The present research study uses the most recent available published secondary data.Secondary data is also collected from the various National and International Research

Journals which are related to Commerce, Management. Secondary data is also collected from various websites.

IV. Recent Trends in Banking Sector

1. Automated Teller Machine (ATM)

It is a computerized electronic machine that performs basic banking functions (such as handling check deposits or issuing cash withdrawals).ATM enables the customer to withdraw their money 24 hours a day. It can be used for payment of utility bills, fund transfer between account, balance inquiry etc.

Benefits

1. Anyone can withdraw cash at any time, day or night. The banks don't need to be open.
2. ATMs offer the convenience of multiple locations. Person can withdraw cash at any bank that is part of the system to which your ATM card is linked.
3. ATM card is protected by a PIN, keeping our money safe.
4. There is no need to fill out withdrawal and deposit slips as is required at the bank.
5. ATMs are faster than going to the bank—no long lines.
6. We can withdraw cash at ATMs in foreign countries.

2. Electronic-fund transfer

It is referred as electronic transfer of money from one bank account to another, either within a single financial institution or across multiple institutions, via computer-based systems, without the direct intervention of bank staff.

Electronic funds transfer is a general banking system by which transactions, such as deposits or bill payments, are made electronically from a donor's bank account or credit card to your bank account.Using Electronic Funds Transfer we can also benefit from reduced paperwork and postage costs.complete details such as the receiver's name, bank account number, account type (savings or current account), bank name, city, branch name etc. should be furnished to the bank at the timeof requesting for such transfers so that the amount reaches the beneficiaries' account correctly and faster.RBI is the service provider of EFT.

Benefits

1. It is easy and convenient.
2. It is fast and secure.

efficient and less expensive than paper cheque payments and collections

Mobile Banking

a service provided by a bank or other financial institution that allows its customers to financial transactions remotely using a mobile device such as a Smartphone .it is usually on 24 hours basis.

Mobile banking is a term used for performing balance checks, account transactions, credit applications and other banking transactions through a mobile device such as a phone

Benefits

In Mobile banking, the user can transfer funds from your bank account to another bank account with a Smartphone just with the help of the internet, from anywhere to everywhere.

It is available for 24 hours and easy and convenient mode for many Mobile users in the rural areas. Mobile Banking is said to be more secure and risk-free than online Internet Banking.

Banking user can transfer funds, and pay bills, checking account balance, study your recent transaction, block your ATM card, etc. Mobile Banking is cost-effective, and Banks offer this at less cost to the customer.

Real Time Gross Settlement (RTGS)

RTGS introduced in India since MARCH 2004. It is specialised fund transfer system from where the transfer of money takes place from one bank to other bank on real time basis. Settlement in "real time" means a payment transaction is not subjected to any waiting with transactions being settled as soon as they are processed.

Benefits

- An RTGS electronic fund transfer facilitates fund transfer on real time basis. In case of a holiday, the amount gets credited on the next working day.
- RTGS could also be done offline by submission of the remittance form at the bank branch of the remitter.
- RTGS avoids the cost involved in other instruments of fund transfer such as demand draft.

4. Fund transfer through RTGS involves comparatively lower remittance charges. Inward remittances are free of cost, while banks can charge a fee not exceeding Rs 30 for an outward remittance on transaction amount of Rs 2lac-5lac. For higher amounts, banks could charge a fee of Rs 55.
5. RTGS is a safe and secure fund transfer mechanism and avoids risk of loss associated with cheques and demand draft that are used for fund transfer.

5. E-cheque

E-Cheque is an electronic document which substitutes the paper check for online transactions. Digital signatures (based on public key cryptography) replace handwritten signatures. The e-Cheque system is designed with message integrity, authentication and nonrepudiation features, strong enough to prevent fraud against the banks and their customers.

Payers and payees can be individuals, businesses, or financial institutions such as banks. E-Cheques are transferred directly from the payer to the payee, so that the timing and the Purpose of the payment is clear to the payee. The payer writes an E-Cheque by structuring an electronic document with the information

Legally required to be in a cheque and digitally signs it. The payee receives the E-Cheque over email or web, verifies the payer's digital signature, writes out a deposit and digitally Signs it. The payee's bank verifies the payer's and payees digital signatures, and then forwards the cheque for clearing and settlement. The payer's bank verifies the payer's digital signature and debits the payer's account.

Benefits

1. Electronic mail (e-mail) that improves communication between individuals and the bank, within the bank, with the bank and external parties and between banks. The availability of online information provides bankers and customers with a powerful mode of communication.
2. Banks can provide the desired information and services online for the customers. Banking processes are made more efficient and cost effective by integrating other aspects of banking operations such as treasury management and financial control. If a banking function does not require physical interaction, it may derive the benefits of electronic banking.

3. Most current E-banking applications use the internet. The advantages of online banking are in providing convenience and flexibility for customers.
4. Online banking allows customers to get account balances at any time. Customers need not worry whether a cheque has been cleared or a deposit has been posted. At the click of a button, customers can easily check the status of their current, savings, and money-market accounts. Through online banking, banks can provide information of accounts instantly. For customers. Customers need not wait till month end for historical, mail statements.
5. Online banking gives the ability to pay bills electronically. Electronic payments can be credited the without any delay. Customers can also download account transactions online. It facilitates to import the transactions directly into typical PC programs at home or office.
6. The transfer of money between accounts is another powerful application of online banking. Online banking provides flexibility, by allowing the customer to access his finances from any part of the globe.

6. Internet banking

Online banking, also known as internet banking, is an electronic payment system that enables customers of a bank or other financial institution to conduct a range of financial transactions through the financial institution's website. The online banking system will typically connect to or be part of the core banking system operated by a bank

Internet banking software can provides personal and corporate banking services offering features such as viewing account balances, obtaining statements, checking recent transaction and making payments. Access is usually through a secure web site using a username and password, but security is a key consideration in internet banking and many banks also offer two factor authentications using a security token.

Benefit

1. If any customer of online banking is out of state or even out of the country and if any money problem arises there, so that customer can log on instantly to his/her online bank and take care of business.
2. In online banking its sites speeds generally execute and also confirm transactions quicker than any ATM processing speeds.

3. In Internet banking people can do their work without any paper work so it reduces costs for banks, and also all transactions can be done without any paper work, that is beneficial for banks and customer also.
4. E-banking or online banking is just different from traditional banking, because in traditional banking people have a limited time period to use any service but in online banking people can use all the services 24 hours in a day, it provides all time facilities, people can do it only by a mouse click. And there is no need to stand in queue now online banking customer can take advantage of all the services by their own electronic devises like PC or mobile and etc. All people want flexibility and Internet banking is trying to provide or offer them.
5. If people are travelling in any foreign country, they may have some difficulty in accessing their bank over the phone. As long as they have Internet banking, however, they can easily access their bank account from there.
6. If, any person apply for online banking he get a password. If he thought that his password is not strong enough, so he can change his online account password.
7. Some fake banks websites through fake emails can also trick you into navigate on that, and that steals your password and also your user name as you enter them. So it is necessary if you enter in any bank websites to access your account to verify carefully those sites.

V. Problems of E-Banking Services

1. Difficulties in functioning of global technology

There is a need to have an adequate level of infrastructure and human capacity building for their local requirements. In developing countries, many consumers either do not beliefto the necessary infrastructure to be able to process e-payments.

2. Customer pleasure

In today's competitive world, pleasure of customers is a major challenge for the banking sector because customers have other choices in various types of services provided by banks.

3. Availability of Personnel services

In present times, banks are to provide numerous services like social banking with monetary possibilities, selective up gradation, computerization and modern mechanization, superior customer services, efficient executive culture, internal direction and control, sufficient

quality, strong organization culture etc. Therefore, banks must be capable to give complete to the customers who come with hope.

4. Competition

The nationalized banks and commercial banks have the competition from foreign and private sector banks. Competition in banking sector brings a variety of challenges before the such as product positioning, new ideas and channels, new market trends, cross selling ad at special needs to be manage, property and hold risk. Banks are restricting their administrative by converting manpower into machine power i.e. banks are decreasing manual powers and using maximum work done through machine power. Skilled and specialized man power is to be utilized

5. Handling Technology

Developing the right technology, deploying it optimally and then leveraging it to the maximum extent is essential to achieve and maintain high service and efficiency standards while remaining cost effective. Early adopters of technology acquire significant cut-throat advances Managing technology is therefore, a key challenge for the Indian banking sector

6. Customer Awareness

Awareness among consumers about the e-banking facilities is still at lower side in Indian Banks are not able to spread proper information about the use, & the facility of internet banking Less awareness of new technologies is among one of the most barrier in the development of e-banking.

7. Less Internet access

The internet banking channel has evolved over the years. The knowledge and availability of internet is still a one of the biggest challenges that prevails in Indian context. So the access of internet and information related to internet are major hurdles.

8. The faith Factor

Faith is the biggest problem to online banking for most of the customers. Conventional banking is favoured by the customers because of lack of trust on the online Security. They have a perception that online operation is risky due to which frauds can take Place.

11. Suggestion

The following suggestions are recommended for enhancing e-banking / internet banking services of banks to the customers

1. Banks should take necessary steps to create awareness among rural people about the advantages of e-banking / internet banking services available in the banks.
2. The e-banking / internet banking system should be enhanced to make the online enquiry and online payment much easier to the customers.
3. Public sector banks should improve their e-banking / internet banking services to compete with their private sector counterparts.
4. Most of the customers have not availed of the e-banking / internet banking services because they do not trust the internet channel presuming it as complicated. So banks may set up a team of personnel to train the customers to get acquainted with internet channel
5. The bank customers have perceived the risk of getting wrong information from e-banking / internet banking services. These illusions should be removed from the minds of the customers by bank people as these factors are the barriers for most of the customers for not adopting these services.
6. Though e-banking / internet banking is convenient and easy to use, customers are afraid of adopting these services because they think thatusing these "services are difficult and complicated". So, on-site training can be provided to the bank customers who intend to use e-banking / internet banking services.

VII. Conclusion

E-Banking has transformed not only the banking relationships but transformed the whole banking industry. The e- banking, therefore taken as a mandate by the banks rather than just an additional feature in most of the developed nations, as it is the economical medium to cater the banking customers. Today banking is not restricted to the traditional physical branch system, where banking staff need to be there personally for enabling banking transactions. But still there is strong requirement of customer- awareness regarding e- banking facility prevails in India and it can served through proper scanning and analysis of the market. Through e- banking, customers can process any banking transaction without even visiting bank branch at any time anywhere and this is known as "anywhere banking". Providing e- banking is no more considered as an additional feature of a banking institution, but now it is became an essential feature of a bank.

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14. The Study of Consumer Satisfaction Related with Online Shopping in India

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Abstract

In the era of globalization electronic marketing is a great revolution. Over the last decade maximum business organizations are running with technological change. Online shopping or marketing is the use of technology (i.e., computer) for better marketing performance.

Internet is an unusual thing that rules the digital world in recent time. "India's digital landscape is growing very fast and the major proliferation of internet is through mobile devices. Due to easily and well accessed internet the usage of the same is huge. There is243.2 million internet users and 106 million active users in India. This growing and diverse Internet population means that people having diverse tastes and purposes are now going to the Web for information and to buy products and services. The internet offers various benefits and offers to consumers that drive them more towards online shopping. Online shopping provides quick access to product related information, saving consumers time, effort and money, quality of the product, and shopping experience.

Key words:E-Commerce, Marketing, Online Shopping, Consumer Satisfaction.

Introduction

Online marketing is a new way of performing the task of marketing and shopping, made feasible by the advent of new technology, namely the Internet. On-line marketing is a form of direct marketing and entails the use of Internet technologies to reach out to customers. It is not a new philosophy of marketing. Broadly speaking, it means marketing online via the Internet. Personal computers, (PC), televisions (TV), cellular phones or personal digital assistance in a digital way, can serve the purpose. With advancement in technology, newer and newer means of going on-line are being devised.

Marketing can be defined as the process of satisfying human needs and wants with the help of information, services or goods through the exchange process. On-line marketing is a new branch of marketing.For a successful online marketer, one need to understand the basic

principles of marketing and marketing processes, including segmentation, targeting, need assessment, marketing research, product development, pricing, distribution and promotion. Online marketing should support the entire marketing programme. It does not and should not exist in a vacuum because the online component is only one part of the marketing solution and not the complete solution.

Objective of the Study

1. To understand the consumers satisfaction with online shopping.
2. To study the impact of online shopping on consumers lifestyle.

Research Methodology

The secondary data for this research study is collected through internet, websites, books, magazines, periodicals and business journals.

Review of Literature

Parikh Darshan (2011) in his thesis on **"Customer acceptance of internet shopping in India: impact of shopping orientations, knowledge and security"** revealed that demographic indicators such as age, gender, marital status, and income have been traditionally used in the study of consumer behavior and market segmentation.

DahiyaRicha (2012) in the study entitled **Impact of demographic factors of consumers on online shopping behaviour**: a study of consumers in India and the study found that On-line shopping is a recent phenomenon in the field of E-Business and is definitely going to be the future of shopping in the world. Most of the companies are running their on-line portals to sell their products/services online.

Bashir (2013) in the study **Consumer Behavior towards online shopping** of electronics revealed that online shopping is getting popular among the young generation as they feel more comfortable, time saving and convenient. It was analyzed from the survey that when a consumer makes a mind to purchase online electronic goods was affected by multiple factors.

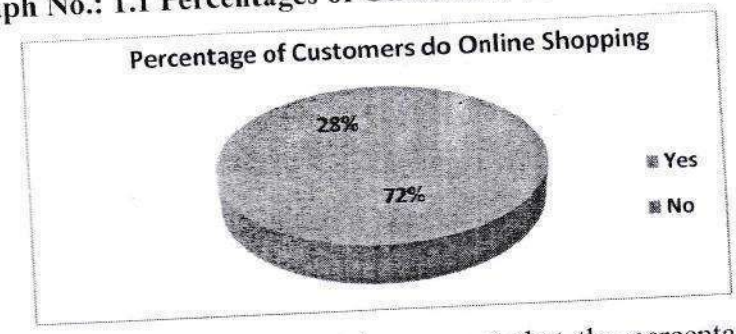
Online shopping in India

Online shopping had a slow journey in India, it has not picked up as much as it should have primarily due to the fact that internet penetration itself is quite low and secondly the online shopping experience has been bad to say the least. Although there are grass root problems, Online Shopping in India is evolving fast and has the potential to grow exponentially in the times to come, as the internet penetration reaches far and wide across the rural area.

Traditionally, Indians are conservative in their approach to shopping. They want to touch feel the products and test its features before buying anything. Most of us are also a witness to recent mall culture where all the products are available under a single roof and at competitive rice points. Little needs to be analyzed about it over here as most of you might have visited a mall at least for once as a past time on a weekend, if not for shopping precisely. Well, I often do it, to be frank. Next in line is the concept of virtual mall or online shopping which is already existent at its preliminary stage in India and is gradually growing exponentially. The market opened up with innovative online shopping initiatives from eBay, Rediff shopping and futurebazaar.com just to name a few. In a sort of change of version from tele-shopping to a broader form of online plus television shopping saw the emergence of a 24-hour shopping channel from Network 18 – TV 18 Home Shopping Network.

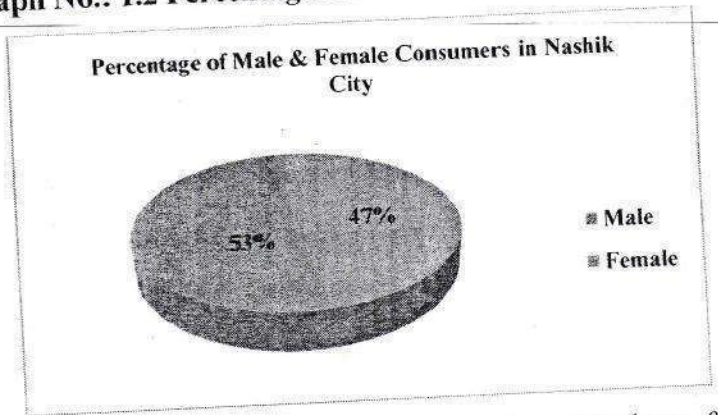
Analysis

Graph No.: 1.1 Percentages of Customers do Online Shopping



It is the result of above graph no. 1.1 represent that the percentages of customers do online shopping. The data collected from respondents was studied and the result of this that out of 100 respondents 72% people do online shopping where as 28% people do not shop online.

