PRELIMINARY PHYTOCHEMICAL SCREENING AND ANTIMICROBIAL ACTIVITY OF *Guazumaulmifolia* Lamk.

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ABSTRACT

GuazumaulmifoliaLamk. Is a small sized tree belongs to family sterculaceae. The leaves and fruits are used by rustics of Akola district to treat gastrointestinal disorders, dermatological and pulmonary infections. Pharmacognostic studies were carried out for evaluation of drugs and to detect adulterations. It includes dermal characters like stomata , trichomes and anatomical features etc. The plant was analysed for its preliminary screening of phytochemicals. The result reveals that the presence of active constituents comprising alkaloids, glycosides and terpenoids etc. The generated datamay provide the basis of its wide use as the therapeutic agent in the traditional and folk medicine.

Keywords*: Pharmacognostic, trichomes and Guazuma ulmifolia*

Introduction

In India there is alternative system of medicine like Ayurveda, Sidha, Unani and traditional medicine has gain its importance in the recent few years of its high potential in curing various diseases with less side effects as compared to synthetic drugs. Natural products of plant and animal origin offer vast resource of new medicinal agents with potential in clinical use . The value of medicinal plants to the mankind is very proven. Nature has been a source of medicinal plants for thousand of years and an impressive number of modern drugs have been isolated from natural resources and has potential to treat diseases all over the world.

The Agaskhed of Akot taluka of Akola district , Maharashtra has a pocket of numerous medicinal plants . The rustics of the area and people of nearby area have been using various plants and their parts as medicine during uttra Nakshetra to cure different ailments without knowing the efficacy or medicinal uses. The rustics of this area use the *Guazuma ulmifolia* to treat fever, flu, Gonorrhea, sore throat, Asthma Diarrhea, Dysentery , Cancer, Hair loss diabetes etc. also used as antidote to snake bite. Therefore it is thought essential to assess the microbial efficacy of *Guazuma ulmifolia* against *Salmonella typhi, Vibro parahaemolyticus, Bacillus subtilis , Candida albicans and Pseudomonas aeruginosa.*

Plant Morphology

*Guazumaulmifolia*Lamk. Is medium sized woody tree. It is commonly found in deciduous forest. It is grows up to 30 m height. Leaves are alternate with two rows in assemledd flatly, leaves are ovate to lanceolate, finely toothed margin with rough texture. Leaves are covered with small star shaped hairs . Flowers are in panicles short stalked small in sized , brown to yellow colour. Fruit is capsule, rounded to elliptical. Seed are many brown coloured.

Material and methods

Plant material

Plant materials collected from Agaskhed of Akot taluka of Akola district during September 2022. The identification is done with the help of standard floras. (Naik 1979; Naik *etal.* 1998; Singh and Kartikayan (2001). The plant material is shaded dried, powered stored in airtight container.

Preparation of Extract

Powdered obtained was subjected to successive Soxhlet extraction with increasing order of polarity i.e. Acetone (56 to 60^0 c), Alcohol (60 to 80^0 C) ,Petroleum ether (60^0 to 80^0 C), Methanol (65.5^0 C-70.5^0 C) and distilled water (60-70^0C) Daniel, (1991).

Test Micro- organism

Bacillus substilis MTCC (1091), *Pseudomonas aeruginosa* MTCC (708), *Candida albicans* MTCC (3971) were obtained from stock cultures of Department of Microbiology , SGBAU Amravati and maintained on Muller

Hinton agar and potato dextrose agar slant for bacteria and fungi respectively and stored at 6^0 C until used. To prepare suspension , the slants were incubated at 37^0 C for 24 hours inoculum was prepared by Mac Farland turbidity standards.

Antimicrobial assay

Antimicrobial activity was determined using agar well diffusion method, nutrient agar for bacteria and potato dextrose agar for fungi was used. Plant extract was dissolved in DMSO (Dimehthylsulphoxide) at concentration of 2mg ml^{-1}. Streptomycin 20 mg $ml^{-1}$was used as standard. Each plate was inoculated with 20 mg ml^{-1}. Microbial suspension having a concentration of 10^0 cells ml^{-1}. 0.1 ml containing fungi were Incubated at 25^0 c for seven days. The antimicrobial activity was observed on inhibition zone which was compared with standard, MIC was also determined by both dilution method. The culture was diluted in nutrient agar both at a density adujusted to turbidity of 0.5 Mac Farland standards . Equal volume of each extracts nutrient broth was mixed in test tubes 0.1 ml standard inoculums was added to each test tube. The lowest concentration of extract that produce on visible bacterial growth when compared with standard regarded as MIC (Perez *et.al* 1990).

Observations

Fruits extracts of *Guazuma ulmifolia*shows variable antimicrobial activities against test organism. The distilled water exhibit remarkable activity against *Salmonella typhi* . The acetone fruit axtractis effective against Pseudomonas aeruginosa and Vibro parahaemolyticus the ethanol and methanol fruit extract was found to be the most effective against Candida albicans ,Bacillus subtilis and Pseudomonas aeruginosa , while the petroleum ether fruit extract does not exhibit any activity. (Table no.1)

Table- I Antimicrobial activity of fruit extract of *Guazuma ulmifolia*

	Organisms	Zone of inhibition (mm)					
		Plant extract					
		PTF	ACF	DTF	ALF	MTF	Control
1.	*Salmonella typhi*	-	-	15	12	06	19
2.	*Vibro parahaemolyticus*	-	15	07	09	-	17
3.	*Bacillus subtilis*	-	13	14	10	15	15
4.	*Candida albicans*	-	13	09	05	18	14
5.	*Pseudomonas aeruginosa*	-	23	13	11	13	17

Fruits extracts: PTF: Petroleum ether; ACF: Acetone; DTF: Distilled water; ALF: Alcohol; MTF : Methanol

Table- II Antimicrobial activity of leaf extract of *Guazuma ulmifolia*

	Organisms	Zone of inhibition (mm)					
		Plant extract					
		PTL	ACL	DTL	ALL	MTL	Control
1.	*Salmonella typhi*	-	-	15	12	06	19
2.	*Vibro parahaemolyticus*	-	15	07	09	-	17
3.	*Bacillus subtilis*	-	13	14	10	15	15
4.	*Candida albicans*	-	13	09	05	18	14
5.	*Pseudomonas aeruginosa*	-	23	13	11	13	17

Leaf Extract: PTL: Petroleum ether; ACL: Acetone; DTL: Distilled water; ALL: Alcohol; MTL: Methanol.

The distilled water and alcohol leaf extract sxhibit good antimicrobial activity rather than other organic solvent. The antimicrobial assay reveals that the fruit extract of *G.ulmifolia* is more effective than the leaf.

Phytochemical screening

Phytochemical screening of G.ulmifolia fruit and leaf showed the presence of different groups of secondary metabolites viz.alkaloids, tannins, saponins, flavonoids,terpenopids and cardiac glycoside.

Sr.No.	Plant parts	Tannins	saponins	Flavonoids	Terpenoids	Cardiac glycosides	Alkaloids	Steroids
1	Fruit	+	+	+	+	+	+	--
2	Leaf	+	+	+	+	+	+	+

Discussion

The preliminary phytochemical screening revealed that the leaf and fruit extracts of *G. ulmifolia* shows the presence of alkaloids, steroids, flavonoids terpenoids, saponins, which may be exhibit antimicrobial activity. Earlier workers have been reported that the phenolic compounds has the antioxidative, antidiabetic and antimicrobial activities (Arts and Hollman, 2005; Scalbeert et.al 2005). Flavonoids are a major group of phenolic compounds reported for their antiviral properties (Barnard et.al.1993), antimicrobial activity(Afolayan and Mayer,1997).

The antimicrobial properties of *G.ulmifolia*fruit and leaf extracts were performed. The distilled water fruit exhibit remarkable activity against *S. typhi* . The acetone fruit extract is effective against *Pseudomonas aeruginosa* and *Vibroparahaemolyticus*the ethanol and methanol fruit extract was found to be the most effective against *Candida allbicans.Bacillus subtilis*and *Pseudomonas aeruginosa*, while the petroleum ether fruit extract does not shows any activity. (Table No. 1). The antimicrobial assay reveals that the fruit extract *G. ulmifolia*is more effective than the leaf. The variations of in the effectiveness of extract against different organisms depend upon the chemical composition and membrane permeability of microorganisms for the chemical and their metabolism.

The diseases can be treated by using synthetic drugs. In recent years it is noticed that the microorganism develop resistance to these synthetic drugs due indiscriminate use of antibiotics. The phytomedicine is the only source to control or develop remedy against such microbial strains. India has richest source of ethnomedicine. The present microbial assay proves that the diseases caused by test organisms can be controled by fruit extract of *Guazuma ulmifolia*which may generate novel drug in future for the treatment of diseases caused by the test microorgansims.

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CLADOCERON COMMUNITY IN THE ARUNAVATI RIVER NEAR ARNI TOWN, DISTRICT YAVATMAL (M.S.) INDIA

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ABSTRACT

Cladocerons play an important role in the presence or absence of certain fish species and determines the population densities of zooplanktons. Zooplanktons play a significant role in transferring energy in aquatic ecosystem as primary consumers and can be used as indicators of trophic phase of a water body or river. Cladocerons diversity was studied from Arunavati river near Arni town which is one of the most ecological parameters to show water pollution. Cladocerons are sufficiently large in size and can be identified easily so far the assessment of water pollution is concern. The data on cladocerons from the Arunavati river are presented as Rotifers (27.90%) and cladocera (16.76%); dominated the zooplanktons population and were followed by copepod (15.49%); protozoan (15.06%); ostracods (13.28%); worms and larvae (11.52%). Abundance in zooplanktons was in the order of Rotifer > Cladocera > Copepoda > Protozoa > Ostracoda > Worms & Larvae. Cladoceron were represented by fourteen species. Holopedium showed their dominance over all the cladocerons and their maximum number were reported at station I, III and IV. Similarly polyphemus were recorded highest at station II and III.

Keywords- *Zooplankton, Cladocera, Arunavati river, Bio-indicator.*

Introduction

Zooplanktons are attracted the attention of several workers throughout the world, as they occupy a central position in the food web of aquatic ecosystem. Availability of resources and competition would primarily determine the balance of individual species within the food web, which in turns influences the variety and proportions of the different organisms, with important implications for the over all functioning of the system, Shah and Pandit (2013). Zooplanktons are also been used as biological indicators of eutrophication, Chakraorty et.al.(1997). Berlgis and Guido (2003), made good contribution on zooplankton studies with special reference to eutrophication process of fresh water body. Influence of physico-chemical parameter with fluctuation of zooplanktons are of great importance and basically essential for fish culture. Zooplanktons play an integral role and serve as bio-indicators and it is well suited tool for understanding water pollution status Contreas et.al,(2007). Islam (2007) in a pond of Rajshahi University, has investigated the effect of abiotic parameters and variations of zooplankton population. The zooplankton provide a direct link between primary producers and higher trophic level. Nearly all fishes depend on zooplankton at same phase of life or entire lives, Madin et.al,(2001). Cladoceron is natural group of organism which acts as a key element in the fresh water food webs, Hessen et. al,(2003). Water fleas are important components of the fauna of fresh water and are particularly significant in the food web of stagnant water ecosystem, Forro, et.al,(2008). Therefore the present study is under taken to evaluate population dynamics of cladocerons and the hydro biological status of Arunavati river.

Material and Method

Arunavati atributary of river painganga in Gondvan basin. The Arunavati river is about70 miles in length. The dam is located near savanga of Digras Taluka in Yavatmal district, Maharashtra. The painganga has six tributaries of same size these are Pus, Arunavati, Adaan, Waghadi, khuni and Vidarbha. The study area of Arunavati river near Arni town was divided into 5 sampling sites to study physico-chemical and biological properties of water representative water samples were collected and analysed. Water samples were collected monthly in one liter polythene bottles between 7:00 AM to 9:00 AM. Abiotic components were analyzed in laboratory condition and zooplanktons for identification were fix in 4% formalin, added with 5 drops of glycerin and 5% sucrose(retain eggs in their brood

chamber). The method used for the estimation of physico-chemical parameters and identification of zooplankton as given by APHA(1989), Edmondson(1959) and Great lake water life photo gallery.

Figure1:-Map of Study area of Arunavati river near Arni town

Result and Discussion

Arunavati river near Arni town exhibited heavy bulk of cladocerons next to number of rotifers all through the period of investigation. The observed zooplanktons belongs to group protozoan, rotifer, cladoceron, copepod, ostracod and worms&larvae. Rotifers(27.95%) and Cladocerons (16.61%) are dominant species. Which is followed by Copepods (15.51%), Protozoans (15.09%), Ostracods (13.30%) and Worms and Larvae (11.54%). Abundance of zooplankton was in order of Rotifera > Cladoceron > Copepoda > Protozoa > Ostracoda > Worms & Larvae (Table-1). Amongs the cladoceron Holopedium showed their dominance over all the cladocerons and their maximum number were reported at stations I,III and IV. Similarly polyphemus were recorded to be the second highest at station II and III. Station wise abundance and their annual range and mean of cladoceron was in the order of station III > station I > station II > station IV > station V (Table-2). Fourteen species of cladocerons were identified and their variation in the abundance of cladoceron at different sampling stations are shown in Table -3. The seasonal variation and their abundance succession was in the order summer > winter > monsoon. Among the cladoceron observe ceriodaphnia, diaphanosoma, leydigia, moinodaphnia were the pollution indicator species but quantity was very meager.

During study period positive correlation is observed between cladocerons and water temperature and with turbidity. Nasar and Dattamunshi (1974) observed negative correlation with these parameters. on the other hand Saunders et.al,(1999) suggested that temperature modulates the duration of egg development and this together with availability of food, can control the abundance of cladocera in winter. Similarly, most of the species observed reported to occure in alkaline water and were known to tolerate a certain range of pH variation. The present study agrees with the findings of Roff(2002); Harshman and Zera (2006) and Bell (2008). From the result shown in present study it is concluded that status of water body is mesotrophic. Pollution indicator planktons are in moderate number confirms that the water is not safe for drinking. The zooplankton community present in the water body is not in good quantity and hence influence food chain as it serve as food for the fish and hence fishery activities cannot be accelerated and pollution indicator species shows that river water is much more polluted need to take action against pollution increasing activity near the river.

Table - 1 : Numerical abundance of zooplanktons (org/l) at different stations of Arunavati river near Arni town during 2018-2019

S.No.	Zooplankton	Stations					**Total**	%
		I	II	III	IV	V		
1	Protozoa	8542	5670	9205	7437	8468	**39322**	15.09
2	Rotifera	14801	13917	14654	15316	14138	**72826**	27.95
3	Cladocera	9646	9204	10383	7878	6185	**43296**	16.61
4	Copepoda	8026	9205	6480	9205	7511	**40427**	15.51
5	Ostracoda	8247	8395	6185	5913	5913	**34653**	13.30
6	Worms & Larvae	5766	6775	4345	7585	5596	**30067**	11.54
	Total Zooplankton	**55028**	**53166**	**51252**	**53334**	**47811**	**260591**	100

Table-2: Annual range and mean values ± s.e. of cladocerons(org/l) from different sampling stations of Arunavati river near Arni town during 2018-2019.

S.No.	Sampling stations	Range		Mean	±S.E.
		Minimum	Maximum		
1	Station -1	295	957	689	69
2	Station -2	368	884	657	51
3	Station -3	295	1178	742	87
4	Station -4	221	958	563	73
5	Station -5	147	736	442	54

Table- 3: Variation in the abundance of cladocerons at different stations of Arunavati river near Arni town during 2018-2019.

Sr..no.	Zoo planktons	Stations				
		I	II	III	IV	V
1	Acantholeberis	+	+	+	+	-
2	Bosmina	++	+	+	+	-
3	Ceriodaphnia□	+	+++	+++	-	+++
4	Chydorrus	+	+	+++	+	+
5	Daphnia	+++	++	+	++	-
6	Diaphanosoma□	+++	-	+	-	+
7	Disparalona	+	+	++	++	+
8	Graptoleberis	+	-	+	+	+
9	Holopedium	+++	++	+++	+	+
10	Leydigia□	+	+	-	+	+
11	Moinodaphnia□	+++	+	+++	+++	+
12	Polyphemus	++	+++	+++	+	+
13	Sida crystallina	++	+++	+	+++	++
14	Simocephalus	+	++	++	++	+

(+)Denotes 500 org/l , (-) Denotes Absent, (□) Pollution indicator species

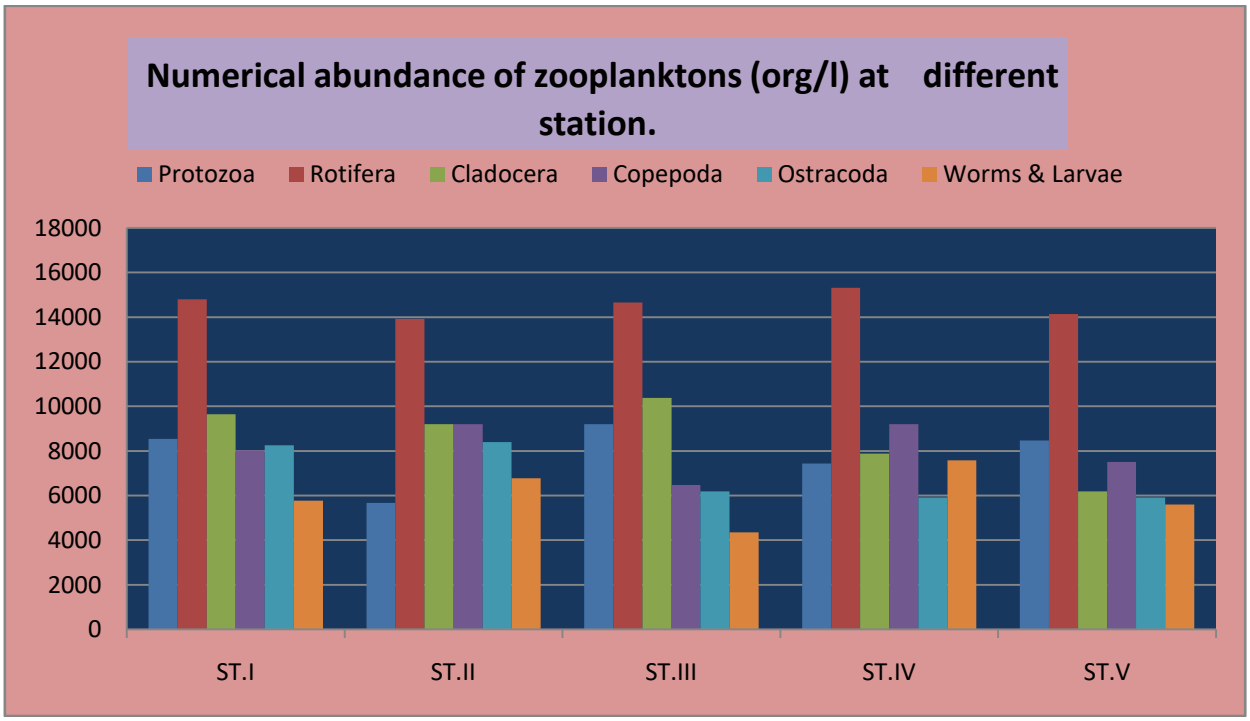

Fig 2: Graphical representation of abundance of zooplanktons (org/l) at different stations.