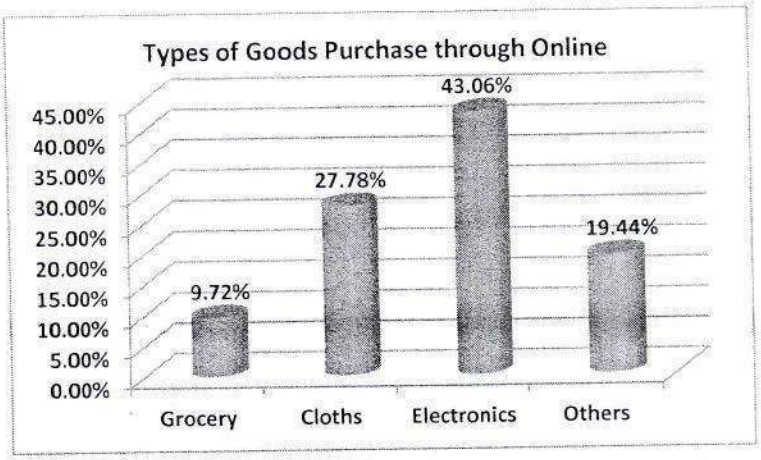
Graph No.: 1.2 Percentages of Male & Female Consumers



Graph No 1.2 shows the comparison between male respondents & female respondents those who are buy the products with the help of online shopping. In this global era the people use

new technology and modern shopping techniques for shopping, out of 100 respondents most of the i.e. 53% of female consumer buy products online and 47% male respondents shop products online.

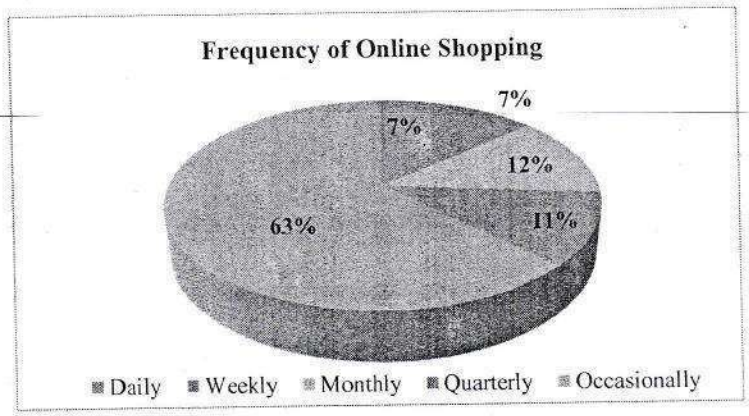
Graph No. : 1.3 Types of Goods Purchase through online shopping



Graph No. 1.3 indicate that various goods purchase by the respondents through online shopping now a days in this global era there are various products are available for the online shopping on various websites the result of the data collected is that most of the respondents purchase electronics goods and cloths which includes major part of mobiles, pen drive, accessories etc.,

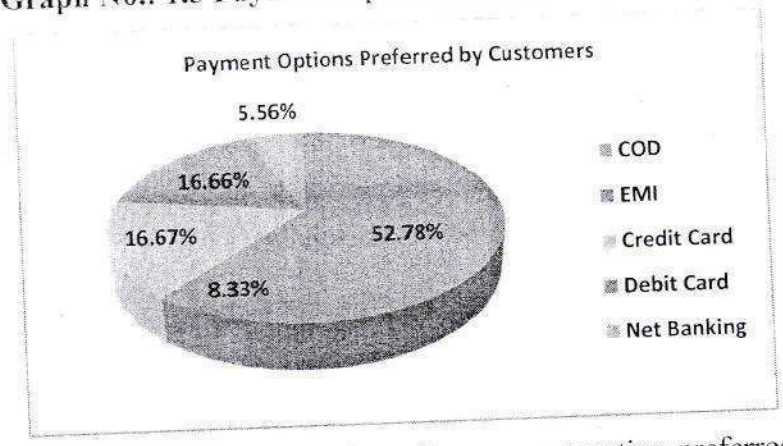
43.05% respondents purchase electronics good, 27.27% respondents purchase cloths through online shopping, 9.72% respondents buy grocery items where as 19.44% people purchase other goods.

Graph No: 1.4 Frequency of customers do Online Shopping



Graph No. 1.4 represent the 62.5% of the respondents did online shopping occasionally, 12.5% of the respondents did online shopping on monthly basis, 11.11 % of respondents did online shopping quarterly and 6.94% of respondents did online shopping weekly as well as daily.

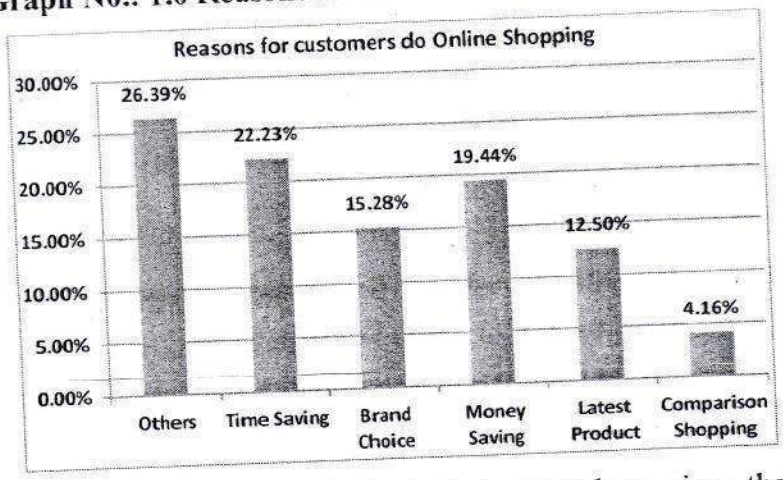
Graph No.: 1.5 Payment Option Preferred by Customers



The above Graph no.1.5 represent about the payment option preferred by the customers to payment of online shopping.

From the above graphical presentation shows that the most of the customers use cash on delivery mode to payment for online shopping, 52.77 % of the respondents use the cash on delivery mode for payment, 8.33 % of respondents prefer Installment System (EMI) mode for payment, 16.67 % of the respondents use debit card and the same percentage of respondents use credit card mode for payment and 5.56 % of respondents use the net banking mode for payment.

Graph No.: 1.6 Reasons for customers do Online Shopping



The above graphical presentation indicate that respondents gives the various views on reasons of online shopping.

From the above we can say that 26.39% of respondents buy good online because of comparison shopping, 22.23% respondents buy online products because of availability of latest products, 15.28% respondents gives the reasons of money saving, 19.44 % of respondents gives the reasons wide variety of brand choice, 12.5 % respondents give the reasons of time saving and 4.16 % respondents told the other reasons.

Problems Faced By Consumers While Doing Online Shopping

1.Delay: The main problem of online shopping is, you cannot receive the product immediately. You have to wait until the product arrives. Sometime it is better to have an item instantly than keep waiting for it for many days.

2.Inferior product: You don't know about the actual quality of the product. Sometimes the description of the product might be different than the actual product. As a result you might end up with inferior quality product.

3.Shipping Charge: Shipping charge and shipping delays are one of the main problems of shopping online. Items are generally cheaper in online web store. But sometime the addition of shipping charge makes the price similar or more expensive than your nearby local store.

4.Delivery Problem: Sometime you may face Delivery risk. Delivery risk occurs when the seller fails to deliver the original product or delivers a damaged product due to shipping problems.

5. Some items are better to buy from the real Store: You wouldn't like to buy any clothing products because you won't be able to know whether they are going to look good on you or not.

6.Return problem: Returning an item is difficult in case of online shopping. Although seller accepts sells return, they usually want the item within a short period of time and you also have to pay for the shipping charges.

7.Warranty issues: Many electronic items are sold without international warranty. So make sure you contact with the seller to verify whether the item has international warranty or not.

Conclusion

From the above study it can be concluded that online shopping is increasing continuously, where the percentage of female consumers is higher. Consumers give the preference for electronics goods. Most of the people do online shopping occasionally, consumers considered various factors before online shopping like prices of products and offer given by sellers.People do online shopping on the basis of suggestions and reviews on products given by friends & relatives. Customers used various shopping website for online shopping. Most of the customers use flipkart and amazon shopping website for shopping. Some customers do not shop

online because of they want to enjoy the traditional shopping with family and friends. Some customers do not prefer for online shopping because of product quality provided by sellers.

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Synthesis of a Novel, Efficient and Reusable Fe(II) Carboxymethylcellulose Catalyst and its Catalytic Activity in the Synthesis of 1,4-dihydropyrano [2,3-c] Pyrazole Derivatives

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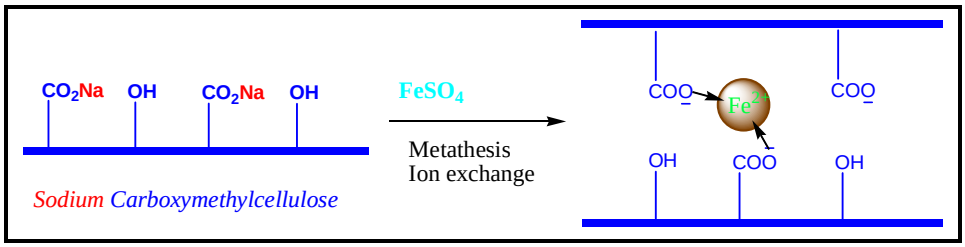
ABSTRACT

Simple and efficient method for the synthesis of 1,4-dihydropyrano[2,3-c]pyrazole derivatives has been developed by one-pot four-component reaction of various aldehydes, malononitrile, ethyl acetoacetate and phenyl hydrazine in the presence Fe(II)CMC as a novel, nanocomposite heterogeneous and reusable catalyst. In this method, Fe(II)CMC was prepared and characterized by SEM and FT-IR techniques. The catalyst was recovered and reused for several cycles without considerable loss of activity. The advantages of the protocol include rapid reactions with good yields, simple workup, and easy isolation of products. The synthesized compounds were characterized by FT- IR, ^{1}H NMR, and ^{13}C NMR spectroscopic technique.

Graphical Abstract



Schematic route for preparation of Fe (II) CMC catalyst.

Keywords: Fe(II) carboxymethylcellulose, Multi-component reaction, Nanocomposite catalyst, Pyranopyrazole.

INTRODUCTION

Heterocycles having pyranopyrazole constitute play an essential role in biologically active compounds. They have been widely used as medicinal intermediates because of their useful pharmacological and biological properties. Many of these compounds are known as antimicrobial [1],

anticancer [**2**], analgesic [**3**], and anti-inflammatory [**4**]. Furthermore, dihydropyrano[2,3 c]pyrazoles showed molluscicidal activity [**5**] and were identified as a screening hit for Chk1 kinase inhibitor [**6**].Therefore, considerable attention has been focused on the development of new methodologies for the synthesis of pyranopyrazoles. The first catalytic synthesis of 4H-pyrano [2,3-c] pyrazole was reported by Otto from 3-methyl-3-pyrazolin-5-one and arylidene malononitrile using base catalyst [**7**]. There are several methods reported in the literature for the synthesis of 4H-pyrano [2,3-c]pyrazoles by using catalyst such as, b-cyclodextrin [8], L-proline [**9**] triethylamine [**10**], piperidine [**11**], morpholine [**12**].Several methods have been reported involving heterogeneous catalysts, such as amberlyst A21[**13**], γ-alumina [**14**], SnO_2 QDs [**15**], Ce (IV)CMC [**16**].

Multicomponent reactions are highly important transformations due to their capacity to combine three or more substrates into a single target in one step[**17**]. MCRs typically obtain a substantial increase in molecular complexity and offer chance for diversity-oriented synthesis. Therefore, these reactions are important in drug synthesis [**18**].

Heterogeneous catalysts are vital in green synthesis because of their easy recovery, subsequent reuse and E factor [**19**]. The usage of heterogeneous metal catalyst instead of traditional homogeneous metal catalysts could be a more environmentally friendly alternative [**20**].

In this research, we report the modified method for preparation and characterization of Fe (II) CMC as a novel, nanocomposite heterogeneous catalyst (Scheme 1).The catalytic activity of Fe (II) CMC was also studied for the synthesis of pyrano[2,3-*c*]pyrazoles by one-pot four-component reaction of various aldehydes, malononitrile, ethyl acetoacetate and phenyl hydrazine. Ferrous(II)carboxymethylcellulose as expeditious reusable nanocomposite heterogeneous catalyst in an excellent yield(Scheme 2).

MATERIALS AND METHODS

All reagents were obtained from commercial sources. Progress of reaction was monitored by silica gel-G coated TLC plates in n-hexane: ethyl acetate system (8:2). The spot was visualized by exposing dry plate in UV chamber. Melting points were taken in open capillaries and are uncorrected. Scanning electron microscopy (SEM) was performed using Hitachi S-4008 instrument.^{1}H NMR and ^{13}C-NMR spectra were recorded on a Bruker Avance II 400 MHz NMR spectrometer (SAIF, Punjab University Chandigarh) in DMSO using TMS as internal standard. IR spectra were recorded on Schimadzu FT-IR affinity model 1 spectrometer using KBr pellets.

Preparation of Fe(II)carboxymethylcellulose *(*CMC−Fe (II))Catalyst: The 8 vv^{-1} aqueous solution of ferrous sulphate i.e.4 g ferrous sulphate in 46 mL of distilled water (solution 1). The 1 vv^{-1} aqueous solution of Na-CMC i.e. 0.5 g of Na-CMC was dissolved into 49.5 mL of distilled water and then Na-CMC/H_2O was stirred for 1 h (solution 2). Solution 1 was added drop wise to solution 2 and stirred for 2 h. The solid was precipitated and further left equilibrate in solution for overnight. The resulting solid was separated from the solution and washed thoroughly with distilled water, then dried in oven at 60°C to constant weight to provide the CMC-Fe (II) as dark brown powder.

General Procedure for the synthesis of pyranopyrazole derivatives: A mixture of aldehyde (2 mmol), malononitrile (2 mmol), ethyl acetoacetate (2 mmol), phenyl hydrazine (2 mmol), CMC−Fe (II) (60 mg) and was stirred in 4 mL aqueous ethanol (50%) at 70^{o}C for mentioned time in table 4. After completion of the reaction (monitored by TLC), the mixture was cooled to room temperature and then catalyst was separated from solid product by an external magnet and was washed with ethanol adequately, and dried in air for the next run. The product obtained washed with distilled water thoroughly. The products were further purified by recrystallization with ethanol.

Spectral data of Compounds (5a-h)

6-amino-1,4-dihydro-4-(4-hydroxyphenyl)-3-methyl-1-phenylpyrano[2,3-c]pyrazole-5 carbonitrile (5a): White solid; m.p.: 210-212°C; IR (cm^{-1}): 3419(NH_2), 3315 (NH_2), 2181 (CN), 2924 (C=C–H), 1396 (C=N), 1593(C= C aromatic), 1190(C-O-C) ; ^{1}H NMR (DMSO-d6, 400 MHz): δ_H: 1.79 (s, 3H, CH_3), 4.56 (s, 1H, CH=), 7.13 (br, s, 2H, NH_2), 6.71-6.74(d,2H, Ar-H),7.03– 7.05 (d, 2H, Ar–H), 7.29– 7.35 (m, 1H, Ar–H), 7.45– 7.51 (d, 2H, Ar–H), 7.78 (d, 2H, Ar–H), 9.35 (s, 1H, OH); ^{13}C NMR (DMSO, 400 MHz): δ = 159, 156, 145, 143, 137, 134, 129, 128, 126, 120, 119, 115, 99, 58, 13 ppm.