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ANTIMICROBIAL EVALUATION OF Co(II), Ni(II) AND Cu(II), COMPLEXES DERIVED FROM THIAZOLE SCHIFF BASE

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ABSTRACT

Schiff base has been prepared by the condensation of 2-hydroxy-5-chloro-3-nitro acetophenone and thiazole. The ligand was characterized by elemental analysis and spectral methods. The coordinating ability of the ligand is investigated by preparing its metal complexes with Co(II), Ni(II) and Cu(II), have been prepared and characterized by elemental analysis, molecular weight determinations, conductance measurements and spectral. All the complexes have been evaluated for their antimicrobial evaluation by agar cup-plate method against various organisms. The isolated products are coloured solids, soluble in DMF, DMSO and THF.

Keywords: *Schiff base, Magnetic susceptibility, Antimicrobial*

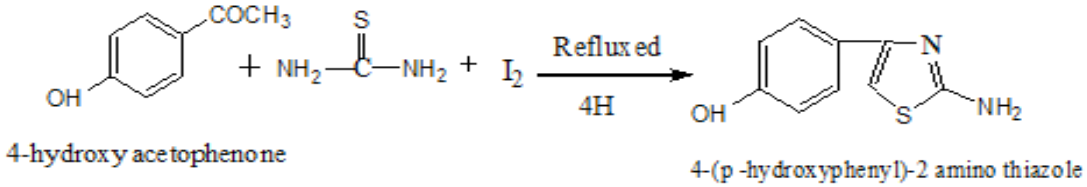
Introduction

The variety of applications of coordination compounds is impressive, ranging from analytical chemistry to bio-chemistry. Some important applications of coordination compounds are in the mineral world, plant world, arts and sciences, electroplating, metallurgy of gold, photographic process, dyes, artificial silk etcSchiff bases are chemical compounds formed from the condensation reaction of aldehydes or ketones with amines. These compounds are majorly used in industries and also have significant biological activities, including antioxidant, antibacterial, antifungal, antiviral and antitumor. The majority of these compounds show excellent catalytic activities. Schiff bases are considered to be the most versatile ligands as they form complexes with the metal atoms. They are called privileged ligands because these compounds can be synthesized simply by condensation or microwaves. Performance of Schiff Bases Metal Complexes and their Ligand in Biological Activity[1] Antifungal Activity of Some Mixed Ligand Complexes Incorporating Schiff Bases[2] Spectral and thermal characterization of Mn(II), Ni(II) and Zn(II) complexes containing schiff Base ligands.[3] Compounds containing an azomethine group (CH=N), known as Schiff bases, were formed by the condensation of a primary amine with a carbonyl compound. Schiff bases of aliphatic aldehydes were relatively unstable and were readily polymerizable. Schiff bases and their complexes are shows good progress in thermal analysis[4]. The mathematical calculating thermogravimetric data, thermal decomposition activation parameters can be obtained[5] This paper discusses the antimicrobial evaluation effect for Schiff base complexes of Co(II), Ni(II) and Cu(II)

Experimental

All the chemicals were of A.R. grade and used as received. 2-hydroxy-5-chloro-3-nitro acetophenone (HCNA) and 4-(p-hydroxyphenyl)-2 amino thiazole was prepared by known methods[6-9]. The solvents were purified by standard methods[10].

Synthesis of 4-(phydroxyphenyl)-2aminothiazole;



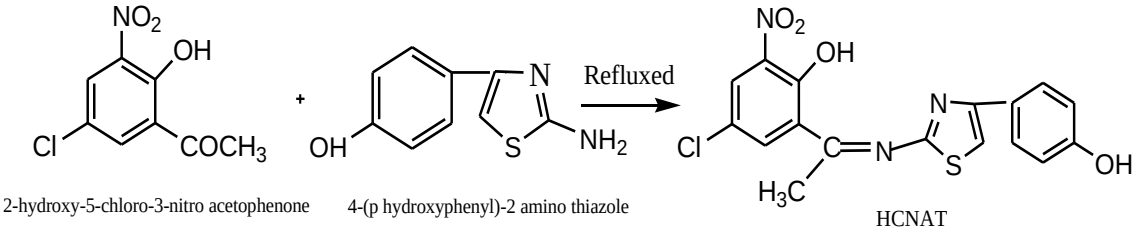
4-hydroxy acetophenone

4-(p -hydroxyphenyl)-2 amino thiazole

Synthesis of 2-hydroxy-5-chloro-3-nitro acetophenone 4-(p-hydroxyphenyl)-2 imino thiazole [HCNAT]:

A solution of 4-(p-hydroxyphenyl)-2 imino thiazole (0.02M) in 25ml of ethanol was added to an ethanolic solution(25ml) of 2-hydroxy-5-chloro-3-nitro acetophenone (0.02M) and the reaction mixture was refluxed on a water bath for 4h. After cooling a pale yellow coloured crystalline solid was separated out. It was filtered and washed with ethanol, crystallized from DMF and dried under reduced pressure at ambient temperature. The purity of ligand was checked by elemental analysis and m.p. It was also characterized by IR and ^{1}H NMR spectral studies.

Yield:70%; m.p. 310^{0}C



2-hydroxy-5-chloro-3-nitro acetophenone 4-(p hydroxyphenyl)-2 amino thiazole HCNAT

Table1. Analytical data of the Ligand.

Ligand	Molecular Formula	Formula Weight	Color and nature	Elemental Analysis			
				C% found (Cal.)	H% Found (Cal.)	Cl% Found (Cal.)	S% Found (Cal.)
HCNAT	$C_{17}H_{13}N_3O_4SCl$	390.6	Yellow Crystalline	52.34 (52.22)	03.26 (03.32)	9.02 (9.08)	08.12 (08.21)

Preparation of complexes: All the metal complexes were prepared in a similar way by following method. To a hot solution of ligand HCNAT (0.02M) in 25ml of ethanol a suspension of respective metal salts was added drop wise with constant stirring. The reaction mixture was refluxed on a water bath for 4-5 h. The precipitated complexes were filtered, washed with ethanol followed by ether and dried over fused calcium chloride. Yield : 50-55%, The complexes are soluble in DMSO and DMF but insoluble in water and common organic solvents. The metal chloride content of complexes were analyzed by standard methods[12] The ^{1}H NMR spectra of ligand was recorded and obtained from RSIC Chandigarh. IR spectra of the compounds were recorded on Perkin Elmer 842 spectrophotometer in the region 400-4000cm^{-1}, Carbon, Hydrogen and Nitrogen analysis were carried out at RSIC, Punjab University, Chandigarh. The molar conductance of the complexes at 10^{-3} M dilution in DMF were determined using equiptronic digital conductivity meter EQ-660 with a cell constant 1.00 cm^{-1} at room temperature. The magnetic moment measurement were made on a Gouy balance at room temperature using [$HgCo(SCN)_4$] as the calibrant. The thermogravimetric analysis were performed on laboratory set up apparatus in air atmosphere at 10^0 C min^{-1} heating rate. The molecular weights of the complexes were determined by Rast method.

Table 2. Analytical data and molar conductance of the compounds.

Ligand	Formula weight g mole^{-1}	Colour	Elemental Analysis Found (Calcd.)				μ_{eff} B.M	Λ_M (Ω^{-1} cm^2 mol^{-1})
			M%	C%	H%	Cl%		
$[CoL_2(H_2O)_2]\ H_2O$	892.1	Brown	6.25 (6.60)	44.86 (45.73)	3.25 (3.36)	7.70 (7.95)	4.6	6.8
$[NiL_2(H_2O)_2]\ H_2O$	891.9	Green	6.30 (6.58)	45.58 (45.74)	3.16 (3.36)	7.72 (7.96)	3.1	7.6
$[CuL_2(H_2O)_2]\ H_2O$	896.7	Brown	6.90 (7.08)	45.26 (45.50)	3.12 (3.34)	7.72 (7.91)	1.6	8.2

Result and Discussion

The Schiff base HCNAT and its complexes have been characterized on the basis of ^{1}H NMR, IR spectral data, elemental analysis, molar conductance, magnetic susceptibility measurements and thermo gravimetric analysis data. All these values and analytical data is consistent with proposed molecular formula of legend. All the compounds are coloured solid and stable in air. They are insoluble in water but soluble in coordinating solvents like DMF and DMSO. The molar conductance values in DMF (10^{-3} M) solution at room temperature (Table2) shows all the complexes are non electrolytes.

The ^{1}H NMR spectra of ligand HCNAT shows signals at δ 12.11, (1H, s phenolic OH), δ 9.52 (1H, s, phenolic OH), δ 7.56, 7.54, 7.53 and 7.52 (4H, m, phenyl) δ 6.81, 6.80, and 6.78(3H, s Phenyl), 6.68 (1H s thiophene), and 2.56(3H, s, methyl) [11,13-15]. IR spectra of ligand and metal complexes shows ν(C=N) peaks at 1620 cm^{-1} and absence of C=O peak at around 1700 – 1750 cm^{-1} indicates the Schiff base formation[16-19].

Table 3. IR spectra of ligand and metal complexes

Χομπουνδ	ν(O–H) ηψδρ ογεν βονδεδ	ν(X=N) ι μινε	ν(X–O) π ηενολιχ	ν(M–O)	ν(M–N)	ν(X–Σ)
HXNAT (ΛH)	3119	1620	1514	––	––	1122
[XoΛ$_2$(H$_2$O)$_2$] H$_2$O	––	1608	1506	472	432	1098
[NιΛ$_2$(H$_2$O)$_2$] H$_2$O	––	1585	1464	469	423	1090
[XυΛ$_2$(H$_2$O)$_2$] H$_2$O	––	1610	1503	508	412	1110

Antimicrobial evaluation: In antimicrobial activity, the antimicrobial agents can be subdivided into different groups. The subdivision can be based upon the group of microorganisms affected such as antibacterial, antifungal, antiprotozoal, antiviral and antineoplastic chemotherapeutic agents.

Table 5. Antimicrobial activity[20-24]

Ligand and its complexes	Zone of inhibition (in mm)					
	P. vulgaris (mm)	*S. aureus* (mm)	*E. coli* (mm)	*P. fluorescen* (mm)	*A. aerogenes* (mm)	*B. megatherium* (mm)
HCNAT	R	S$_{16}$	S$_{12}$	S$_{10}$	R	R
Co- HCNAT	R	S$_9$	R	S$_{12}$	S$_7$	R
Ni- HCNAT	S$_8$	S$_{11}$	R	S$_{14}$	S$_9$	S$_7$
Cu- HCNAT	S$_{12}$	S$_{14}$	S$_7$	S$_9$	R	S$_9$

S - Sensitive (Bacteriocidal) R - Resistant (Bacteriostatic)

Conclusions

In conclusion, we have synthesized new ligand 2-hydroxy-5-chloro-3-nitro acetophenone 4-(p-hydroxyphenyl)-2 imino thiazole and their metal complexes. The Schiff base ligand and all the metal complexes show more activity towards *S. aureus* and least activity towards *E. coli*, *A. aerogenes* and *B. megatherium* . The structural changes have marked effect on the sensitivity and sensitivity varies with organisms.

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A STUDY ON CONSUMER PERCEPTION TOWARDS DIGITAL WALLETS

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ABSTRACT

The government of India takes various initiatives to promote digital transactions in the country. According to Newzoo Games Performance, Monitor India is the second largest country in the world that used smart mobile phones that is 659.00 million. India's 46.5 percent population used Smart Mobile phones regularly. E-Wallets in mobile phones are playing a vital role in the various types of digital transactions. Now a day become a regular practice for various types of e-payments by citizens due to the convenience of E-wallets. The present study is an attempt to evaluate and understand the consumer perception towards E payment through various mobile E-Wallets. A structural questionnaire was used to collect primary data.

Keywords: E-wallets, Digital Payments, Consumer Perceptions

I) Introduction

The Spread of digital technology and internet services has brought a massive transformation in the routine life of citizens. Information and Communication Technology plays a vital role and made a revolution in e-commerce and e-payment system. There is a rapid increase in the number of smart phone users in our country. According to Newzoo Games Performance Monitor, India is the second largest country in the world used 659.00 million smart mobile phones regularly. India's 46.5 percent population used Smart Mobile phones. It improves the growth ofe-commerce transactions with the help of various software application in smart phones. Digital Wallet is the most popular software system in a smart phone which is used equally to the physical wallet in which we carry money. E-wallets can be categorized into four parts: open wallets, semi-open wallets, closed wallets, and semi-closed wallets. A digital wallet is a software system that stores the user's details and passwords securely for payment across numerous websites. The bank account number of the user is linked to the digital wallet which allows the user to make purchases easily and quickly. The bank accounts of individual users are linked to their digital wallets. Digital wallets are not used only for online purchases but also for the authentication of the users. A digital wallet can store complete user information including credentials, transaction history, and personal details. They can be used in combination with other mobile payment systems.

Users can transfer their money through their bank accounts in digital wallets and carry out certain offline transactions as well. Despite the growth in the number of digital commerce applications, there are still certain issues faced by these e-commerce applications such as security issues, privacy issues, lack of knowledge, mobile illiteracy, and fraud. These issues are a major obstacle to further e-commerce business development. Hence it becomes very important for service providers to understand these issues from the consumer's perspective. According to the Reserve Bank of India, there are three types of E-wallets currently used in India

- **Open wallet**: Open digital wallet is used to purchase goods and services, including financial products like insurance and mutual funds. It can also be used to withdraw cash at ATMs or transfer funds at merchant locations and point-of-sale terminals where such cards are accepted.
- **Semi-closed**: Through semi-closed wallets, an individual can shop online, recharge their phone and pay bills. However, through these wallets, one cannot withdraw cash from an ATM. Through semi-closed wallets, one can purchase goods and services with listed merchants partnered with the wallet's company. Paytm, PayUMoney, and Oxygen are a few examples of semi-closed digital wallets.

- **Closed wallets**: Wallets issued to consumers for exclusive use are known as closed wallets. These can be used when transacting with these respective companies. A certain amount is locked with the company, in case you cancel or return the order. When a customer return or cancel an order, the merchant company credits your wallet account with the refund amount directly. Examples of closed digital wallets include BigBasket wallet, MakeMyTrip wallet, etc

The popular E-wallets are

1. Paytm
2. Phone Pe
3 Amazon pay
4 BHIM App
5. Freecharge
6 HDFCpayzapp
7. MobiKwik
8. Google Pay
9. Amazon Pay
10 Airtel Thanks App

II) Objectives of Study

- To study the awareness of youth towards the E-wallet in Akola city.
- To find out the preference for E-wallets among youngsters.
- To examine the perception towards the E-wallet.
- To identify the factors that affect consumer preference towards E-wallets.
- To suggest overcoming the problems of using an E-wallet.

III) Research Methodology

The present study is based on primary and secondary data sources. Primary data was collected from 50 respondents by using a structured questionnaire. Which has been created using Google Forms and distributed among social media users in Akola city of Maharashtra? The secondary data is collected from websites, research journals, newspapers, and magazines. For sampling random sampling method was used to collect the data from the respondents. The sample size is 50. And the data is analyzed and interpreted using Microsoft Excel.

IV) Data Interpretation and Analysis

Table 1 Demographic Profile of Responses (50)

	Categories	Count	Percentage
Age	18-25	14	28.00
	26-35	16	32.00
	36-45	11	22.00
	46-55	5	10.00
	56 and above	4	8.00
Gender	Male	32	64.00
	Female	18	36.00
Educational Qualification	Undergraduate	6	12.00
	Graduate	18	36.00
	Post Graduate	26	52.00
Annual Income	Less than 1 Lakh	5	10.00
	1Lakh to 2 Lakh	13	26.00
	2 Lakh to 3 Lakh	10	20.00
	3 Lakh to 4 Lakh	6	12.00
	4 Lakh to 5 Lakh	16	32.00
Profession	Service	21	42.00
	Business	14	28.00
	Professional	7	14.00
	Students	8	16.00

The above table explains that around 28% of the respondents are from the category of 18 to 25 years, and 32% of the respondents belong to the category of 26-35 years. Around 36% of the respondents are graduates and around 42% of them have been working in the service area. 32% of the respondents have an annual income in the range of 400000-500000

Table 2 Preference regarding the use of Digital Wallets for purchases

Products /services	No. of respondents Percentage	Percentage
Books	1	2.0
Movie Tickets	5	10.00
To pay bills	13	26.00
Travel Tickets	17	34.00
Clothes	4	8.00
Recharge Digital or DTH	1	2.00
To transfer money	2	4.00
Electronic products	1	2.00
Restaurants	6	12.00
Total	50	100

As per the above table, 34% majority of the respondents preferred to use Digital wallet payment to pay bills followed by travel tickets and so on.

Table 3 Factors influencing customers to go for Digital wallets

Factors Influencing opt for M-wallets	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Instant Payments	**0**	2(4%)	4 (8%)	29 (58%)	15(30%)
The reputation of the company	**0**	4(8%)	8(16%)	33(66%)	4(8%)
One stop shop	**0**	6(12%)	27(54%)	13(26%)	4(8%)
Seamless process	**0**	3(6%)	7(14%)	21(42%)	19(38%)
Instant Refunds	1(2%)	10(20%)	9(18%)	13(26%)	17(34%)
Rewards and offers	0	0	3(6%)	38(76%)	8(16%)
Safety and Security	**0**	2(4%)	15(30%)	25(50%)	8(16%)

From the above table, we understand that around 76% of the people agree that rewards and offers influence them to go for purchases, followed by 58% of the people who believe that digital wallets help to make instant payments.

Table 4 Factors abstaining customers to go for Digital wallets

Factors refraining the usage of M-wallets	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Prefer to use other cashless payment option	2(4%)	4(8%)	6(12%)	16(32%)	22(44%)
Concerned about the security of digital payments	1(2%)	5(10%)	7(14%)	11(22%)	26(52%)
No value in using digital payments	3(6%)	11(22%)	19(34%)	7(14%)	10(20%)
Glitches	6(12%)	10(20%)	5(10%)	9(18%)	20(40%)
Possibility of information theft during wireless transmission	2(4%)	4(8%)	3(6%)	16(32%)	25(50%)

From the above Table, it shows that 50% of the respondents strongly agree that they are concerned about the security of Digital payments and the possibility of information theft.

V) Findings

Based on the structured questionnaire that was administered to 50 respondents, the findings were as follows:

a) 34% of respondents prefer using digital wallets for paying bills followed by booking travel tickets and so on.
b) Instant payment, offers, and rewards One of the major reasons people opt for digital wallets. Nearby 76% of people opt for digital wallets because of the rewards attached tothe use of digital payments.
c) 44% of the respondents strongly agree that they are concerned about the security of Digital payments and leakage of information, which serves as one of the refraining factors for the use of digital wallets.
d) A great number (52%) of the respondents said that security is very important while purchasing products online.