6-amino-1,4-dihydro-3-methyl-1-phenyl-4-p-tolylpyrano[2,3-c]pyrazole-5-arbonitrile(5b): White solid; m.p.: 176–178°C; IR (cm^{-1}): 3464(NH_2), 3348 (NH_2), 2187 (CN), 2985 (C=C–H), 1388 (C=N), 1602 (C= C aromatic), 1028(C-O-C); 1H NMR (DMSO-d6, 400 MHz): δ_H:1.79 (s, 3H, CH_3), 2.30 (s, 3H, CH_3), 4.59 (s, 1H, CH=), 7.13 (br, s, 2H, NH_2), 7.11– 7.13 (m, 4H, Ar–H),7.26– 7.30 (m, 1H, Ar–H), 7.46– 7.48 (d, 2H, Ar–H), 7.81 (d, 2H, Ar–H); ^{13}C NMR (DMSO, 400 MHz): δ = 165, 158, 155, 145, 136, 131, 129, 121, 114, 107, 59, 55.5, 20.6 13.6 ppm.

6-amino-1,4-dihydro-3-methyl-1,4-diphenylpyrano[2,3-c]pyrazole-5-carbonitrile (5c): White solid; m.p.: 170-172°C; IR (cm^{-1}): 3358(NH_2), 3350 (NH_2), 2260 (CN), 2983 (C=C–H), 1364 (C=N), 1604 (C= C aromatic), 1035(C-O-C); 1H NMR (DMSO-d6, 400 MHz): δ_H: 1.94 (s, 3H, CH_3), 4.68 (s, 1H, CH=), 4.73 (br, s, 2H, NH_2), 7.13-7.31(m, 10H, Ar–H), ^{13}C NMR (DMSO, 400 MHz): δ = 168, 145, 137, 136, 130, 129, 128.8, 128.7, 119.2, 113, 60, 56, 43, 18 ppm.

6-amino-4-(3-chlorophenyl)-1,4-dihydro-3-methyl-1-phenylpyrano[2,3-c]pyrazole-5-carbo nitrile (5d): White solid; m.p.: 156–158°C; IR (cm^{-1}): 3424(NH_2), 3346 (NH_2), 2260 (CN), 2981 (C=C–H), 1301 (C=N), 1593 (C= C aromatic), 1089(C-O-C) ; 1H NMR (DMSO-d6, 400 MHz): δ_H: 1.93 (s, 3H, CH_3), 4.68 (s, 1H, CH=), 4.76 (br, s, 2H, NH_2), 7.19-7.37(m, 5H, Ar–H), 7.48(d, 2H, Ar–H),7.67(d, 2H, Ar–H) ^{13}C NMR (DMSO, 400 MHz): δ = 168, 145, 138, 136, 133 130, 128, 127, 119, 112, 60, 56, 15 ppm.

6-amino-4-(2-chlorophenyl)-1,4-dihydro-3-methyl-1-phenylpyrano[2,3-c]pyrazole-5-carbonitrile (5e): White solid; m.p.: 148–150°C, IR (cm^{-1}): 3442(NH_2), 3358 (NH_2), 2258 (CN), 2983(C=C–H), 1380 (C=N), 1604 (C= C aromatic), 1051(C-O-C) ; 1H NMR (DMSO-d6, 400 MHz): δ_H: 1.91(s, 3H, CH_3), 5.32 (s, 1H, CH=), 4.73 (br, s, 2H, NH_2), 7.21– 7.43 (m, 5H, Ar–H),7.48 (d, 2H, Ar–H),7.68 (d, 2H, Ar–H); ^{13}C NMR (DMSO, 400 MHz): δ = 165.9, 159, 156, 146.3, 129, 119, 113, 111, 107, 59, 57, 54, 13 ppm.

6-amino-1,4-dihydro-4-(3-methoxyphenyl)-3-methyl-1-phenylpyrano[2,3-c]pyrazole-5-carbo nitrile (5f): White solid; m.p.: 132-134°C, IR (cm^{-1}): 3452(NH_2), 3350 (NH_2), 2258 (CN), 2973 (C=C–H), 1411 (C=N), 1598 (C= C aromatic), 1037(C-O-C); 1H NMR (DMSO-d6, 400 MHz): δ_H: 1.79 (s, 3H, CH_3), 3.80 (s, 3H, OCH_3), 4.80 (s, 1H, CH=), 6.98 (br, s, 2H, NH_2), 6.82(d, 2H, Ar–H), 7.05 (d, 2H, Ar–H), 7.19-7.24 (m, 1H, Ar–H),7.39 (d, 2H, Ar–H),. ^{13}C NMR (DMSO, 400 MHz): δ = 160.5, 151, 148, 126, 123, 111.1, 108, 55.5, 13 ppm.

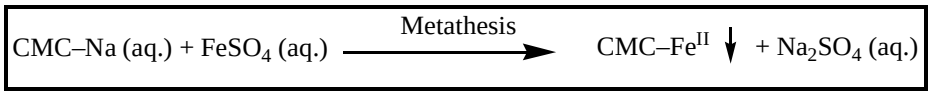
6-amino-4-(4-chlorophenyl)-1,4-dihydro-3-methyl-1-phenylpyrano[2,3-c]pyrazole-5-carbonitrile 5g): White solid; m.p.: 176–178°C; IR (cm^{-1}): 3370(NH_2), 3330 (NH_2), 2198 (CN), 2987 (C=C–H), 1390 (C=N), 1597 (C= C aromatic), 1022(C-O-C) ; 1H NMR (DMSO-d6, 400 MHz): δ_H: 1.89 (s, 3H, CH_3), 5.62 (s, 1H, CH=), 4.73 (br, s, 2H, NH_2), 7.29-7.37(m, 3H, Ar–H), 7.41(d, 2H, Ar–H),7.47-7.51(m, 2H, Ar–H), 7.78(m, 2H, Ar–H), ^{13}C NMR (DMSO, 400 MHz): δ =168, 145, 138, 135, 132 130, 128, 128.5, 118, 114, 60, 56, 14 ppm.

6-amino-1,4-dihydro-3-methyl-4-(4-nitrophenyl)-1-phenylpyrano[2,3-c]pyrazole-5-carbonitrile 5h): Yellow solid; m.p.: 198–200°C; IR (cm^{-1}): 3412(NH_2), 3348 (NH_2), 2258 (CN), 2985 (C=C–H), 1352 (C=N), 1600 (C= C aromatic), 1161(C-O-C) ; 1H NMR (DMSO-d6, 400 MHz): δ_H: 1.79 (s, 3H,

CH_3), 4.95 (s, 1H, CH=), 6.98 (br, s, 2H, NH_2), 7.32-7.35(m, 1H, Ar–H), 7.48-7.53(m, 2H, Ar–H),7.57(d, 2H, Ar–H), 7.80(d, 2H, Ar–H), ^{13}C NMR (DMSO, 400 MHz): δ = 160, 142, 138, 137, 135 134, 130, 127, 119, 114, 60, 56, 18 ppm.

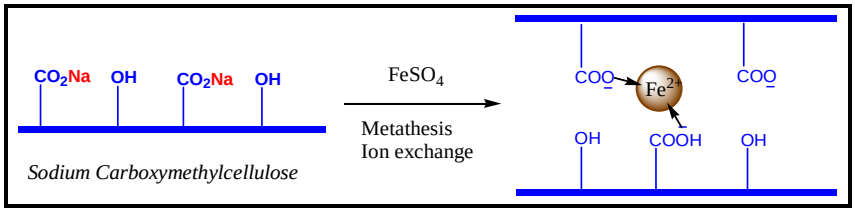
RESULTS AND DISCUSSION

Preparation and characterization of Fe (II)−CMC catalyst: Fe (II) CMC catalyst was prepared by metathesis reaction in which Na^+ ion is exchanged by Fe^{+2} ion(procedure described above).



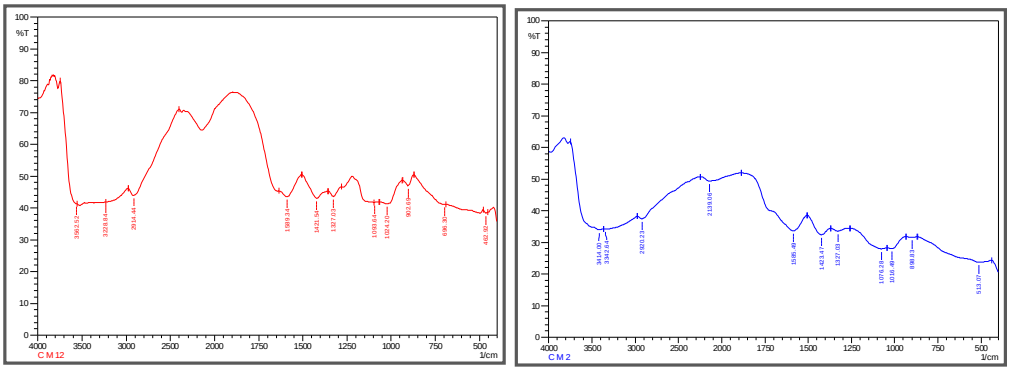
Scheme 1. Synthesis of Fe (II) −CMC catalyst by metathesis reaction.

The prepared Fe (II) −CMC catalyst was characterized using techniques including FT-IR and SEM. The FT-IR spectroscopy is an important tool that determines the coordination property of the polymer with metal ions. We have recorded FT-IR spectra of CMC−Na (Figure 1 a) and CMC−Fe^{II} (Figure 1 b).



Schematic route for preparation of Fe (II) CMC catalyst.

Na-CMC FTIR (Figure 1 a) spectrum shows the characteristic broad band of -OH groups at 3562, the -CH stretching vibration band at 2914 cm^{-1}, the asymmetric stretching band of ether groups at 1093 cm^{-1}, and the associated bands of carboxyl groups at 1589 and 1421 cm^{-1}. The Fe-CMC FTIR(b) spectrum shows the characteristic broad band of -OH groups at 3414 cm^{-1}, the –CH stretching vibration band at 2920 cm^{-1}, the asymmetric stretching band of ether groups at 1076 cm^{-1}, and the associated bands of carboxyl groups at 1585 and 1423 cm^{-1}. The peak at 1093 cm^{-1} is due to $–CH_2–O–CH_2–$ stretching which is slightly shifted to 1076cm^{-1} for CMC−Fe (II) , implying a very weak coordination between $–CH_2–O–CH_2–$ and Fe(II). Evidently, CMC can interact with Fe^{+2}*via* both the −COO− and −OH functional groups.



(a) (b)

Figure 1. IR spectra of (a) Na-CMC (b) Fe (II)-CMC.

Surface morphology and size of the as-synthesized catalyst that play an important role in the catalytic performance were investigated with scanning electron microscopy (SEM). The SEM image

of freshly prepared Fe(II) CMC shows that the particles have morphology with rough surface (Figure 2). Such rough structure of the catalyst increases surface area of catalyst and improves its catalytic activity.

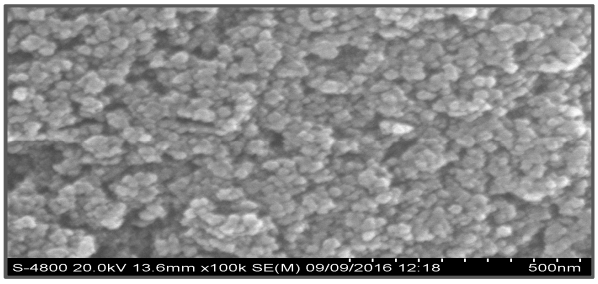


Figure 2. SEM images of fresh Fe(II) CMC catalyst

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Catalytic activity of Fe IICMC catalyst on synthesis of pyranopyrazole: The studies were initiated to optimize the reaction conditions for pyranopyrazole synthesis, several parameters such as the loading amount of catalyst, solvent and temperature were explored systematically by choosing the reaction of 4- hydroxyl benzaldehyde, malononitrile, ethyl acetoacetate and phenyl hydrazine as a model.

The model reaction was carried with the amount of Fe(II) CMC ranging from 20-100 mg (Table 1). Trace amount of the product was detected in the absence of the catalyst (Table 1, entry 1), which shows that the catalyst played key role in this transformation. It was found that 60 mg of catalyst was enough to push the reaction to completion.

Table 1. Effect of the amount of catalyst on the synthesis of 6-amino-1,4-dihydro-4-(4-hydroxyphenyl)-3-methyl-1-phenylpyrano[2,3-c]pyrazole-5-carbonitrile[a].

Entry	Catalyst amount (mg)	Time(min)	Yield[b] (%)
1	--	90	30
2	20	40	71
3	40	30	82
4	60	15	90
5	80	15	85

[a]Reaction conditions: 4-hydroxybenzaldehyde (2 mmol), malononitrile (2 mmol), ethyl acetoacetate (2 mmol), Phenyl hydrazine (2 mmol), and 50% EtOH (4 mL) at 70^0C, [b]Isolated yield

Having screened various solvents in the model reaction, we found that aqueous ethanol (50%) as the solvent gave the highest yield of 90% (Table 2, entry 4).

Table 2. Effect of solvents on the synthesis of 6-amino-1,4-dihydro-4-(4-hydroxyphenyl)-3-methyl-1 -phenylpyrano[2,3-c]pyrazole-5-carbonitrile[a].

Entry	Catalyst amount (mg)	Solvent	Time (min)	Yield[b] (%)
1	60	--	60	60
2	60	H_20	30	70
3	60	EtOH	25	85
4	60	50% EtOH	15	90
5	60	80% EtOH	20	87
6	60	DMF	25	65
7	60	THF	30	55

[a]Reaction conditions: 4-hydroxybenzaldehyde (2 mmol), malononitrile (2 mmol), ethyl acetoacetate (2 mmol), Phenyl hydrazine (2 mmol), Fe^{II}CMC (60mg) and solvent (4 mL) at 70°C, [b]Isolated yield

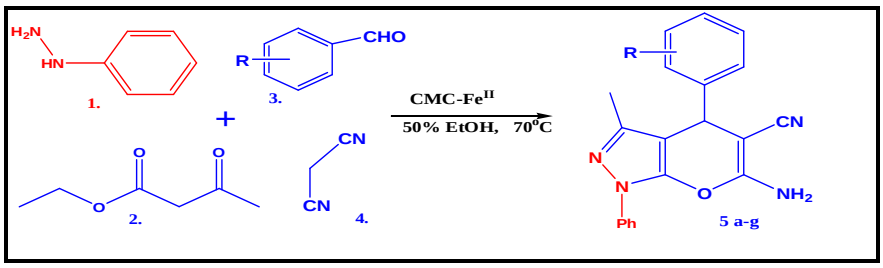
To investigate effect of temperature on transformation as shown in table 3, obtained the best results at 70°C (Table 3, entry 4), hence all the reactions performed at the temperature of 70°C.

Table 3. Effect of temperature on reaction time and yields for the synthesis of 6-amino-1,4-dihydro-4-(4-hydroxyphenyl)-3-methyl-1-phenylpyrano[2,3-c]pyrazole-5-carbonitrile[a].

Entry	Temp (^{0}C)	Time (min)	Yield[b] (%)
1	RT	600	28
2	40	180	44
3	50	50	69
4	60	30	80
5	70	15	90
6	80	15	90

[a]Reaction conditions: 4-hydroxybenzaldehyde (2 mmol), malononitrile (2 mmol), ethyl acetoacetate (2 mmol), Phenyl hydrazine (2 mmol), and 50% EtOH (4 mL),[b]Isolated yield

After the study of above optimized reaction conditions were explored for the Synthesis of series of 6-amino-1,4-dihydro-3-methyl-1,4-diphenylpyrano[2,3-c]pyrazole-5-carbonitriles (**5a-g)** from phenyl hydrazine **1**, ethyl acetoacetate **2**, substituted benzaldehyde **3**, and malononitrile **4** catalyzed by CMC−Fe II in 4 mL of 50% ethanol at 70°C (Scheme-2) and the results are summarized in table 4.



Scheme 2. Synthesis of series of 6-amino-1,4-dihydro-3-methyl-1,4-diphenylpyrano[2,3-c]pyrazole-5-carbonitriles (**5a-h)**

The structures of all 5a-h compounds were confirmed by FT-IR, ^{1}H NMR and ^{13}C NMR spectroscopic methods. Also, their melting points were compared with literature report.