VI) Conclusions

Thus, online purchases using digital wallets are increasing suddenly. The mindset of the customers has gradually moved from buying and selling on a cash basis to buying and selling by way of digital wallets. The majority of the respondents think that trust plays a vital role in the use of digital wallets. The use of digital wallets is in favorof the young generation as they feel it is more comfortable, structured, and convenient. It is analyzed from the survey that when a consumer makes a mind to purchase through digital wallets he or she is affected by multiple factors which influence his behavior out of which safety and security remain the major concern. The main crucial identified factors are time-saving, the offers and rewards, and convenience.
Mobile wallet payment is a sizable platform for new and upcoming technology which promotes financial institutions in India through mobile technology and also helps to increase their customers and users. The security issues that are tightened and reduced will automatically increase the adoption of a mobile wallet. Recently, everyone has had a smart phone but there is a need to create awareness and acceptance of mobile wallet services that are comfortable, structured, reliable, confidential, safe, and convenient without any effort.

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IMPACT OF E-BANKING SERVICES ON CONSUMER SATISFACTION IN INDIA WITH SPECIAL REFERENCE TO PUBLIC SECTOR BANK

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ABSTRACT

E-banking is a system that provides users with a range of online banking services through the use of the Internet and telecommunications networks. Customers can use this method to access their bank accounts online and carry out different financial operations online. Online banking, virtual banking, and Internet banking are other names for it.Banking services around the world have been transformed by technologyinto supply and demand based as it was traditionally. A lot of customer-centric research is now being done on the products and services provided by banks. Globally, lifestyles have changed dramatically, and with it, the banking needs of consumers. For banks to achieve their objectives of customer acquisition and retention, assessing the needs of customers and bringing products and services to market accordingly is the need of the hour. Primary and secondary information has been relied upon for this research article. The basis of account holders in the public sector State Bank of India has been taken while compiling the preliminary information from the Yavatmaldistrict.For this, preliminary information has been collected through two hundred respondents from the Yavatmal district and their views have been obtained through important questions and it has been presented with the help of a table and graph. The entry of electronic media into the banking sector in these research articles is very beneficial. This leads to huge savings in customer time. This research paper has been prepared in accordance with the fact that e-banking speeds up financial transactions.While collecting the data for this research article, the sample selection method is made using the simple random sampling method in the sample selection method.

Keywords: *Innovation, E-Banking, global competitiveness, Customer ExperienceCustomer Satisfaction.*

Introduction

E-banking is a system that provides users with a range of online banking services through the use of the Internet and telecommunications networks. Customers can use this method to access their bank accounts online and carry out different financial operations online. Online banking, virtual banking, and Internet banking are other names for it.Internet banking is the automatic delivery of new and existing products to customers. With Internet banking, both private and business customers can perform several functions, such as opening accounts, doing business, transferring money, receiving information, borrowing and crediting money, etc. Gone are the days when customers planned their day around limited banking hours and long queues. Banking is now done with a few clicks and is always available on devices such as phones and computers. Over the past decade and a half, traditional banking has undergone a massive transformation withtechnology and electronic banking, and as a result, customer satisfaction has gripped the banking industry all over the world. Banking customers are moving from indifference to satisfaction and reaping many benefits as banks continuously adopt the technology. The growth of the banking sector was fuelled by the COVID pandemic. Since people rarely met or interacted, there were very few opportunities to communicate with each other or physically exchange cashin a transaction in those days. This has increased the use of e-banking due to the growth of digitized transactions and a cashless society.

Progress in the banking sector has not been easy. Many countries, including India, experienced great resistance in the early stages of technological upgrading. Union leaders led workers in this resistance, fearing job losses. Over time, however, resistance weakened. Banking services around the world have been transformed by technologyinto supply and demand based as it was traditionally. A lot of customer-centric research is now being done on the products and services provided by banks. Globally, lifestyles have changed dramatically, and with it, the banking needs of consumers. For banks to achieve their objectives of customer acquisition and retention, assessing the needs of customers and bringing products and services to market accordingly is the need of the hour. In ten years, we have experienced

the whole spectrum, from strong resistance to the computerization of employees to intensive and targeted investments in the technology that laid the foundation for electronic banking and made it very popular in many countries. Technology has proven to be a strategic tool that has led to phenomenal growth and over-productivity in terms of both customer numbers and superior operational control.

There are several channels in the online banking world that enable this change. The most commonly used are online, telephone, and SMS banking services, ATMs, debit and credit cards, electronic money transfers and settlements, electronic payments, digital wallets, merchant accounts, and other electronic business solutions.

The financial services sector now includes commercial and retail banking and wealth management services. Customer Experience (CX) has undergone a huge transformation in this industry.

It is very important to remember that customer satisfaction shows that the existing customer base of the bank accepts and is satisfied with the offers and operations of the bank. It helps to move from customer satisfaction to customer loyalty and helps tremendously in brand building. Research shows that the more receptive customers are, the better the brand image of the bank.

Some of the easily observable results that lead to customer satisfaction in an online banking system are increased productivity, reduced banking costs, quick settlement, and high volumes of banking transactions. The industry has identified a number of factors affecting customer services such as quality of service, web design, content security, privacy, convenience, and speed. Theincrease in the number of internet users has added to the digital transformation of banks. The number of Internet users in India is constantly growing and is part of the story of why and how Internet banking is thriving. It's the same everywhere in the world.

According to a recent study by Harvard Business Review Analytic Services, improving CX is among the top fivepriorities for the financial services industry in the coming year. Major investments are being made indigital transformations to deliver memorable customer experiences while meeting increasingly complex regulatory requirements.

Online banking services have multiple digital touchpoints. Combining them connects the customers' financial functions and gives the online banking company a 360-degree overview of the customer. The big picture also allows online banking companies to mine data for customized reports that help customers make data-driven financial decisions. Automation has allowed bankers to focus on customer relationships, which is extremely important.

Given below are a few common e-banking services:

Electronic Fund Transfer (EFT): When a fund(money) is transferred from one bank to another bank electronically, it is called an electronic fund transfer. For example- Direct deposit/debit, Wire transfer, NEFT, RTGS, IMPS, etc.

POS – Point Of Sale: As the name suggests, Point Of Sale usually refers to a POINT(Retail Outlet) in terms of date, time, and place where a customer can make payment using plastic cards for the purchase of goods & services.

Credit Card: Credit cards are used for online and POS outlet payments, and it is issued by the banks to their customer at their request, after checking their credit scores. This provides the customers to borrow funds to a certain limit and make transactions. The cardholders are required to pay their debt within a time period with some charges.

ATM: ATM stands for Automated Teller Machine. It is one of the oldest and most common e-banking services. They provide 24×7 banking at all major locations. ATMs are not only used to withdraw cash whenever required, they can also be used to check your account statements, fund transfers, PIN and mobile number, etc.

Electronic Data Interchange (EDI): EDI is used in the banking industry to improve operational efficiency and reduce the cost of banking services. It also helps in efficient and faster process management.

Objective

1. To know and study the importance of e-banking services through public sector banks.

2. To know and study the views of the customers of State Bank of India in the public sector regarding their satisfaction with respect to e-banking services.
3. To study e-banking services based on primary and secondary information and formulate important conclusions.

Review of literature

1. WILLIAM ROBERT., DEVI PREETHA GOWTHAMAN, A study on the impact of e-banking on customer satisfaction in India, concluded that Electronic banking has a greater impact on the economy as well as the banking sector. Provision of financial services A system accessible to the poorest is considered an important part of poverty reduction strategies. Technological innovation offers considerable hope, even if it implies fundamental changes in the delivery mechanisms of banks and the role of banking service providers and their relationship with customers. In that case, productivity, efficiency, economic growth, and providing optimal service to customers are huge in electronic banking altogether. Customers must be trained and familiar with the use of electronic channels. Bank employees must also be fully informed about the use of electronic channels so that they can be guided by customers effectively.
2. Sharma Jyotsna, Singh Jagdeep, Singh Amandeep ,(2020) Impact of E-Banking Service Quality on Customer Satisfaction, The main objective of this paper is to measure the impact of E-banking service quality on customer satisfaction. The primary data method is used to collect data by using the interview method over 504 respondents. The random sampling technique has been taken up for the survey by keeping due care for the availability and easiness of the customers. Obtain the conclusion The banks or service providers can identify the flaws in the offered services. They can plan and devise a strategy for improvising the service quality to satisfy their customers. With the dawn of technological innovations, the banking industry has taken up various smart moves to conduct banking practices. Also, the usage of E-Banking services is increasing day by day. It becomes relevant to identify the most excellent service quality dimensions offered by any bank or E-Banking service providers. Also, the focus is to identify the weak areas of business operation where the service providers can work upon to make the service better and improvised.

Hypothesis

H_0 - As the use of e-banking systems in the public sector is on the rise, the time savings of account holders are not being done in a big way.

H_1 - As the use of e-banking systems in the public sector is on the rise, the time savings of account holders are huge.

Research Methodology

Primary and secondary information has been relied upon for this research article. The basis of account holders in the public sector State Bank of India has been taken while compiling the preliminary information from the yavatmal district. For this, preliminary information has been collected through two hundred respondents from the Yavatmal district and their views have been obtained through important questions and it has been presented with the help of a table and graph. The entry of electronic media into the banking sector in these research articles is very beneficial. This leads to huge savings in customer time. This research paper has been prepared in accordance with the fact that e-banking speeds up financial transactions.While collecting the data for this research article, the sample selection method is made using the simple random sampling method in the sample selection method.

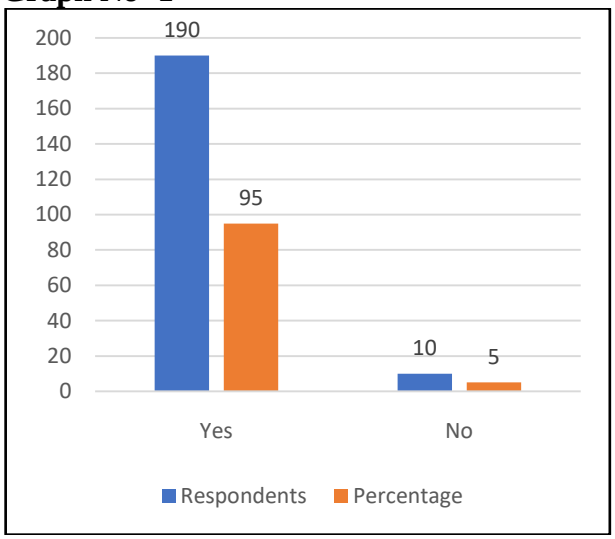
Data analysis:

1) Is Internet banking saving your time in a big way?

Table no- 1

Sr. No	Respondents Opinion	Respondents	Percentage
1	Yes	190	95
2	No	10	5
	Total	200	100%
Source: Primary Data			

Graph No- 1



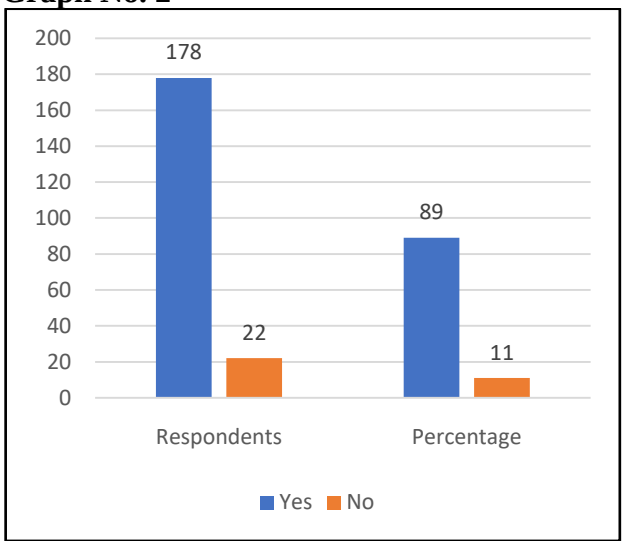
From the above arrays and graphs, it can be seen that 190 i.e. 95 percent of the votes received were the highest in the opinions received regarding the huge savings in the time of the account holders due to e-banking. This proves that the e-banking facility is saving the time of the customers which is increasing their satisfaction.

2) Using Internet banking is increasing your satisfaction?

Table no.2

Sr. No	Respondents Opinion	Respondents	Percentage
1	Yes	178	89
2	No	22	11
	Total	200	100%
Source: Primary Data			

Graph No. 2



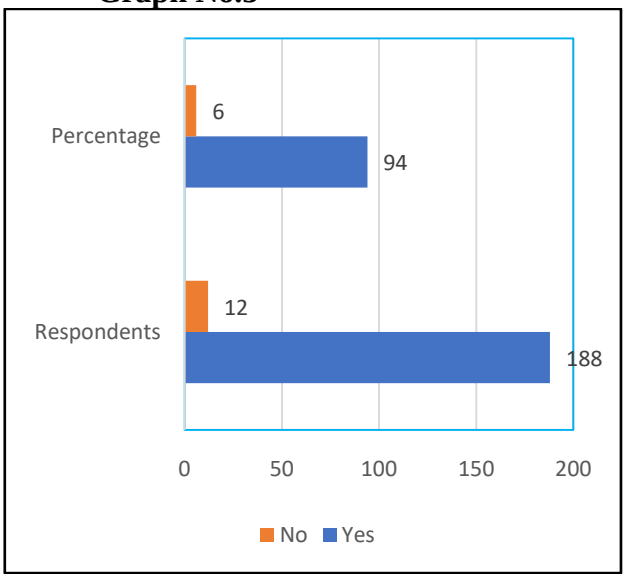
From the above array, it can be seen that 178 i.e. 89 percent of the votes received in the opinions received in respect of the fact that the use of internet banking is leading to a huge increase in the satisfaction of the account holders. This proves that Internet banking is a boon to public banking sector customers**.**

3) While using Internet banking, such as debit cards credit cards, and UPI, are you doing your job faster?

Table No. 3

Sr. No	Respondents Opinion	Respondents	Percentage
1	Yes	188	94
2	No	12	6
	Total	200	100%
Source: Primary Data			

Graph No.3



From the above arrays and graphs, it can be seen that a total of 188 respondents agreed to the votes received in terms of Internet banking providing facilities like debit cards credit cards, and UPI payments at a much faster pace. This proves that the facility of e-banking appears to be much easier and more comprehensive for account holders.

Limitation

1. Preliminary information for this research article has been collected from bank customers in the Yavatmal district.
2. The findings from the research are presented only on the basis of primary and secondary information.

3. The basis of account holders in the public sector State Bank of India has been taken while compiling the preliminary information from the yawatmal district.
4. It is not possible to say for certain whether the findings from the research will apply to other places or not.

Conclusion

Public sector banks today make use of e-banking facilities in a big way to provide various facilities to the account holders, mainly ATMcards debit cards, and UPI payment online banking systemsNEFT and RTGS, which include saving time to the customer as well as speeding up his financial transactions.The revolution in internet banking has been largely successful today as customers are taking advantage of it in a big way and it has also facilitated the financial transactions of the account holders. According to the sector from which the data was collected, since the launch of the e-banking facility, the time taken in the bank has been greatly reduced, making it easier to receive or send money to a great extent.This proves that the alternative hypothesis presented in the research article is proved on the basis of the opinions obtained with the help of the table and graph the aboveAs the use of e-banking systems in the public sector is on the rise, the time savings of account holders are huge.

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SCOPE OF RESEARCH IN SANSKRIT WITH SPECIAL REFERENCE TO NEP 2020

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ABSTRACT

It is a well-known fact that, Sanskrit is one of the oldest languages in the world. Sanskrit belongs to Indo – European family of languages. Many scholars within and outside India have proved that Sanskrit is the mother of modern Indian Languages and few foreign languages have inspired by Sanskrit. Therefore, in and outside India, there are many institutions which impart the knowledge of Sanskrit language. In India, there are many higher education institutes like government and private universities, IITs etc. which provide the knowledge of Sanskrit along with other subjects. After completing post-graduation in Sanskrit, every year, many students try to enroll themselves for PhD program in Sanskrit in such higher education institutions. But it has been observed that most of the times students fail to register themselves for PhD due the lack of the knowledge of research areas in Sanskrit. This paper is a humble effort to show the possibilities of the research areas in Sanskrit. Central Government of India has declared the New Education Policy 2020 (NEP 2020). By keeping this in the mind, the paper aims to connect the research areas in Sanskrit with NEP 2020 and tries to find out the possible areas of comparative research as well.

Keywords: *Sanskrit, PhD, Indian Knowledge System, NEP 2020, Research*

Introduction

It is a well-known fact that, Sanskrit is one of the oldest languages in the world. Sanskrit belongs to Indo – European family of languages. Many scholars within and outside India have proved that Sanskrit is the mother of modern Indian Languages and few foreign languages have inspired by Sanskrit. Therefore, in and outside India, there are many institutions which impart the knowledge of Sanskrit language. Of Course, in comparison to other countries in the world, the number of such institutions is significantly large inIndia. In India there are three main boards which control school education: 1. State boards 2. Central Board of Secondary Education 3. Indian Certificate of Secondary Education. All these boards provide an option to students to learn Sanskrit along with other languages during their schooling. Apart from schools, there are many higher education institutes like government and private universities, IITs etc. which provide the knowledge of Sanskrit along with other subjects. Such higher education institutes aim atvalue-based research. To achieve this aim, these institutes offer research program (PhD) in various subjects and Sanskrit is one of them.

After completing post-graduation in Sanskrit, every year, many students try to enroll themselves for PhD program in Sanskrit.Butit has been observed that most of the times students fail to register themselves for PhD due the lack of the knowledge of research areas in Sanskrit. This paper is a humble effort to show the possibilities of the research areas in Sanskrit. Central Government of India has declared the New Education Policy 2020 (NEP 2020). By keeping this in the mind, the paper aims to connect the research areas in Sanskrit with NEP 2020 and tries to find out the possible areas of comparative research as well.

Oxford Dictionary defines the term research as a careful study of a subject, especially in order to discover new facts or information about it. In case of Sanskrit, it is expected that one should make a detailed study of at least one branch from various branches of this subject and try to find out the problem to give the solution. Many times, common people consider Sanskrit as just a merelanguage in which the sacred texts of Hinduism were written. But Sanskrit is not only limited to this. There are many branches of this subject like literature, poetics, grammar, linguistics, philosophy, inscriptions, texts based on sciences etc. Research areas are not different than these branches. It shows that there is a wide scope of research in Sanskrit. The description of each research area is given below:

1. Literature – Sanskrit literature is vast and one of the qualitative literatures. One can divide texts of Sanskrit literature under

following sections by observing the common factors –

A) Vedic Literature – It includes four *Veda*s, *Brahmana*s, *Aranyaka*s and *Upanishad*s.

B) Epics – Ramayana and Mahabharata written by great poets Valmiki and Vyas respectively comes under this section.

C) Classical Sanskrit Literature – Classical Sanskrit literature is very rich. Poets like Bhasa, Kalidasa, Bhavabhuti, Bhartruhari, Vishakhadutta and many more have contributed to literature through their dramas and other poetic compositions of different type. Anyone can easily find out the list of their works in any book related to Sanskrit literature.