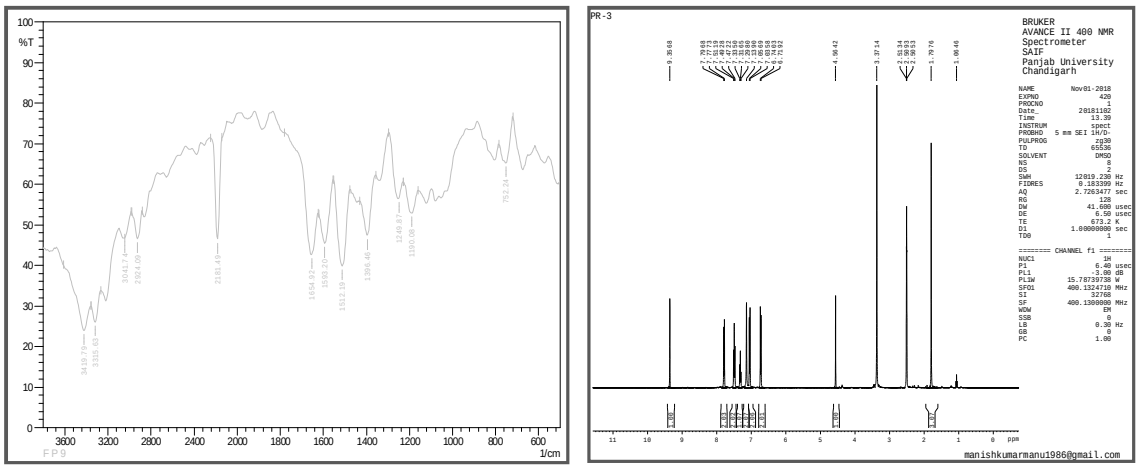


Figure-3. FTIR and ^{1}H NMR spectrum of compound 5a.

Table 4. CMC−Fe II catalyzed synthesis of 6 -amino-1,4-dihydro-3-methyl-1,4-diphenylpyrano[2,3-c]pyrazole5-carbonitriles(**5a-h)**

Entry	R	Time (min)	Yield[b] (%)
5a	4-OH	15	90
5b	4-CH_3	12	92
5c	H	18	86
5d	3-Cl	15	84
5e	2-Cl	21	80
5f	3-OCH_3	15	91
5g	4-Cl	12	92
5h	4-NO_2	15	88

[a]Reaction conditions: 4-hydroxybenzaldehyde (2 mmol), malononitrile (2 mmol), ethyl acetoacetate (2 mmol), Phenyl hydrazine (2 mmol), Fe^{II} CMC (60mg) and 50% EtOH (4 mL) at 70°C, [b]Isolated yield

APPLICATION

Nanocomposites of cellulose and its derivatives are gaining importance because of their value-added applications in science and technology. FeII CMC like nanocomposites with good tensile strength biomedical applications and as host materials. Ferrous(II) carboxymethylcellulose as expeditious reusable heterogeneous catalyst in an excellent yield for synthesis of pyranopyrazole derivatives as pharmaceutically and biologically important compounds.

CONCLUSION

In conclusion, we prepared Fe (II) CMC as a novel nanocomposite recoverable catalyst and it has been characterized using SEM and FT-IR techniques. The catalytic activity of the prepared catalysts was investigated in the synthesis of 1,4-dihydropyrano[2,3-c]pyrazole derivatives through one-pot multi-component reaction of various aldehydes, malononitrile, ethyl acetoacetate and phenyl hydrazine in the presence Fe(II) CMC as a novel, nanocomposite heterogeneous and reusable catalyst. The catalyst was recovered and reused for several cycles without considerable loss of activity. The advantages of the protocol include rapid reactions with good yields, simple workup, and easy isolation of products.

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Synthesis of 6-Amino-2, 4-Dihydropyrano-[2, 3-*c*]Pyrazol-5-Carbonitriles Catalyzed by Cerium(IV)carboxymethylcellulose under Solvent-Free Conditions

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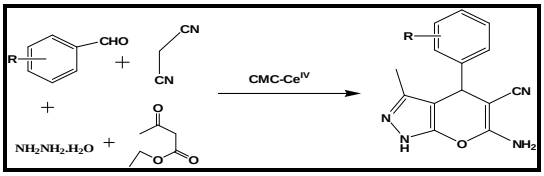
ABSTRACT

An efficient, high-yielding, and rapid protocol has been developed for the synthesis of 6-amino-2,4-dihydropyrano[2,3-c]pyrazol-5-carbonitriles derivatives via a one-pot, four-component, reaction of hydrazinehydrate, ethyl acetoacetate, aldehydes, and malononitrile using Cerium(IV) carboxymethylcellulose as expeditious reusable heterogeneous catalyst. The protocol proves to be efficient and environmentally benign in terms of very easy workup, good yields, and ease of recovery of catalyst.

Graphical Abstract



Synthesis of 6-amino-4-aryl-3-methyl-2,4-dihydropyrano[2,3-c]pyrazole-carbonitriles catalyzed by CMC−Ce (IV)under solvent free conditions

Keywords: Heterogeneous catalyst, Cerium(IV) carboxymethylcellulose, Four-component reaction, pyrano[2,3-c]pyrazole.

INTRODUCTION

Multicomponent reactions (MCRs) play an important role in modern organic chemistry because they generally exhibit higher atom economy and selectivity as well as produce fewer by-products compared to classical multistep synthesis [**1**]. MCRs are easy to perform, inexpensive, and quick, consume less energy, and involve simple experimental procedures [**2**]. Dihydropyran [2,3-C]pyrazole moiety in their molecular framework have been reported as anticancer-antitumor [**3**], analgesic [**4**],

anti-inflammatory [5], antimicrobial [6], molluscicidal activities [7] and have been identified as a screening hit for Chk1 kinase inhibitor [8].

Otto first attempted, synthesis of 4H-pyrano [2,3-c] pyrazole from 3-methyl-3-pyrazolin-5-one and arylidene malononitrile using base catalyst [9]. There are several methods reported in the literature for the synthesis of 4H-pyrano [2,3-c]pyrazoles by using catalyst such as triethylamine [10], piperidine [11], morpholine [12], b-cyclodextrin [13], L-proline [14], acidic ionic liquid [15], tetra(n-butyl)ammonium bromide [16], P_2O_5-SiO_2 [17], $CeCl_3$ [18], and $NH_4H_2PO_4/Al_2O_3$ [19]. Several methods involving heterogeneous catalysts, such as amberlyst A21 [20], γ-alumina [21], and SnO_2 QDs [22], have been reported.

Recently, heterogeneous catalysts have been highly acknowledged for the sustainable development of any catalytic process because of their easy recovery, recyclability, minimization of undesired toxic wastes, and E factor [23]. The usage of heterogeneous metal Lewis acid catalyst instead of traditional homogeneous metal Lewis and Bronsted acid catalysts could be a more environmentally friendly alternative. Solid catalysts provide numerous opportunities for recovering and recycling catalysts from reaction environments [24].

Looking at these reactions, we decided to investigate efficiency of Cerium(IV)carboxymethylcellulose [25] heterogeneous catalyst for the synthesis of 6-amino-2,4-dihydropyrano [2,3-c]pyrazol-5-carbonitriles. Herein we report a one pot synthesis of 6-amino-2,4-dihydropyrano [2,3-c]pyrazol-5-carbonitriles derivatives from ethyl acetoacetate, hydrazine hydrate, aldehydes, and malononitrile using Cerium(IV) carboxymethylcellulose as expeditious reusable heterogeneous catalyst in an excellent yield (Scheme 1).

MATERIALS AND METHODS

Melting points was taken in open capillaries and are uncorrected. Progress of reaction was monitored by silica gel-G coated TLC plates in n-hexane: ethyl acetate system (9:1).The spot was visualized by exposing dry plate in UV chamber. IR spectra were recorded on Schimadu IR affinity model 1 spectrometer using KBr pellets.^{1}H NMR and ^{13}C-NMR spectra were recorded on a Bruker Avance II 400 MHz NMR spectrometer (SAIF, Punjab University Chandigarh) in DMSO using TMS as internal standard. All reagents were obtained from commercial sources.

Typical Reaction procedure

Preparation of Cerium(IV) carboxymethylcellulose(CMC−Ce(IV)) Catalyst: The Cerium(IV) carboxymethylcellulose were prepared following the literature procedure [25]. The 5.5 wt.% aqueous solution of cerium(IV) ammonium nitrate (5.5 g dissolved in 94.5 mL H_2O) was slowly added drop wise to an aqueous 1.0 wt.% solution of sodium carboxymethylcellulose (1.0 g dissolved in 99 mL H_2O) with constant stirring at room temperature. Yellow solid was precipitated immediately which was left to equilibrate in solution for 12 h. The resulting solid was separated from the solution by suction and washed thoroughly with distilled water, then dried at 60◦C to constant weight to provide the CMC−Ce(IV) as yellow powder.

General Procedure for the Synthesis of 6-Amino-2, 4-dihydropyrano[2, 3-c]pyrazol-5-carbonitriles: A mixture of ethyl acetoacetate (2 mmol, 0.26 g), hydrazine hydrate(2 mmol, 0.12 g), aldehydes (2 mmol), malononitrile (2 mmol, 0.13 g) and CMC−Ce(IV) (10 mol%) was placed in a round bottom flask. The reaction mixture was stirred at room temperature under an open atmosphere for a specific time, as shown in table 1. Progress of the reaction was monitored by TLC. After the completion of the reaction, the reaction mixtures as heated dissolve the product in ethanol and filtered hot. The filtrate was allowed to stand at room temperature when the product separated. It was filtered

and wash with water, followed by a mixture of ethyl acetate/hexane (20:80v/v), which was further purified by recrystallization with ethanol.

Spectral data of 6-Amino-2,4-dihydropyrano[2,3-c]pyrazol-5-carbonitriles

6-Amino-3-methyl-4-(p-tolyl)-2,4-dihydropyrano[2,3-c]pyrazole-5-carbonitrile (1): White solid; m.p.: 172–175^{0}C, lit. [25] m.p.: 174–177^{0}C; IR (cm^{-1}): 3406(NH_2), 3331 (NH_2), 3219(NH), 2197 (CN), 2974 (C=C–H), 1467 (C=N), 1622 (C= C aromatic), 1190(C-O-C); 1H NMR (DMSO-d6, 400 MHz): δ_H:1.1 (s, 3H, CH_3), 2.32 (s, 3H, CH_3), 4.28 (s, 1H, CH=), 6.58 (br, s, 2H, NH_2), 7.02– 7.08 (m, 4H, Ar–H), 12.11 (s, 1H);^{13}C NMR (DMSO, 400 MHz): δ = 158, 156, 141, 135, 128.7, 127.02, 107, 59, 20.6, 13.6 ppm.

6-Amino-4-(4-methoxyphenyl)-3-methyl-2,4-dihydropyrano[2,3-c]pyrazole-5carbonitrile(2): White solid; m.p.: 170–174^{0}C, lit. [25] m.p.: 172–176^{0}C; IR (cm^{-1}): 3400(NH_2), 3337 (NH_2), 3229(NH), 2201 (CN), 2982 (C=C–H), 1396 (C=N), 1598 (C= C aromatic), 1178(C-O-C); 1H NMR (DMSO-d6, 400 MHz): δ_H: 2.30 (s, 3H, CH_3), 3.72 (s, 3H, OCH_3), 4.27 (s, 1H, CH=), 6.75 (br, s, 2H, NH_2),6.82(d, 2H, Ar–H), 7.09(d, 2H, Ar–H), 12.07 (s, 1H); ^{13}C NMR (DMSO, 400 MHz): δ = 165, 158, 155, 136.9, 136, 131, 129, 121, 114, 107, 59, 55.5, 13.6 ppm.

6-Amino-3-methyl-4-(4-nitrophenyl)-2,4-dihydropyrano[2,3-c]pyrazole-5-carbonitrile (3): White solid; m.p.: 194–196^{0}C, lit.[25] m.p.: 194–196^{0}C; IR (cm^{-1}): 3398(NH_2), 3329 (NH_2), 3217(NH), 2201 (CN), 2974 (C=C–H), 1364 (C=N), 1663 (C= C aromatic), 1064(C-O-C); 1H NMR (DMSO-d6, 400 MHz): δ_H: 2.38 (s, 3H, CH_3), 4.49 (s, 1H, CH=), 7.03 (br, s, 2H, NH_2),7.47(d, 2H, Ar–H), 8.20(d, 2H, Ar–H), 12.08 (s, 1H); ^{13}C NMR (DMSO, 400 MHz): δ = 164.9, 158, 157, 152, 146.3 128.7, 123.6, 119.2, 105, 60, 56, 40,13.6 ppm.

6-Amino-3-methyl-4-(2-nitrophenyl)-2,4-dihydropyrano[2,3-c]pyrazole-5-carbonitrile (4): White solid; m.p.: 176–178^{0}C, lit.[25] m.p.: 178–180^{0}C; IR (cm^{-1}): 3445(NH_2), 3300 (NH_2), 3202(NH), 2210 (CN), 2980 (C=C–H), 1371 (C=N), 1604 (C= C aromatic), 1070(C-O-C); 1H NMR (DMSO-d6, 400 MHz): δ_H: 2.36 (s, 3H, CH_3), 5.08 (s, 1H, CH=), 6.96 (br, s, 2H, NH_2),7.45(m, 2H, Ar–H), 7.83(m, 2H, Ar–H), 12.05 (s, 1H); ^{13}C NMR (DMSO, 400 MHz): δ = 164.9, 158, 157, 148,139, 133 130, 128, 127, 123, 118, 106, 60, 56, 32, 13 ppm.

6-Amino-3-methyl-4-(m--tolyl)-2,4-dihydropyrano[2,3-c]pyrazole-5-carbonitrile (5): White solid; m.p.: 152–154^{0}C, IR (cm^{-1}): 3383(NH_2), 3338 (NH_2), 3223(NH), 2191 (CN), 2960(C=C–H), 1398 (C=N), 1604 (C= C aromatic), 1060(C-O-C) ; 1H NMR (DMSO-d6, 400 MHz): δ_H:2.32 (s, 3H, CH_3), 3.73 (s, 3H, CH_3), 4.29 (s, 1H, CH=), 6.68 (br, s, 2H, NH_2),6.72– 6.77 (m, 4H, Ar–H), 12.05 (s, 1H); ^{13}C NMR (DMSO, 400 MHz): δ = 165.9, 159, 156, 146.3, 129, 119, 113, 111, 107, 59, 57, 54, 13 ppm.

6-Amino-4-(3,4-dimethoxylphenyl)-3-methyl-2,4-dihydropyrano[2,3-c]pyrazole-5-carbonitrile (6): White solid; m.p.: 174^{0}C, lit.[11] m.p.: 176–178^{0}C; IR (cm^{-1}): 3450(NH_2), 3337 (NH_2), 3109 (NH), 2222 (CN), 2943 (C=C–H), 1446 (C=N), 1575 (C= C aromatic), 1155(C-O-C); 1H NMR (DMSO-d6, 400 MHz): δ_H:2.52 (s, 3H, CH_3), 3.86 (s, 6H, OCH_3), 3.36 (s, 1H, CH=), 8.58 (br, s, 2H, NH_2), 7.02 (d, 1H, Ar–H), 7.34 (dd, 1H, Ar–H), 7.49 (d, 1H, Ar–H), 12.07 (s, 1H).^{13}C NMR (DMSO, 400 MHz): δ = 160.5, 151, 148, 126, 123, 111.1, 108, 55.5, 13 ppm.

6-Amino-3-methyl-4-phenyl-2,4-dihydropyrano[2,3-c]pyrazole-5-carbonitrile (7): White solid; m.p.: 168^{0}C, lit.[25] m.p.: 164–167^{0}C; IR (cm^{-1}): 3391(NH_2), 3335 (NH_2), 3217(NH), 2189 (CN), 3061 (C=C–H), 1398 (C=N), 1612 (C= C aromatic), 1066(C-O-C) ; 1H NMR (DMSO-d6, 400 MHz): δ_H:1.4 (s, 3H, CH_3), 4.10 (s, 1H, CH=), 6.65 (br, s, 2H, NH_2), 7.44– 7.20 (m, 5H, Ar–H), 12.01 (s, 1H), ppm.

6-Amino-4-(4-chlorophenyl)-3-methyl-2,4-dihydropyrano[2,3-c]pyrazole-5-carbonitrile(8):
White solid; m.p.: 160^{0}C, lit.[25] m.p.: 158–160^{0}C; IR (cm^{-1}): 3406(NH_2), 3331 (NH_2), 3219(NH), 2193 (CN), 2987 (C=C–H), 1465 (C=N), 1681 (C= C aromatic), 1060(C-O-C) ; 1H NMR (DMSO-d6, 400 MHz): δ_H:1.83 (s, 3H, CH_3), 4.52 (s, 1H, CH=), 6.09 (br, s, 2H, NH_2), 7.22(d, 2H, Ar–H), 7.85 (d, 2H, Ar–H), 12.14 (s, 1H) ppm.

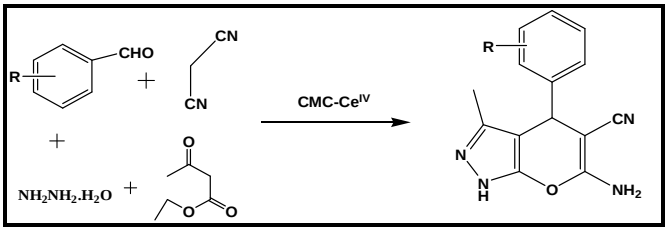
RESULTS AND DISCUSSION

To the best of our knowledge, this are the first examples of the use of Cerium(IV) carboxymethylcellulose (CMC−Ce ^{IV}) catalyst for the synthesis of 6-Amino-2,4-dihydropyrano[2,3-c] pyrazol-5-carbonitriles. The studies were initiated to optimize the reaction conditions for a model reaction of hydrazine hydrate, ethyl acetoacetate, benzaldehyde, and malononitrile in the presence of different mol% of catalyst (Table 1). To establish the real effectiveness of the catalyst for the synthesis of 6-amino-3-methyl-4-(3-phenyl)-2,4-dihydropyrano[2,3-c]pyrazole-5-carbonitrile, a test reaction was performed without catalyst using hydrazine hydrate, ethyl acetoacetate, benzaldehyde,

Table 1. Synthesis of 6-amino-4-aryl-3-methyl-2, 4-dihydropyrano [2, 3-c]pyrazole-carbonitriles catalyzed by CMC−Ce^{IV} .

Entry	CMC−Ce^{IV} (mol %)	Time (min)	Yield (%)
1	No catalyst	90	30
2	5	20	76
3	10	10	92
4	15	15	87
5	20	20	85

and malononitrile. It was found that only 30% yield of product was obtained in the absence of catalyst even after 1.5 h. To develop a viable approach, the model reaction was investigated by employing different mol% of CMC−Ce^{IV} catalyst. Moreover, we found that the yields were obviously affected by the amount of CMC−Ce^{IV} loaded (Table-1).



Scheme 1. Synthesis of 6-amino-4-aryl-3-methyl-2,4-dihydropyrano[2,3-c]pyrazole-carbonitriles catalyzed by CMC−Ce^{IV} under solvent free conditions.

Table 2. CMC−Ce^{IV} catalyzed synthesis of 6-amino-4-aryl-3-methyl-2,4-dihydropyrano [2,3-c]pyrazole-carbonitriles

Entry	R	Time(min)	Yield (%)
1	4-CH_3	10	86
2	4-OCH_3	13	84
3	4-NO_2	10	92
4	3-NO_2	15	84
5	3-OCH_3	12	85
6	3,4-$(OCH_3)_2$	15	86
7	H	10	92
8	4-Cl	12	89

Therefore, 10 mol% of CMC−Ce^{IV} was sufficient and optimal quantity for the completion of the reaction. By using this criteria, present study describe the synthesis of series of 6-amino-4-aryl-3-methyl-2,4-dihydropyrano[2,3-c]pyrazole-carbonitriles from hydrazine hydrate, ethyl acetoacetate, benzaldehyde and malononitrile catalyzed by CMC−Ce^{IV} under solvent free conditions (Scheme- I). The results of CMC−Ce^{IV} catalyzed synthesis of 6-amino-4-aryl-3-methyl-2,4-dihydropyrano[2,3-c] pyrazole-carbonitriles are presented in table 2. The structure of compounds 1–8 was deduced from their infrared spectral, ^{1}H NMR, and ^{13}CMR data. Also, their melting points were compared with literature reports.

APPLICATION

These investigations involve use of solvent free method. The procedure offers advantages in terms of better yields, short reaction times, mild reaction conditions, and reusability of the catalyst. The low cost, and ready availability of catalyst, an environmentally benign procedure makes this methodology, a useful contribution to the existing procedures available for the synthesis of pyranopyrazole derivatives as a biologically and pharmaceutically relevant materials.

CONCLUSIONS

In conclusion, a novel one-pot four-component synthesis in the presence of cerium carboxymethylcellulose (CMC−Ce^{IV}) and reusable catalyst under solvent-free condition has been developed. To the best of our knowledge, this is the first example of used of CMC−Ce^{IV} for the synthesis of these pyranopyrazole derivatives under solvent-free conditions. Present methodology offers very attractive features such as cleaner reaction profile, high efficiency, shorter reaction times, higher yields, and tolerance of wide scope of substrates which make the process efficient and practical. Simplicity, making it an attractive alternative for the clean synthesis of pyranopyrazole derivatives as a biologically and pharmaceutically relevant material.

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Synthesis of 2,2'-{[2,6-Dichloro-1-(Substituted phenyl)-1,4-Dihydropyridine-3,5-Diyl] Dimethylylidene} Dipropanedinitrile Using Green Catalyst L-Proline-Fe_3O_4 MNP

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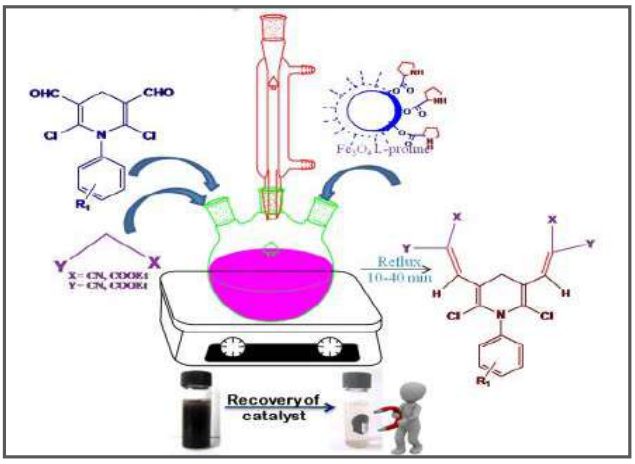
ABSTRACT

The Knoevenagel reaction was mainly used in synthetic practices to achieve sigma bond formation between two carbon atoms. Hence it is need to synthesis a basic organocatalyst supported on ferrite nanoparticles. It is facile and environmentally benign L-proline-Fe_3O_4 MNP was synthesized and was successfully used for the synthesis of 2-benzylidenemalononitrile derivatives, which were obtained in excellent yields via multicomponent reactions. Magnetic organocatalysts can be easily recovered by simple magnetic decantation and their catalytic power remains unaffected after 3 consecutive cycles, making them environmentally friendly, obeys concept of green chemistry and widely applicable in several organic transformations due to their efficiency, easy for handling, and cost effectiveness. Synthesized compounds were characterized by ^{1}H-NMR, FT-IR and Elemental analysis.

Graphical Abstract



Keywords: Vilsmeier-Haack reaction; Knoevenagel condensation; Ferrite, Magnetic Nanoparticles, Green Chemistry.

INTRODUCTION

Today organic synthesis is based on Magnetic nanomaterials are found a major role in many fields, including industrial procedure biotechnology, biomedicine, environmental remediation, and especially catalysis. The Knoevenagel reaction was mainly used in synthetic practices to achieve sigma bond formation between two carbon atoms [**1**]**.** Hence it is need to synthesis a basic organocatalyst supported on ferrite nanoparticles [**2**]. Most of these reactions are generally carried out in organic solvents, with a few aqueous phase organocatalytic processes as recent exceptions [**3**], although water is an environmentally benign solvent [**4**]. The use of environmentally benign solvents like water [**5**] and absent of organic solvent reactions represent very effective green chemistry [**6**] methods from economical as well as synthetic point of view [**7**]. They not only reduce the load of organic solvent clearance, but also improve the speed of many organic reactions. Therefore, efforts have been made to carry out the Knoevenagel condensation in aqueous medium [**8**]. It was found that the Knoevenagel condensation reaction of aromatic aldehydes with malononitrile or ethyl cyanoacetate takes place in aqueous medium [**9**]. The separation and recycling of the catalyst is highly favorable since catalysts are often very expensive.

MATERIALS AND METHODS

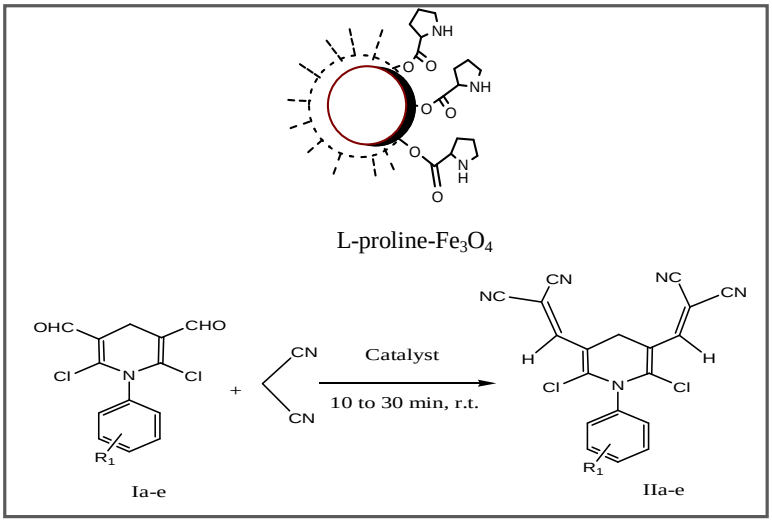
Melting Points of compounds were taken in open air capillary tube and are uncorrected. ^{1}H-NMR spectra were recorded on 399 MHz Gemini 2000(Varian, Oxford using DMSO as solvent. IR spectra were recorded on a Perkin-Elmer spectrophotometer FT-IR 1725X. Analytical TLC, Thin-layer Chromatography (TLC) was performed on precoated on Merck silica gel 60 F254 plates. The elemental analysis was performed on the Vario EL III-C, H, N, O elemental Analyzer-GmbH, Hanau-Germany. Reagents and solvents were used without purification purchased from Loba Chem Pvt. Ltd and used as such the 'nano' word used for materials which has diameters near to <100 nm. The important facts about Nano-scale materials that they possess high specific surface areas due to large surface area, where taking a 5 nm spherical magnetite (Fe_3O_4) particle, the coupled specific surface area (240 m^2 g^{-1}) is significantly better than that (<10 m^2 g^{-1}) which characterizes large mass magnetite. Moreover, as the percentage of atoms at the surface, which are more active, increases with decreasing size, particles at the nano-scale are more active than the equivalent bulk material. The most commonly used magnetic nanoparticles include magnetite (Fe_3O_4) and L-proline Fe_3O_4 has good stability, low environmental impact and high magnetic susceptibility which is used for easy and promotes separation of catalyst and also we have studied their recycling power.

The starting material for this synthesis 2,6-dichloro-(substitutedphenyl)-1,4-dihydropyridine-3,5-dicarbaldehyde **1a-e** were synthesized by Vilsmeier-Haack reactions on (substituted phenyl) piperidine -2,6-diones [**10-14**].

Preparation of magnetic Fe_3O_4 nanoparticles (MNPs): It begins with mixture of $FeCl_3.6H_2O$ (5.838 g, 0.022 mol) and $FeCl_2.4H_2O$ (2.147 g, 0.011 mol) were dissolved in 100 mL of deionized water in a round bottom flask (250 mL) at under room temperature. Then 2 mmol of L-proline (0.230 gm) was added after stirring thereafter, 10 mL of aqueous. NH_3 solution (32%) was then added into mixture within 40 min with vigorous mechanical stirring throughout mixing. Finally, the black precipitate solid was collected by magnetic decantation, washed with distilled water until solution becomes neutral, and then washed with ethanol to remove unreacted L-proline and dried at 80°C in scientific oven [**15, 16**]. After the performing the procedure the magnetic nano material was characterized by using a Scanning Electron Microscopy (SEM). The structure of magnetic catalysts is usually determined by X-ray diffraction (XRD) and organocatalyst immobilization confirmed by FT-IR Spectra.

RESULTS AND DISCUSSION

Catalyst used for optimization



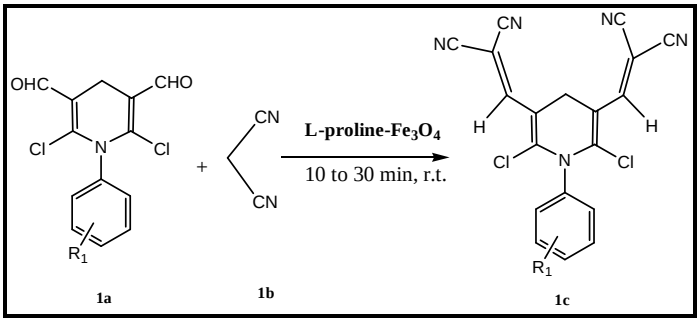
Scheme I

Table 1. Optimization of reaction parameters[a]

Entry	Catalyst[b]	Solvent	Time (min)	Yield[c] (%)
1	A	Ethanol	05	60
2	A	Ethanol	10	86
3	A	Ethanol	20	90
4	A	Ethanol	30	92
5	A	Solvent free	40	--
6	A	H_2O	15	--

[a]Reaction conditions: Aldehyde (0.01mol), [b]Active Methylene Compounds(a-e) (0.01 mol), [c]Proline-Ferrite, under R.T

General Procedure: A mixture of malononitrile **1b** (4.4 mmol), 2,6-dichloro-(substitutedphenyl)-1,4-dihydropyridine-3,5-dicarbaldehyde**1a** (2 mmol), malanonitrile (2 mmol) and L-proline Fe_3O_4 water/ ethanol or water (10 mL) was heated at reflux for 10-30 min in order to synthesize 2, 2'-{[2,6-dichloro -1-(substitutedphenyl)-1,4-dihydropyridine-3,5-diyl]dimethylylidene}dipropanedinitril derivatives. Progress of the reaction was monitored by TLC. The catalyst was recovered by simple decantation of reaction mixture by pouring content in to ice water. The product was filtered. The recovered catalyst was washed with ethanol, dried in oven. The resulting catalyst can be used for second cycle of reaction.



Scheme 2. 2,2'-{[2,6-dichloro-1-(substitutedphenyl)-1,4-dihydropyridine-3,5-diyl] dimethylylidene}dipropanedinitrile

Table 2. Recyclizing study of Catalyst

Entry	Compounds	Cycle	Yield (%)
1	1a	1st	92
2	1a	2nd	82
3	1a	3rd	65

Table 3. Substrate Study[a]

S. No.	V-H Aldehyde (-R)[b]	X	Y	Product	Yield (%)[c]	M.P. (°C)
1	-H	CN	CN	IIa	94	>280
2	4-Cl	CN	CN	IIb	89	260-262
3	2-Cl	CN	CN	IIc	82	270-72
4	4-NO_2	CN	CN	IId	94	>280
5	3-NO_2	CN	CN	IIe	90	>280
6	2-NO_2	CN	CN	IIf	90	230-232
7	-H	CN	COOEt	IIg	91	192-194
8	4-Cl	CN	COOEt	IIh	85	200-202
9	2-Cl	CN	COOEt	IIi	81	212-14
10	4-NO_2	CN	COOEt	IIj	93	180-82
11	3-NO_2	CN	COOEt	IIk	80	176-178
12	2-NO_2	CN	COOEt	IIl	82	>280

[a]Reaction conditions: Aldehyde (0.01mol) [b], Active Methylene Compounds(a-e) (0.01 mol), Proline-Ferrite, under r.t.[c]Isolated yield.