D) Modern Sanskrit Literature – It is not the case that people are not making a composition in Sanskrit in 21st century. Many Sanskrit scholars are engaged in writing dramas, *mahakavya*s in Sanskrit on different topics. They are trying to write in a different literary form like Hiku, comics, fables, fairy tales etc.

E) Literature translated in Sanskrit–Many Sanskrit scholars have translated the literature of varied types from modern languages to Sanskrit. Even though the number of such type of literature is not large in comparison to classical and modern Sanskrit literature, still one cannot neglect or overview its contribution to Sanskrit Literature.

F) Commentary Literature –Sanskrit Commentary literature plays an important role in understanding Sanskrit texts. Commentaries were written down on all most all the texts of classical Sanskrit literature. For example – Shri Shankaracharya wrote an exhaustive commentary on *Brahmasutra*. This commentary is primary source of Vedantic school of thought. Magha, one of the famous Sanskrit poets wrote a mahakavya titled as *Shishupalavadham.* There are eighteen commentaries on this master piece. Without commentaries, it is not possible to read Sanskrit literature. Commentaries provide the meaning of the text, dissolution of the compounded words, meaning of difficult words and the information related to mythology, geography, astronomy etc. as requires.

Scope of Research in literature – One can make either a detailed critical study of the composition/s of particular author or a comparative study of any composition with the similar composition found in some other language. One can study these texts from different point of views like historical, literal, social, political, grammatical etc. One can critically evaluate the literature translated in Sanskrit. One can study different commentaries which were written down on a particular text and reveal how different commentators think on the same topic in varied manners. It shows that there is a wide scope of research in the field of Sanskrit literature.

2. Poetics – It is a theory of structure, form and discourse within literature. In ancient time, many Sanskrit scholars have written down the texts which give guidelines or the rules of literature. Bharata's Natyashastra, Vishwanatha's *Sahityadarpan*, Mamatta's *Kavyaprakash* are a few of them. Poetics and Literature are the two sides of one coin. One who has read Sanskrit literature can easily point out that Sanskrit poets composed their works as per the rules and regulations given by these authors.

Scope of Research in Poetics – As literature and poetics go hand in hand, one can study and critically evaluate the composition/s of any time period in the light of above-mentioned texts of Sanskrit Poetics. Treatises that deal with Sanskrit poetics give emphasis on purity of language, figures of speech, metres etc. Also, they highlight the merits and demerits of any composition. One can do comprehensive research on any of these factors, which are essential for good composition. One can compare the metres and figures of speech with modern Indian and foreign languages.

3. Grammar – Grammar i.e.*Vyakarana* is considered as one of the six limbs of the *Veda*. In ancient time, in Gurukul system it was necessary for every student to have a detailed and in-depthknowledge of grammar, as without grammar no one can understand Vedic literature which was the essential part of their curriculum. Panini's *Ashthadhyayi* is a great work which provides the rules of Sanskrit grammar. This treatise is world famous and not only Indian but also foreign scholars who are engaged in studying and teaching Sanskrit must study and follow the rules given by

Panini in around 4th Century B.C. The tradition which studies and contribute to Panini's Grammar is called as Paninian Tradition. Paninian Tradition is still alive in India. Even in present days, texts like *Laghusiddhantkaumudi* and *Vaidyakaranasiddhantkaumudi* authored by Varadaraj and Bhattoji Dikshit respectively which are based on the work of Panini are included in the graduation and post – graduation curriculums. Beside Panini's *Ashthadhyayi*, there are other works which are influenced by Panini's work,try to offer the rules of Sanskrit grammar for easy and better understating of a lay person. *HaimaVyakarana, Katantra Vyakarana* etc. are examples of such works.

Scope of research in Grammar – Grammar is considered as a backbone of any language. Therefore, the students who study Sanskrit must focus to attain commandon Sanskrit Grammar. From research point of view, it is advisable that researcher should find out the problems or discrepancy in the rules of Panini or in the declensions of various forms of words and verbs and try to give the solution to that issue. One can compare the Paninian Tradition with other traditions of Sanskrit Grammar. One can find out the scope and limitations of non – paninian grammatical traditions.

4. Linguistics – This branch of knowledge makes a scientific study of human language. This is a modern term. Widely, it has been heard that foreign scholarsintroduced this term to Indian grammarians. It is acceptable to a certain extent that the term 'Linguistics' was introduced by the foreign scientists,but,the role and functions of the linguistics was very well known by Indians since 4th Century BC. Panini, in his work, titled as *Ashthadhyayi* gave the sutras i.e. rules related to places of articulation. Works like *Vaiyakaranabhushansara, Vakyapadiya, Paramalaghumanjusha* speak in detail about Sanskrit linguistics.

Scope of research in Sanskrit linguistics – Grammar and linguistics go hand in hand. One can make a comparative study of Sanskrit and modern linguistics. One can study the concepts from above mentioned texts and relate them with the concepts of modern branch of linguistics. One can try to practically examine the content of these text in language laboratories. Computational linguistics is a new field where a person who is equally skilled in both Sanskrit and computer programmingcan contribute a lot. Many universities and IITs are concentrating on this field.

5. Manuscriptology– Inscriptionsare believed to be a valuable source of history. Inscriptions played a vital role in restructuring Indian history. Most of the ancient inscriptions which give information about ancient Indian dynasties were written in Sanskrit language in different scripts.

Scope of research in Manuscriptology – To make a valuable and constructive research in this branch one must study Archeology or Indology along with Sanskrit. One can read such inscriptions, manuscripts and discover hidden secrets of Indian history. One can study these inscriptions to figure out the social, political and cultural history of ancient India. In Sanskrit, the period of most of the authors is still in dispute. One can solve this dispute by studying inscriptions.

6. Philosophical Texts – There are six orthodox and three heterodox systems of Indian Philosophy. 18 prominent and 108 minor *Upanishad*s are the treasure of various philosophical thoughts.*Bhagvadgeeta* which is a part of *Mahabharata* is not only a holy book but also philosophical text which speaks about *Samkhya* and *Yoga* systems of Indian Philosophy. *Ishwarkrishna*'s*Samkhyakarika*, *Patanjali*'s *Yogasutrani*, *Gautama*'s *Nyayasutrani*, *Kanada*'s *Vaisheshikasutrani*, *Jaimini*'s *Purva-Mimamsasutrani*, *Badarayana*'s *Brahmasutrani* are the prominent texts of six orthodox systems of Indian Philosophy. Texts of Jain and Buddhist Philosophy were found in Sanskrit, Ardhamagadhi and Pali languages. Scholars or the followers of various philosophical systems have written down the commentaries to eradicate the thoughts or the views of other schools of philosophy and to establish the thought of the school which they follow. Number of such Sanskrit commentary literature is huge.

Scope of research – One who has studied Sanskrit philosophical text while pursuing post- graduation degree can contribute a lot in the field of Sanskrit as well as philosophy. Student who hasknowledge of Sanskrit can first pursue M.A. degree in Philosophy, to understand the Indian and Western philosophy and then can compare the different tenants of these systems of Philosophy. One can study a particular branch of philosophy to find out the problem and can try to give a solution to it through the discourse of same or different school of philosophy. Any prominent author of philosophy like *Shankaracharya* can be studied by a researcher to underline his contribution in the field of Sanskrit and Philosophy. To make honest and valuable research in this branch, one must study Sanskrit and Philosophy thoroughly. Students of Philosophy cannot ignore Sanskrit and Students of Sanskrit cannot ignore philosophy.

7. Texts related to Ancient Indian KnowledgeSystem –Now a days people from various streams are willing to know Ancient Indian Knowledge System (AIKS). Many private and government institutes are offering short-term and long-term courses in AIKS. University Grants Commission has started offering National Eligibility Test in AIKS. It shows that this is an emerging field. Many texts related to ancient Indian Biology, Agriculture, Chemistry, Zoology, Medicine, Mathematics, Astronomy, Yoga etc. were written in Sanskrit.

Scope of Research in the field of AIKS– This is a new area which has a great research potential. One should keep in mind that this field requires not only Sanskrit scholars but the scholars from the discipline of pure sciences. A person with interdisciplinary knowledge can make good research in this area. A person who is really keen to explore this area must be free from prejudices.

8. Research in Sanskrit and NEP 2020 –NEP 2020 is focusing on interdisciplinary education and research. Our present education system allows you to attain expertise only in one discipline. While studying the subjects which comes under humanities, one cannot learn commerce or pure sciences simultaneously from main stream education. NEP 2020 allows you to gainknowledge ofdifferent subject/s as per your likings while studying any particular subject. Sanskrit students should take benefit of it and try to gain knowledge of different subjects. It will help them not only from research point of view but also from the career point of view. It will expand the scope of research areas in Sanskrit. It is advisable for the students from other discipline to study Sanskrit to know the history, culture, literature, sciences of Ancient India. After studying Sanskrit, they will attain a comparative approach which plays a vital role in research. It can be suggested to all students and particularly to the students of Sanskrit to take the best advantage of NEP 2020 to learn and explore new subjects and to perform best research which can be beneficial to the society.

9. Conclusion

The paper has focused all most on all the areas of research in the field of Sanskrit. Sanskrit students must take serious efforts to attain the knowledge of ancient and modern traditions and try to connect both. It is obvious that Sanskrit students have great pride of our culture, but at the same time they should not have any unrealistic ideas about the greatness of Indian culture. Comparative approach is a must. Any Sanskrit text can be studied from different approaches like critical, historical, social, political, linguistical. Therefore, sky is the limit for research in Sanskrit.A researcher should possess open mindedness and he should accept his flaws humbly and receive compliments in the same manner.

At the end it is advisable to everyone and particularly to research scholars that there are various branches of knowledge. Knowledge has no end. One cannot attain knowledge of each and everything in one life. Each human being has limited time and everyone should consider that it is his duty to give his best to the society within this stipulated time.