Spectral Data for the Synthesized Compounds:

1). 2,2'-{[2,6-dichloro-1-(4-methylphenyl)-1,4-dihydropyridine-3,5-diyl]dimethylylidene}dipro-Panedinitrile: **M**.P.=180-184°C. IR (KBr, cm^{-1})=2345, 2225, 1589, 1271, 684, ^{1}H NMR (DMSO-d6 400 MHz) δ:=8.56(s,2H), 7.96(2,H) 7.93(s,2H), 2.50(s,3H), 3.33(2,H), ^{13}C NMR (DMSO-d6 100 MHz): 159, 149, 154, 128, 124, 114, 78,113,111,110 , 56., LC-MS: 392.

2). 2,2'-{[2,6-dichloro-1-(4-chlorophenyl)-1,4-dihydropyridine-3,5-diyl] dimethylylidene}dipro-panedinitrile: M.P.= 260-26°C. IR (KBr, cm-1) = 621, 2239, 1641, 1236. ^{1}H NMR (DMSO-d6 400 MHz) δ:= 2.15(s,2H), 7.06(s,1H), 6.8(d,2H), 6.6(d,2H), ^{13}C NMR(DMSO-d6 100 MHz) :167,121, 159, 132,129,118, 114 , 55. LC-MS: 414.

3). 2,2'-{[2,6-dichloro-1-(4-chlorophenyl)-1,4-dihydropyridine-3,5-diyl]dimethylylidene} bis(2-cyanoprop-2-enoate). M.P.= 200-202°C. IR (KBr, cm-1) = 609, 1265, 1625, 2224. 1H NMR (DMSO-d6 400 MHz) δ:=1.26(t,3H), 4.15(q,2H), 7.41(s,1H), 3.61(s, 2H), 6.24(d,1H), 6.33(s,1H), 6.67(d,1H), 6.86(dd,1H), 13C NMR(DMSO-d6 100 MHz) :139, 133, 131, 130, 124, 123, 120, 119, 119.0,40, 38, 34. LCMS: 506.

4). 2,2'-{[2,6-dichloro-1-(4-nitrophenyl)-1,4-dihydropyridine-3,5-diyl] dimethylylidene}dipropa-nedinitrile. M.P.=>280 °C. IR (KBr, cm-1): 3043, 2227, 1571, 1394, 1207, 1101, 609. ^{1}H NMR (DMSO-d6 400 MHz) δ:= 4.71(s,2H), 7.5(s, 1H), 7.1(d, 2H), 7.0(d,2H). LC MS: 421.

APPLICATION

The present method was environmentally benign. L-proline-Fe_3O_4 MNP displaces all other methods that use various organic solvents, catalysts and that are performed at higher temperature.

CONCLUSION

In conclusion, we have demonstrated a very simple and highly efficient method for the Knoevenagel reaction of aromatic aldehydes with various active methylene containing compounds to give2,2'-{[2,6-dichloro-1-(substitutedphenyl)-1,4-dihydropyridine-3,5-diyl]dimethylylidene}dipropanedinitrile product in good to excellent yields at room temperature. In the above research we suggest that the present method of environmentally benign. L-proline-Fe_3O_4 MNP displaces all other methods that use various organic solvents, catalysts and that are performed at higher temperature.

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Recent Trends and Emerging Issues in Business, Management and Taxation.

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ANALYSIS OF E-COMMERCE & M-COMMERCE & ANALYSIS OF SECURITY ISSUES

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Abstract:

E-commerce refers to wide collection of online business activities for products and services. E-commerce is subdivided into three categories: business to business or B2B (Cisco), business to consumer or B2C (Bigcommerce), and consumer to consumer or C2C (eBay) also called electronic commerce. M-commerce is a term that is used to refer to the growing practice of conducting financial and promotional activities with the use of a wireless handheld device(Ola App). The term m-commerce is short for mobile commerce, and recognizes that the transactions may be conducted using cell phones, personal digital assistants and other hand held devices that have operate with Internet access. E-commerce reduces the burden of infrastructure to conduct businesses and thereby raises the amounts of funds available for profitable investment. E-commerce security has its own particular nuances and is one of the highest visible security components that affect the end user through their daily payment interaction with business.

Keywords: E-commerce, M-commerce, Advantages of E-commerce and M-commerce, Limitations, Security Issues, M-Commerce Applications.

Introduction:-

Electronic commerce, or e-commerce, refers to economic activity that occurs online. E-commerce includes all types of business activity, such as retail shopping, banking, investing and rentals. Even small businesses that provide personal services, such as hair and nail salon, can benefit from ecommerce by providing a website for the sale of related health and beauty products that normally are available only to their local customers. Electronic commerce draws on technologies such as mobile commerce, electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems. Modern electronic commerce typically uses the World Wide Web at least at one point in the transaction's life-cycle, although it may encompass a wider range of technologies such as e-mail, mobile devices social media, and telephones as well. E-commerce differs from e-business in that no commercial transaction, an exchange of value across organizational or individual boundaries, takes place in e-business.

Mobile commerce is a type of e-commerce conducted through mobile devices such as mobile phones, personal digital assistants (PDAs) and other devices with a wireless connection. It basically depends upon the availability of mobile connectivity. Mobile e-commerce, m-commerce is also known as next-generation e-commerce, it enables user to access the internet without needing to find a place to plug in. The emerging technology

behind m-commerce which is based on the Wireless Application Protocol (WAP), has made far greater strides in Asia, Europe, where mobile devices equipped with Web-ready micro-browsers are much more common than in the United states. Payment mechanism (Micro Payments) is another essential feature of m-commerce. The objective and usage of these micro-payments can bring opportunities to small businesses both to sell new services and to operate more efficiently.

Related Works:-

1. The main difference in M-commerce definition with Ecommerce uses the wireless net for performing financial, services and purchases. In other words in M-commerce all kinds of trends such as business-to-consumer, business-to-business and consumer-to-consumer are there. The booming popularity has forced the corporate world to develop a new commerce platform that can reach to masses. Mobile commerce has attracted massive traffic because of its unique characteristics
2. Nowadays communication-centric and computing-centric devices are becoming a single intelligent wireless device. Peoples around the world are making use increasingly of electronic communications facilities in their daily lives. This mostly involves interactions between parties who have never formerly met. Consequently, communications networks of all kinds are being exploited in new path to conduct business, to facilitate remote working and to create other "virtual" shared environments.
3. M-commerce is a new area arising from the marriage of electronic commerce with emerging mobile and pervasive computing technology. The newness of this area and the rapidness with which it is emerging makes it difficult to analyze the technological problems that m-commerce introduces and, in particular, the security and privacy issues.
4. In fact while the use of Ecommerce is provided only when the user is at his/her own home or workplace or in any other location he/she has to access media such as, Internet, TV…. M-commerce merely need the Mobile-phone. However this doesn't bear the meaning that M-commerce is limited to ordinary applications like reading E-mail or reporting. Within the pass of time the services and ample abilities of M-commerce are getting more popular and more complete than the Ecommerce. Generally, M-commerce has several major advantages to consumers.
5. Educating the consumer on security issues is still in the infancy stage but will prove to be the most critical element of the e-commerce security architecture. Trojan horse programs launched against client systems pose the greatest threat to e-commerce because they can bypass or subvert most of the authentication and authorization mechanisms used in an e-commerce transaction. These programs can be installed on a remote computer by the simplest of means: email attachments.

Purpose of Study:-

Study the Overview of E-commerce and M- commerce.
Discuss M-Commerce VERSUS E-Commerce
Challenges before E-commerce and M-commerce

Advantages of E-Commerce:

1. Faster buying and selling procedure, with number of choice for selection.
2. 24/7 access which in turn significantly increase the profits.
3. Low operational costs and better quality of services.
4. Number of service providers can be selected for the inventory management.
5. Up-to-date and improved product with customer satisfaction.

Disadvantages of E-Commerce:

1. Lack of Business Model.
2. Lack of trust.
3. Lack of key public infrastructure.
4. Both technological and non-technological.

Advantages of M- Commerce:

1. It includes cost saving and new business opportunities.
2. It can be used anywhere anytime with light weighted device.
3. Single owner has control over data whereas the mobile device can be highly personalized.

Disadvantages of M- Commerce:

1. Providing wider reach here customer loyalty is tested.
2. Costlier than e-commerce.
3. Security of data moved across some mobile and wireless networks.

E-Commerce V/s M-Commerce

Points	E-commerce	M-Commerce
Ubiquity	The use of wireless device enables the user to receive information and conduct transactions anywhere, at anytime	It's the explosion of applications and services that are becoming accessible from internet-enabled mobile devices.
Accessibility	Mobile device enables the user to be contacted at virtually any time and place	The user also has the choice to limit their accessibility to particular persons or times.
Instant Connectivity	Instant connectivity or "always on" is becoming more prevalent will the emergence of 3G… networks, GPRS or EDGE.	Mobile internet sites, or WAP sites.

Challenges before E-commerce and M-commerce

1. Reliability and integrity: Interference and fading make the wireless channel error prone. Frequent handoffs and disconnections also degrade the security services.
2. Confidentiality/ Privacy: The broadcast nature of the radio channel makes it easier to tap. Thus, communication can be intercepted and interpreted without difficulty if no security mechanisms such as cryptographic encryption are employed.
3. Identification and authentication: The mobility of wireless devices introduces an additional difficulty in identifying and authenticating mobile terminals.

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"Feasibility of Private Sector Investment in Road Sector under BOT in Maharashtra: A Case Study of Mumbai Nasik Expressway (MNEL)"

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Abstract:

The provision of roads has been one of the most important functions performed by governments in most countries. However, the evolving financing mechanism for roads has been one characterized by changes to take care of emerging requirements. The possibility of construing the road function in common welfare terms weakened over a period of time. Due to Paucity of funds it is not possible for the Government to provide road connectivity to the increasing population. BOT is a popular model for the road development in which the sharing is between public and private sector.

Maharashtra state has taken pro-active measures towards the BOT approach for the development of roads under PPP model. PPPs present an opportunity to meet the State's investments needs to make the development of roads. MSRDC has propelled private sector participation in road projects. This research study examines in detail the financial feasibility study about the road developed under BOT model as Mumbai Nasik Expressway. The project involves four- laning of the 99.5 km Vadape-Gonde (Mumbai-Nasik) section of the National Highway-3.The study examines the data about traffic and toll revenue from the project and the feasibility analysis is done through the projection for 20 years. Various risks involved in the project implementation are identified.

Keywords: Infrastructure, BOT, PPP, Toll, MNEL

1. Introduction:

Infrastructure is a key driver of economic growth. The much anticipated further growth in all sectors of the economy will be increasingly contingent on the availability of the physical infrastructure and related services. The development of human resources contributes to sustained growth and productive employment. A healthy, educated and skilled workforce can contribute more significantly and effectively in economic development. The State is a major contributor to the nation's economy accounting for almost 21 % of the industrial output, 13 % of the national GDP, 13.7% of total factory employment. Mumbai, the capital is regarded as the hub for financial and business activities of the country and is the headquarters of many of the large business establishments and financial institutions. The state industrial growth rate has remained at around 10 % over the past few years and efforts are required to push this growth rate by creating an efficient infrastructure for facilitating sustained industrial production.

The road infrastructure in the State is managed by various local bodies including Public Works Department of the state, municipal corporation, Maharashtra State Road Development Corporation (MSRDC), Maharashtra Industrial Development Corporation (MIDC), Forest Department. The establishment of fully state owned corporation, MSRDC has propelled private sector participation in road projects. However some of the projects are suffering from slow implementation which in turn has escalated the project cost. The government expects private sector investment to increase significantly both at the central and state level in the future.

Maharashtra state has taken pro-active measures towards the PPP/BOT approach for the development of roads. MSRDC has propelled private sector participation in road projects. This research study examines in detail the financial feasibility study about the road developed under BOT model as Mumbai Nasik Expressway. The project involves four- laning of the 99.5 km Vadape-Gonde (Mumbai-Nasik) section of the National Highway-3.

1.1 Objectives of study

1. To study the nature of BOT project and contract .
2. To review the literature related with BOT projects from the point of Value for money and feasibility of the project.
3. To analyze the economic output & risks involved in implementation of the project

1.2 Methodology and Data Sources

Firstly literature related with the BOT road projects were reviewed at national and international level through the books, journals, conference proceedings and articles, websites and other sources at national and international levels. The study is done through collecting the information from the Government, Concessionaire Company and NHAI, and actual observation about the number of vehicles. The data collected include the concession agreement, annual audited financial statements for the toll road, details about the toll rates and number of vehicles.

2. Literature Review:

The involvement of private finance is an important factor for PPP as it is a fact that the public sector seeks to receive the best value for money (VFM) by securing the benefits of private finance for PPP projects. A private party generally raises the funds both in equity & debt finance. **Vivek Sadashiv Jadhav, Abdul Rashid Chand Attar** (July 2014), in their paper of economic evaluation of BOT projects carried out the traffic volume study to make projection of BOT projects for next 30 years to predict the revenue generation of the project through the case study of IRDP project at Kolhapur Municipal Corporation under BOT. They have calculated the IRR of the project on the basis of traffic simulation as 19% and are of the opinion that the project is viable as the IRR, NPV is positive. **Rajan Pathan, Pimplikar (2013) e**xplored the financial viability of BOT Project through the study of the factors affected as concession period, extent of govt. grant. It is observed that risk management is an important process necessary in order to achieve a successful project financing. **Bagui and Ambarish Ghosh (2011)** stated sensitivity analysis may be carried out to determine the uncertainty of a project. It is denoted that total project cost, financial internal rate of return and net present value vary linearly with a negative slope. FIRR increases with increasing total project cost. **Steve Jang** (2011) stated that the PPP project NPV of private sector contractors is to be compared with that public sector to determine whether the private sector contractors are able to manage & absorb the particular risks of projects. e.g. it can be observed how the changes of debt-equity ratio would influence project NPV. There are various studies (**Zhang 2004a, Zhang et al 2002**) which have shown that the NPV measure only emphasizes financial appraisal & ignores analysis on such multiple criteria as techniques, management, legislation, environment, etc. The discount rate reflects the time value for money & the premium that is required by investors in the project to compensate them for the systematic risk inherent in the project; thereby converting future cash flows into equivalent present cash flows.IRR is defined as the rate of interest that makes the NPV of a cash flow equal to zero. **Esther Malini 1999** stated that risk profiles for the financial indicators NPV & IRR is obtained through simulation model which indicates financial viability of a BOT project giving stress on proper toll structure , toll revision , giving government

grant making a reasonable agreement between the project sponsor & project promoter on sharing of risks & the terms of the concession.

3. Project Background:

Mumbai Nasik Expressway Ltd (MNEL) is the special purpose vehicle promoted by Gammon Infrastructure to develop, operate and manage the Vadape to Gonde section of the National Highway no.3 in Maharashtra. Mumbai Nasik Expressway connects one of the most important gateways - Mumbai to Northern, Central and Eastern part of India. The project involves four-laning of the 99.5 km Vadape-Gonde (Mumbai-Nasik) section of the National Highway-3. This contract was given in June 2005 to Gammon India, Sadbhav Engineering and Billimoria consortium of contractors. The concession/license period for this project is 20 years that runs until October 2025. The client is National Highways Authority of India & the Partners in the SPV are Gammon, Sadbhav Engineering Limited and B.E. Billimoria & Co. Limited. The project is completed in the year 2010. MNEL will have a revenue stream comprising of Toll collections.

Table 3.1 Project Description:

Source: NHAI

Sr.No.	Particulars	Information
1	Total project Cost	Rs. 579 Million
2	Actual Project Cost incurred	Rs. 805 Million
3	Section	Km. 539.500 to km.440.000section on NH-3 (Vadpe-Gonde)
4	Length of the project	99.5 km.
5	Employer	NHAI
6	Independent Consultant(Construction Period)	Sheladia Associates INC in association with Artefacts Projects
7	Concessionaire	MUMBAI NASIK EXPRESSWAY LTD.
8	Location of toll plaza	At Km. 455+485 and 532+690
9	Date of Commencement	12/04/2012
10	Concession Period	20 Years
11	Construction period	36 Months
12	Extended construction period	61 Months
13	Project Completion date Provisional	31/05/2011
14	Toll started on	29/05/2010 (at Milestone I) 03/09/2011(at Milestone II)
15	Toll completion date	17 years of tolling commencing from 03/09/2011

3.2 Need of the Project:

1. The NH-3 road which was there before the development was 2 lane. The percentage of people and goods travelling on this road is increased tremendous. Hence, it was the dire necessity to develop such road to overcome the traffic problems.
2. Mumbai is called as the commercial capital of India and Nasik is famous for the Agricultural products such as onions, grapes, sugarcane, vegetables etc. Large percentage of these agricultural products are exported and for that sent to Mumbai from Nasik. To make the safe transportation the development of such road is very important.

3. Nasik has MIDC Satpur, and Ambad industrial zones where number of industries are situated and these people always want to travel from Nasik to Mumbai. The development of road saves the travel time, fuel consumption and the maintenance costs of the vehicles which indirectly help to save the money of travelers.

3.3 Salient features of a typical NHAI Concession Agreement (CA)

1. The CA entitles the concessionaire to design, engineer, finance, construct, operate and maintain the project facility during the concession period as well as to levy and collect toll fees from vehicles for using the project.
2. The CA stipulates that the tolls would be levied at rates notified by a government agency and also defines the rates for annual escalation in toll rates.
3. The government proposed exemptions or subsidies for certain vehicle categories. While the traffic risks are borne by the concessionaire.
4. The concession agreement allocates the risks associated with securing various regulatory approvals, and acquisition of land to the project owner. It provides for an independent consultant or supervisor to monitor the progress and the quality of construction during the project period.
5. It also provides for the appointment of an O&M contractor to operate and maintain the highway during the concession period.

4 Traffic Volume Projections:

The traffic has been projected up to the horizon year 2030. Traffic forecast, both normal and generated traffic, in terms of vehicles and PCU, for the horizon years 2005-2032 at 5 year intervals is presented below: Share of tollable traffic among goods vehicles is high. About 25% of goods vehicles are non tollable. This may be mainly due to LCVs having short haul trips near the urban areas. The capacity of 4 lane divided carriageway calculated based on the IRC guidelines is 80,000 PCUs/Day.

Table 4.1 Traffic Growth Rate Percentage as per Agreement:

Year	Up to 2005	2010	2015	2020	2025 onwards
Car	6	5.5	5	4	3
Bus	5	4	3.5	3	3
LCV/Truck	6	5	4.5	4	3
Multi Axle Vehicles	4	3	3	3	3

The traffic growth rate per year on the basis of projection and actual data analyzed is as follows.

Table: 4.2 Traffic Projections of Total PCUs

Year	Total	% increase	Actual	Analysis	Actual % Increase
2005	90,744		--	Not Started	--
2010	1,22,643	6	5,84,3476	Actual	--
2015	1,52,773	5	65,49,286	Actual	10%
2020	1,85,082	4	84,76,247	Projection	23%
2025	2,14,526	3	9,95,57,473	Projection	10%
2030	2,48,060	3	11,20,52,812	Projection	11%

Source: DPR for 4/6-laning of Gonde Vadape Section of NH-3, Volume IV and analyzed

As stated in the table 4.2 the projections done after every 3/5 years. In the actual data as shown in table 4.2 it is observed that the actual number of vehicles from 2011 to 2015 is doubled approximately. On the basis of actual reports of the company until now the average total vehicles for a year range from 4.5 to 5.5 lakh. This shows that the traffic is having an increasing trend which will result in increasing toll revenue.

5 Economic evaluation of project:

5.1 The main tasks for economic and financial analysis are:

- Collecting and reviewing the data related with cost of construction, operation and maintenance of the toll road.
- Collecting the data related with the traffic, toll revenue and socio economic and environmental analysis.
- Data about the fundraising and capital cost, Debt-equity Ratio and other financial analysis.
- Collecting the Annual Financial Statements for the project till 2015.

Through this data the financial analysis is conducted to determine whether the project is financially feasible and meet the requirements of the stakeholders such as Government, Private investors and the Public i.e. travelers. The financial analysis is carried out considering the key factors as the soundness and profitability of the project cash flow doing verification through the calculation of the project IRR, calculation of NPV, and Socio Cost-Benefit and economic analysis. The project is completed under BOT Toll Model under which the fees collected by the concessionaire as toll will be the income used to recover their investments. Based on the data collected from the concessionaire the cash flow analysis is conducted to calculate the NPV & IRR of the project. Cost Based Data include the cash inflow and outflow data: The main items considered are as Construction cost, operating and maintenance cost, Administration Cost

Cash Inflow: Toll collection, Grant from NHAI, Other Income

Cash Outflow: O & M Expenses, Establishment/ Employee Benefit Expenses, Loan repayment (Finance Cost +Interest), Depreciation, Other Expenses.

The debt Equity Ratio is 70:30.

The Cost Benefit Ratio is >than 1, hence the project is feasible.

5.2 IRR Calculation:

The financial feasibility of the proposed project is based on the cost of the project and Toll revenue is used as a key parameter to calculate the Internal Rate of Return (IRR)

Year	Cash flows (in crores)
2010	-729.94
2011	51.25
2012	97.74
2013	130.614
2014	127.439
2015	131.898
2016	165.084
2017	184.182
2018	203.280
2019	222.378

2020	241.476
2021	260.574
2022	279.672
2023	298.770
2024	317.868
2025	336.966
2026	356.064
2027	375.162
2028	394.260
2029	413.358
2030	432.456
IRR	**20%**
NPV	**255.05 crore**

Source: Data collected & analyzed

The figure for the year 2010 shows the total cost of the project while the figures from the year 2011 to 2030 show the respective toll revenues. The actual data of cash inflow & outflow until 2015 is collected and that basis further calculations made by simple trend analysis. The IRR for the project is 20% as per the analysis of cash inflow and outflow where the discount factor is considered as 10% as given in concession agreement. It is observed that the project is viable with the positive grant from the government for O. & M. Expenses. The concessionaire is able to recover the capital cost within a period of 10 years approx. and also can have good profitability through toll collection over the period of concession as the number of vehicles and the toll rates both are increasing every year.

The NPV of the project is **255.05 crore** which is positive.

5.3 Findings and the risks involved:

1. **Cost-Overrun Risk**: As per the financial analysis it is observed that the Project cost decided as per Concession agreement was Rs. 579 crore but the Actual cost incurred as stated in the statements was Rs. 805 crores. Due to this the cost overrun risk is observed in the project implementation. It is observed that the increase in project cost was due to the delay in the completion of the project construction as the scheduled date of completion was 3 years from the date of agreement but it was not completed within the same period. The reasons for delay were delay in land acquisition, and other force majeure risks due to opposition from local people.
2. Due to delay in completion the other risks involved were inflation and delay in full fledged toll collection.
3. NPV of the project indicates that the project is feasible from the point of view of concessionaire.
4. **Improper traffic forecasts**: The traffic projections made in DPR are far less than the actual number of vehicle and the number of vehicles is increasing over a period of time. Due to this it results in delay in travel time due to queuing of vehicles at toll naka.
5. **Toll Charges:** The toll charges are increased every year as they are linked with WPI. The toll collection shows an increasing trend. There is strong opposition by public to pay the tolls. Maintenance of roads is not done by the concessionaire properly and regularly.

6 Conclusion:

As per the financial analysis the IRR and NPV of the project is positive. Hence the project is feasible from the point of view of concessionaire. The land acquisition process for PPP projects is the most challenging and the Govt. must take efforts to provide the land for construction of the project. The award of project must be done only after the process of land acquisition completed. Infrastructure projects typically have significant social and environmental impacts, arising from their construction and operation. It is therefore necessary that BOT projects have an environmentally and socially responsive development framework. As there is strong opposition by the public to pay the tolls it is important to make effective communication with people to get their support. The provisions of the concession agreement should be revised considering these problems faced by the stakeholders.

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Research Article

SYNTHESIS AND CHARACTERIZATION OF 2,6-DICHLORO-1-(N-SUBSTITUTED PHENYL)-1,4-DIHYDROPYRIDINE-3,5-DICARBALDEHYDES AND THEIR TRANSFORMATION INTO EFFECTIVE ANTIFUNGAL 4-THIAZOLIDINONE DERIVATIVES

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ABSTRACT

A series of new 4-thiazolidinones **5a-f** were prepared by condensation of thiolactic acid with Schiff bases **4a-f** which in turns have been prepared by the action of amines on 2,6-dichloro-1-(*N*-substituted phenyl)-1,4-dihydropyridine-3,5-dicarbaldehydes **3.** The structures of the newly synthesized compounds have been confirmed on the basis of elemental analysis and spectral studies. The newly synthesized title compounds have been screened for their in *vitro* antimicrobial activities. Some of the compounds exhibited encouraging results.

Keywords: Dihdropyridines, Schiff bases, 4-thiazolidinones, antimicrobial activity.

INTRODUCTION

The therapeutic problem has achieved increasing importance in hospitalized patients, in immuno suppressed patients with AIDS or undergoing anticancer therapy and organ transplants. In spite of a large number of antibiotics and chemotherapeutics available for medicinal use, at the same time the emergence of old and new antibiotic resistance created in the last decades a substantial medical need for new classes of antibacterial agents. A potential approach to overcome the resistance problem is to design innovative agents with a different mode of action so that no cross-resistance with the present therapeuticals can occur[1].

Various substituted 4-thiazolidinone derivatives are associated with diverse pharmacological activities such as antifungal[2], antithyroid[3], local anaesthetic[4], monoamine oxidase inhibition[5] antihyperglycemic[6], anticancer[7], diuretic[8], nematocidal[9], anticonvulsant[10] and antitubercular activity against M. tuberculosis $H_{37}Rv$[11]. More recently, an improved protocol has been reported wherein zinc chloride is used as a dehydrating agent to accelerate the intramolecular cyclization resulting in faster reaction and improved yield[12,13]. The zinc chloride mediated protocol has the advantage of mild reaction conditions, a very short reaction time, and product formation in almost quantitative yields.

In view of the above and in continuation of our work in the synthesis of fused heterocyclic compounds[14-19], we herein report a new series of Schiff bases **4a-f** and substituted 4-thiazolidinone derivatives **5a-f. (Scheme-II).**

EXPERIMENTAL

All melting points were determined in open capillary and are uncorrected. The IR spectra were recorded on FT-IR spectrophotometer. ^{1}HNMR spectra were recorded on varian USA Mercury plus 300 MHz NMR spectrometer with DMSO-d_6 as a solvent using TMS as internal reference (chemical shift in δ ppm). The starting compounds

were synthesized according to **scheme-I**. Glutaric acid **1** was converted into N-substituted phenyl glutarimides **2a-f** which were then diformylated using Vilsmeier-Haack reaction to form **3a-f.**

General procedure for preparation of Schiff bases 4a-f(i),(ii)

2,6-dichloro-1-(*N*-substituted phenyl)-1,4-dihydropyridine-3,5-dicarbaldehyde (1mmole) was refluxed with two different aromatic primary amines(2mmole) in water bath for 4-5 hours using ethanol as solvent and few drops of glacial acetic acid. The reaction mixture was poured into crushed ice. The product was isolated and recrystalized from ethanol to give **4a-f**.(**Scheme-II**). Physical data of 4a-f(i),(ii) are given **Table-1**. Characterisation data of these compounds are given in **Table-2**.

General procedure for preparation of 4-thiazolidinones 5a-f(i),(ii)

The Schiff bases **4a-f** (1mmole) were refluxed with thiolactic acid (2mmole) in the presence of catalytic amount of anhydrous $ZnCl_2$ in dry 1,4-dioxane (30 ml) for 6 hours. The mixture was then cooled and poured in to crushed ice and water. The product separated was filtered, dried and recrystallised from ethanol to give **5a-f**.(**Scheme-II**). Physical and elemental analysis data of **5a-f (i),(ii)** are listed in **Table-3.**

4-thiazolidinone 5a (i)

IR(KBr): 2921 (CH str.), 1700 (C=O str.), 827 (C-Cl), 750 (C-S-C str.) cm^{-1}.

^{1}HNMR(DMSO-d_6): δ 1.48 (d, 6H, J=9.0 Hz, $2CH_3$), 2.45 (s, 6H, $2CH_3$), 3.14 (s, 2H, CH_2), 4.1 (q, 2H, J=9.0 Hz, 2CH), 5.39 (s, 2H, 2N-CH), 7.01-6.44 (m, 5H, ArH), 7.16-7.03 (m, 8H, ArH).

4-thiazolidinone 5b (i)

IR(KBr): 2918 (CH str.), 1655 (C=O str.), 816 (C-Cl), 714 (C-S-C str.).cm^{-1}.

^{1}HNMR(DMSO-d_6): δ 1.52 (d, 6H, J=9.0 Hz, $2CH_3$), 2.40 (s, 9H, $3CH_3$), 3.00 (s, 2H, CH_2), 4.0 (q, 2H, J=9.0 Hz, 2CH), 5.40 (s, 2H, 2N-CH), 6.89-6.43 (m, 4H, ArH), 7.15-6.99 (m, 8H, ArH).

4-thiazolidinone 5c (i)

IR(KBr): 2920 (CH str.), 1680 (C=O str.), 795 (C-Cl), 753 (C-S-C str.).cm^{-1}.

^{1}HNMR(DMSO-d_6): δ 1.57 (d, 6H, J=9.0 Hz, $2CH_3$), 2.42 (s, 6H, $2CH_3$), 2.98 (s, 2H, CH_2), 3.97 (q, 2H, J=9.0 Hz, 2CH), 5.31 (s, 2H, 2N-CH), 7.02-6.50 (m, 4H, ArH), 7.17-7.04 (m, 8H, ArH).

4-thiazolidinone 5d (i)

IR(KBr): 2924 (CH str.), 1675 (C=O str.), 800 (C-Cl), 750 (C-S-C str.).cm^{-1}.

^{1}HNMR(DMSO-d_6): δ 1.49 (d, 6H, J=9.0 Hz, $2CH_3$), 2.40 (s, 6H, $2CH_3$), 3.09(s,2H,CH_2), 4.0 (q, 2H, J=9.0 Hz, 2CH), 5.21 (s, 2H, 2N-CH), 7.02-6.42 (m, 4H, ArH),7.18-7.03 (m, 8H, ArH).

4-thiazolidinone 5e (i)

IR(KBr): 2919 (CH str.), 1660 (C=O str.), 777 (C-Cl), 684 (C-S-C str.).cm^{-1}.

^{1}HNMR(DMSO-d_6): δ 1.50 (d, 6H, J=9.0 Hz, $2CH_3$), 2.38 (s, 6H, $2CH_3$), 3.01(s, 2H, CH_2), 4.3 (q, 2H, J=9.0 Hz, 2CH), 5.27 (s, 2H, 2N-CH), 6.97-6.38 (m, 4H, ArH), 7.14-6.98 (m, 8H, ArH).

4-thiazolidinone 5f (i)

IR(KBr):2921 (CH str.), 1695 (C=O str.),1294 (OCH_3), 829 (C-Cl), 690 (C-S-C str.)cm^{-1}.

^{1}HNMR(DMSO-d_6): δ 1.54 (d, 6H, J=9.0 Hz, $2CH_3$), 2.36 (s, 6H, $2CH_3$), 2.96 (s, 2H, CH_2), 3.78 (s, 3H, OCH_3), 3.99 (q, 2H, J=9.0 Hz, 2CH), 5.32 (s, 2H, 2N-CH), 6.92-6.49 (m, 4H, ArH), 7.17-7.10 (m, 8H, ArH).

4-thiazolidinone 5a (ii)

IR(KBr): 2923 (CH str.), 1680 (C=O str.), 759 (C-Cl), 694 (C-S-C str.) cm^{-1}.

^{1}HNMR(DMSO-d_6): δ 1.46 (d, 6H, J=9.0 Hz, $2CH_3$), 3.11 (s, 2H, CH_2), 4.2 (q, 2H, J=9.0 Hz, 2CH), 5.0 (s, 2H, 2N-CH), 7.03-6.56 (m, 5H, ArH), 7.37-7.04 (m, 8H, ArH).

LC-MS [ESI] m/z (%) : 677 (48), 393 (100), 357(31).

4-thiazolidinone 5b (ii)

IR(KBr): 2922 (CH str.), 1690 (C=O str.), 814 (C-Cl), 690 (C-S-C str.) cm^{-1}.

^{1}HNMR(DMSO-d_6): δ 1.49 (d, 6H, J=9.0 Hz, $2CH_3$), 2.35 (s, 3H, CH_3), 3.07 (s, 2H, CH_2), 3.97 (q, 2H, J=9.0 Hz, 2CH), 5.34 (s, 2H, 2N-CH), 7.00-6.49 (m, 4H, ArH), 7.39-7.06 (m, 8H, ArH).

4-thiazolidinone 5c (ii)

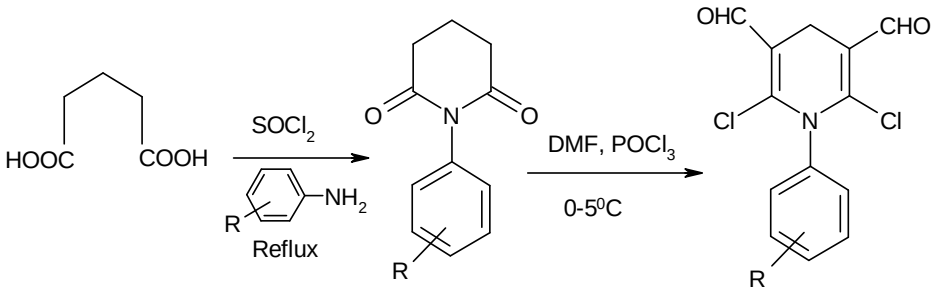
IR(KBr): 2924 (CH str.), 1660 (C=O str.), 780 (C-Cl), 696 (C-S-C str.).cm^{-1}.

^{1}HNMR(DMSO-d_6): δ 1.46 (d, 6H, J=9.0 Hz, $2CH_3$), 3.0 (s, 2H, CH_2), 4.2 (q, 2H, J=9.0 Hz, 2CH), 5.10 (s, 2H, 2N-CH), 7.03-6.54 (m, 4H, ArH), 7.40-7.09 (m, 8H, ArH).

4-thiazolidinone 5d (ii)
IR(KBr): 2926 (CH str.), 1668 (C=O str.), 826 (C-Cl), 690 (C-S-C str.) cm^{-1}.
^{1}HNMR($CDCl_3$): δ 1.50 (d, 6H, J=9.0 Hz, $2CH_3$), 2.55(s, 2H, CH_2), 4.0 (q, 2H, J=9.0 Hz, 2CH), 5.35 (s, 2H, 2N-CH), 7.28-7.01 (m, 4H, ArH), 7.87-7.30 (m, 8H, ArH).

4-thiazolidinone 5e (ii)
IR(KBr): 2922 (CH str.), 1700 (C=O str.), 780 (C-Cl), 683 (C-S-C str.).cm^{-1}.
^{1}HNMR(DMSO-d_6): δ 1.47 (d, 6H, J=9.0 Hz, $2CH_3$), 2.88 (s, 2H, CH_2), 4.3 (q, 2H, J=9.0 Hz, 2CH), 5.32 (s, 2H, 2N-CH), 7.01-6.50 (m, 4H, ArH), 7.32-7.04 (m, 8H, ArH).

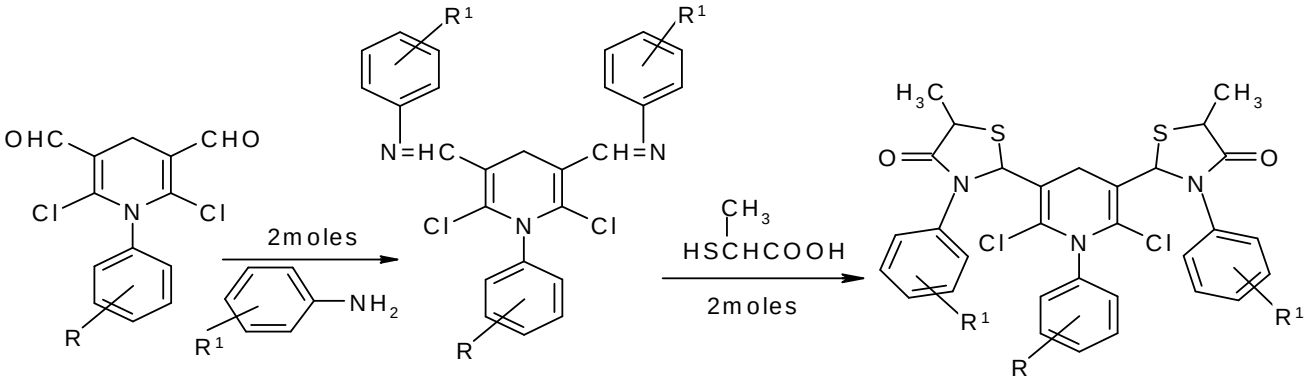
4-thiazolidinone 5f (ii)
IR(KBr): 2922 (CH str.), 1695 (C=O str.), 1299(OCH_3), 828 (C-Cl), 690 (C-S-Cstr.).cm^1.
^{1}HNMR(DMSO-d_6): δ 1.48 (d, 6H, J=9.0 Hz, $2CH_3$), 3.13 (s, 2H, CH_2), 3.79 (s, 3H, OCH_3), 3.97 (q, 2H, J=9.0 Hz, 2CH), 5.38 (s, 2H, 2N-CH), 7.05-6.67 (m, 4H, ArH), 7.41-7.12 (m, 8H, ArH).



1 **2 a-f** **3 a-f**

R, a = -H, b = -4Me, c = -2Cl, d = -4Cl, e = -3Cl, f = -4OMe

Scheme- I.



3 a-f **4 a-f (i), (ii)** **5 a-f (i), (ii)**

R, a = -H, b = - 4Me, c = - 2Cl, d = - 4Cl, e = - 3Cl, f = - 4OMe

R^1, (i) = - 4Me
(ii) = - 4Cl

Scheme-II

Antimicrobial activity

The compounds **5a-f(i),(ii)** were screened for their in vitro antimicrobial activities against *B. subtilis, E. coli, S. aureus, P.aeroginosa* and *A. niger.* The agar diffusion assay (Well method, Disc size 6mm, Hi media) was used. The compounds were tested at the concentration of 100µg/ml in DMF. The results were compared with respective standards Chloramphenicol and Nystatin.

The microbial screening results of 4-thiazolidinone derivatives 5a-f(i) and 5a-f(ii) revealed that the compound 5b(ii) showed good antibacterial activity against B.subtilis and S.aureus. The compounds 5a(i), 5b(i) and 5d(ii) showed better activity against E. coli and P.aeroginosa.

On the other hand, all the compounds 5a-f(i) and 5a-f (ii) demonstrated an excellent activity against A. niger. The compounds 5a(i), 5a(ii), 5b(i), 5b(ii), 5d(ii), 5e(ii) and 5f(ii) are found more potent than standard against A. niger.(**Table-4**)

RESULTS AND DISCUSSION

From the reports, by realizing the importance of 4-thiazolidinone derivatives, we wanted to develop an innovative synthesis of 4-thiazolidinone derivatives from 2,6-dichloro-1-(*N*-substituted phenyl)-1,4-dihydropyridine-3,5-dicarbaldehyde.

As a results of our studies related to the development of synthetic protocols, we report here a novel and easy access to 4-thiazolidinone derivatives. In this work initially Schiff bases 4a-f(i) and 4a-f(ii) were synthesized by treating 2-moles of substituted aromatic primary amines with 1 mole of Vilsmeier-Haack product 3a-f which on cyclocondensation with 2-moles of thiolactic acid afforded corresponding 4-thiazolidinone derivatives 5a-f(i) and 5 a-f(ii) (Scheme-II).

Table 1: Physical Data of Compounds 4a-f(i),(ii)

Compound No.	R	R^1	M.F.	M.P. (°C)	Yield (%)
4 a(i)	-H	-4Me	$C_{27}H_{23}N_3Cl_2$	143-145	65
4 b(i)	-4Me	-4Me	$C_{28}H_{25}N_3Cl_2$	149-151	72
4 c(i)	-2Cl	-4Me	$C_{27}H_{22}N_3Cl_3$	109-111	62
4 d(i)	-4Cl	-4Me	$C_{27}H_{22}N_3Cl_3$	101-103	78
4 e(i)	-3Cl	-4Me	$C_{27}H_{22}N_3Cl_3$	125-127	85
4 f(i)	-4OMe	-4Me	$C_{28}H_{25}ON_3Cl_2$	119-121	72
4 a(ii)	-H	-4Cl	$C_{25}H_{17}N_3Cl_4$	139-141	62
4 b(ii)	-4Me	-4Cl	$C_{26}H_{19}N_3Cl_4$	128-130	54
4 c(ii)	-2Cl	-4Cl	$C_{25}H_{16}N_3Cl_5$	115-117	52
4 d(ii)	-4Cl	-4Cl	$C_{25}H_{16}N_3Cl_5$	89-91	76
4 e(ii)	-3Cl	-4Cl	$C_{25}H_{16}N_3Cl_5$	122-124	59
4 f(ii)	-4OMe	-4Cl	$C_{26}H_{19}ON_3Cl_4$	144-146	61

Table 2: Spectral Data of Compounds 4 a-f(i),(ii)

Compd. No.	IR (KBr) cm^{-1}
4a(i)	2922 (CH_3), 1600 (C=N), 1514 (ArC=C), 1253 (C-N), 756 (C-Cl),
4b(i)	2924 (CH_3), 1598 (C=N), 1512 (ArC=C), 1250 (C-N), 816 (C-Cl).
4c(i)	2925 (CH_3), 1600 (C=N), 1450 (ArC=C), 1248 (C-N), 827 (C-Cl).
4d(i)	2920 (CH_3), 1606 (C=N), 1489 (ArC=C), 1249 (C-N), 815 (C-Cl).
4e(i)	2924 (CH_3), 1593 (C=N), 1470 (ArC=C), 1250 (C-N), 780 (C-Cl).
4f(i)	2924 (CH_3), 1606 (C=N), 1510 (ArC=C),1300 (-OCH_3), 1247 (C-N), 829 (C-Cl).
4a(ii)	1612 (C=N), 1491 (ArC=C), 1249 (C-N), 826 (C-Cl)
4b(ii)	2923 (CH_3), 1598 (C=N), 1407 (ArC=C), 816 (C-Cl), 250 (C-N).
4c(ii)	1595 (C=N), 1442 (ArC=C), 1247 (C-N), 790 (C-N), 827 (C-Cl)
4d(ii)	1597 (C=N), 1450 (ArC=C), 1249 (C-N), 827 (C-Cl)
4e(ii)	1595 (C=N), 1423 (ArC=C), 1248 (C-N), 780 (C-Cl)
4f(ii)	1599 (C=N), 1491 (ArC=C), 1247 (C-N), 1300 (OCH_3), 828 (C-Cl)

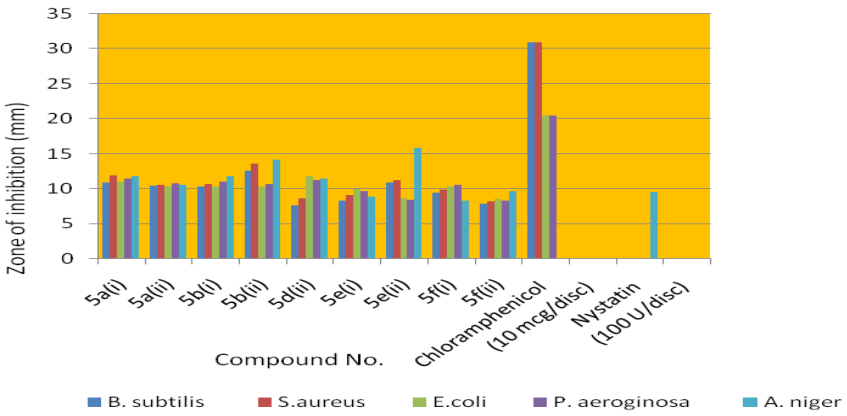
Table 3: Physical Data of Compounds 5a-f(i),(ii)

Compd. No.	R	R^1	M.F.	M..P. (°C)	Yield (%)	% Found (Calcd.)		
						C	H	N
5a(i)	-H	-4Me	$C_{33}H_{31}O_2N_3S_2Cl_2$	169-171	59	62.18 (62.25)	4.81 (4.90)	6.50 (6.60)
5b(i)	-4Me	-4Me	$C_{34}H_{33}O_2N_3S_2Cl_2$	185-187	60	62.68 (62.76)	5.01 (5.11)	6.40 (6.45)
5c(i)	-2Cl	-4Me	$C_{33}H_{30}O_2N_3S_2Cl_3$	121-123	53	58.98 (59.06)	4.42 (4.50)	6.20 (6.26)
5d(i)	-4Cl	-4Me	$C_{33}H_{30}O_2N_3S_2Cl_3$	127-129	53	59.01 (59.06)	4.41 (4.50)	6.18 (6.26)
5e(i)	-3Cl	-4Me	$C_{33}H_{30}O_2N_3S_2Cl_3$	137-139	59	59.03 (59.06)	4.39 (4.50)	6.21 (6.26)
5f(i)	-4OMe	-4Me	$C_{34}H_{33}O_3N_3S_2Cl_2$	114-116	63	61.19 (61.25)	4.89 (4.98)	6.22 (6.30)
5a(ii)	-H	-4Cl	$C_{31}H_{25}O_2N_3S_2Cl_4$	159-161	62	54.87 (54.95)	3.66 (3.71)	6.11 (6.20)
5b(ii)	-4Me	-4Cl	$C_{32}H_{27}O_2N_3S_2Cl_4$	139-141	66	55.51 (55.58)	3.87 (3.93)	5.99 (6.07)
5c(ii)	-2Cl	-4Cl	$C_{31}H_{24}O_2N_3S_2Cl_5$	148-150	58	52.23 (52.30)	3.33 (3.39)	5.82 (5.90)
5d(ii)	-4Cl	-4Cl	$C_{31}H_{24}O_2N_3S_2Cl_5$	134-136	67	52.25 (52.30)	3.32 (3.39)	5.85 (5.90)
5e(ii)	-3Cl	-4Cl	$C_{31}H_{24}O_2N_3S_2Cl_5$	104-106	80	52.21 (52.30)	3.34 (3.39)	5.82 (5.90)
5f(ii)	-4OMe	-4Cl	$C_{32}H_{27}O_3N_3S_2Cl_4$	156-158	77	54.27 (54.32)	3.78 (3.84)	5.86 (5.93)

Table 4: Results of antimicrobial activity of the compounds 5a-f(i),(ii)

Compound	*B. subtilis*	*S.aureus*	*E.coli*	*P. aeroginosa*	*A. niger*
5a(i)	10.94	11.89	11.01	11.45	11.85
5a(ii)	10.41	10.56	10.39	10.85	10.58
5b(i)	10.32	10.65	10.36	11.02	11.83
5b(ii)	12.63	13.65	10.40	10.69	14.17
5d(ii)	7.66	8.64	11.84	11.26	11.52
5e(i)	8.31	9.12	9.98	9.65	8.92
5e(ii)	10.91	11.27	8.66	8.42	15.87
5f(i)	9.45	9.86	10.30	10.59	8.37
5f(ii)	7.91	8.21	8.57	8.35	9.68
Chloramphenicol (10 mcg/disc)	30.94	30.94	20.52	20.52	NA
Nystatin (100 U/disc)	NA	NA	NA	NA	9.53

Diameter in mm calculated by digital Vernier Caliper.
"-" means no zone of inhibition,NA means "Not Applicable"



Biological activities of compounds **5a-f (i), (ii)**

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