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SIGNIFICANCE OF CONTEMPORARY EMERGING TRENDS IN MODERN ENGLISH LITERATURE

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ABSTRACT

English literature boasts of a centuries old prolific and diverse history. From the works of Shakespeare and Milton to those of contemporary authors like J.K. Rowling and Amish Tripathi, the field has produced countless masterpieces that has shaped our culture and society. However, the world of English literature is not stagnant but continuously evolving thus new trends and themes continue to emerge. Through this article, our aim is to identify the various recent trends in modern literature and also to quantify their impact in establishing fresh techniques usedin their compositions. In this article, we also identify some of the recent trends in postmodern contemporary literature, including the rise of diverse voices, application of technology in literature, the resurrection of classic works, and the emergence of new genres. We try to catalogue these trends through a literary analysis and discern insights to comprehend the prospective literary canvas.

Keywords: *Postmodernism, English language and literature, Diverse voices, Technology, Eco-criticism, New genres.*

Introduction

English literature has a vast and rich history, and it continues to evolve and change with each passing year. As we examine and survey the 21st century literature, quite a few new trends and styles are worth studying. In this article, we will attempt to analyse these various styles and examine how they are shaping the field of English literature.

Diversity and Inclusion: One of the most significant trends in English literature in recent times attributes to significant emphasis on diversity and inclusion. This trend is driven by a growing awareness of the need to represent a wider range of voices and experiences in literature. Authors from traditionally marginalized communities are now receiving greater recognition, and their works are being widely published and celebrated.

The 2022 Nobel award winning novelist Kazuo Ishiguro, born in Japan and completed his studies in Europe. Ishiguro's novels explore themes of memory, identity, and belonging. His work is a trend setting example for its nuanced portrayal of characters raised in diverse cultural backgrounds.

Similarly, the rise of movements like #OwnVoices has encouraged authors from underrepresented communities to share their own stories and experiences. This has led to a proliferation of works that challenge dominant narratives and offer fresh perspectives on social and political issues.

Environmentalism: One more crucial stream in English literature involves a growing focus on environmentalism. As the world grapples with the threat of climate change and environmental degradation, authors are exploring the medium of literature as a method of creating awareness among people.

In example, Richard Powers' Pulitzer Prize-winning novel, The Overstory, captures the story of a group of activists who are fighting to save majestic forests from annihilation. The novel explores the complex relationships between humans and nature and raises important questions about our responsibility to the planet.

Similarly, Barbara Kingsolver's latest novel, Unsheltered, explores the impact of climate change on a small community in New Jersey. The novel examines the social and economic factors that contribute to environmental degradation and raises important questions about our ability to address these issues and to find a cure that can be implemented.

Digital Literature: The rise of digital technology has had a profound impact on English literature, and it has opened up new avenues for creativity and experimentation. Digital literature encompasses a wide range of forms, from interactive novels to Social media

fiction. It is characterized by its use of multimedia elements and innovative storytelling techniques.

For example, the novelist Robin Sloan has created several works of "media fiction," which combine traditional narrative elements with digital media. His novel, Sourdough, tells the story of a tech worker who discovers the joys of baking bread and is accompanied by a website that features recipes, blog posts, and other multimedia content.

Similarly, manymagazine Twitter accountsregularly publish micro-fiction pieces that are no more than a few sentences long. These works demonstrate how social media platforms can be used as a means of sharing literature and engaging with readers in new and exciting ways.

The rise of diverse voices: Over the past few decades, there has been a growing awareness of the need to include underrepresented communities in the literary landscape. This has led to a surge in works by women, people of colour, and LGBTQ+ authors, among others. These authors are exploring new themes and perspectives, and their works are challenging traditional notions of what literature can be. Some notable works in this category include "The Color Purple" by Alice Walker, "Beloved" by Toni Morrison, and "The God of Small Things" by Arundhati Roy.

Implementation of technology: With the advent of digital media, authors are finding new ways to tell stories and engage with readers. E-books, audiobooks, and interactive novels are just a few examples of how technology is transforming the literary landscape. In addition, social media platforms like Twitter and Instagram have given authors a new way to connect with their readers and build a following. Examples of books that have successfully used technology include "The Silent History" by Eli Horowitz and "S." by J.J. Abrams and Doug Dorst.

Restructuring or transformation of classic works: From the age ofDante to Chaucer, Ben Jonson to Jane Austen, Wordsworth to Langston Hughes, more and more classic works of literature are not only remodelled but also transformed by 21st century authors. This trend eclipses not only Western literature; Epic classic worksall over the world are blended into something new and fresh. For example, "The Palace of Illusions" by Chitra Banerjee Divakaruni is modelled uponIndian the Hindu epic "The Mahabharata". It channels and encompasses the perspective of strong female character of ‘Draupadi from the epic saga. Another such example is the masterpiece “Mrityunjaya” byShivajiSawant who focused on the character of ‘Karna’ from the Mahabharata saga. Playwright GirishKarnad used the historical and mythological classic works and blended them into his plays to create an utmost impact on the rural audience in India. This trend is revitalising interest into classic worksand make them interesting for the new age readers.

Development of new genres: Traditional genres such as drama, poetry and the novel still enjoy success, yet new forms of literature are also evolving with each passing day. New genres are much more versatile and experimental in nature such as flash fiction literature, Animation graphic novels.Latest sensation is hybrid combinations like "lyric essays" as well as "prose poetry." These new literary variants are growing past the constraints set by age old traditional genres. They pose a serious challenge to the monopoly of classical themes and set rules of literary compositions. It is through the experimentation, of fusion in genres that we will get to see the true talent of upcoming writers.

Conclusion

The emerging trends in English literature as discussed in the article above are significant for several reasons. Initially they are expanding the literary canvas with the inclusion and representation of people from different culture and heritage. The varied experiences of these writers can transform and alter the conventional methods of sketching the plot line and characters in resonance with the 21st century world. In accordance, by giving voice to underrepresented communities they are pushing the boundaries of what literature can and should be as well as the various ways in which it can be accepted and appreciated by the readers. It is instrumental in bringing forth the

better adapted and revitalized versions of Classic works. These works are better suited to modern spectators.Finally it can be argued that emerging trends are absolutely vital for the blossoming of innovation in modern literature. The trends outlined in this article represent some ways in which the field is changing. As we move into the future, it is clear that diversity, environmentalism, and digital technology will continue to play an important role in shaping the literature of our time. By exploring these trends and engaging with new and emerging voices, we can gain a deeper understanding of the world around us and identify numerous ways to navigate the realm of literature

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IMPORTANCE OF FOREST FOR CONSERVATION OF LIFE

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ABSTRACT

Forest is an important part of biodiversity. It is consist of microorganisms, plants, animals, birds, etc. All of these play an important role in life cycle. Plant gives oxygen to all organisms which were eaten by animals and animals are degraded by microorganisms; completes life cycle. Forest is the good source of food and water; depends on these things all of the organisms and humans lives. This paper deals with the study of factors responsible for growth of forest and use of forest to conserve the life.

Keywords: *Forest, life, conservation.*

Introduction

In the past, forests spread over half the world's land surface. Today, despite large scale conversion to agriculture, rangelands and desert, forests and woodlands still cover 35 per cent of the land area, albeit much of this of reduced quality. They contain, proportionately, the greatest quantity of biodiversity in terms of species, genetic material and ecological processes. Forests are an integral part of human society, philosophy and culture and provide us with an immense range of goods and services. According to FAO, the forest cover is defined as, " all land, more than one hectare in area, with a tree canopy density of more than 10 percent irrespective of ownership and legal status. Such land may not necessarily be a recorded forest area. It also includes orchards, bamboo and palm". The definition of forest cover has clearly been defined in all the India State of Forest Report (ISFR) and in all the International communications of India. Based on 15th State of forest report of 2017 conducted by the Forest Survey of India (FSI), the total forest and tree cover is 24.39 percent of the geographical area of the country.As per the latest Food and Agriculture Organization (FAO) report, India is placed 8th in the list of top ten nations reporting the greatest annual net gain in forest area. India wants 33% of its geographical area under forest cover as per National Forest Policy. As many as 15 states and union territories (UTs) have forest cover exceeding 33 percent of their geographical area. India's Intended Nationally Determined Contribution (INDC) talks of the creation of an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover by 2030. The National forest policy 1952 The policy advocated a functional classification of India's forests, apart from legal classification, to focus attention on the specific object of management in each case into: (a) Protection forests (b) National forests (c) Village forests (d) Tree- lands. The Policy also suggested keeping a minimum of one third of the country's total land areas under forests, with 60% in the Himalayas and other hilly tracts liable to erosion and 20% in the Plains. The Policy strongly deprecated the notion widely entertained that 'forestry as such had no intrinsic right to the land but may be permitted on sufferance on residual land not required for any other purpose.

Forests are storehouses of a large variety of life forms such as plants, mammals, birds, insects and reptiles etc. Also the forests have abundant microorganisms and fungi, which do the important work of decomposing dead organic matter thereby enriching the soil.The forest ecosystem has two components- the non-living (abiotic) and the living (biotic) component. Climate, soil type are part of the non-living component and the living component includes plants, animals and other life forms. Plants include the trees, shrubs, climbers, grasses and herbs in the forest.

Causes of forest destruction

Largely as a result of the underlying causes outlined above, there are also some immediate causes of forest degradation and destruction. These include (i) pressure from human settlement including agriculture, fuel-wood

collection, etc. (ii) Operations of the timber trade, logging and intensification of forest management. (iii) The impact of other industrial sectors, such as agribusiness, mineral mining, etc. (iv) atmospheric pollution, (v) increasing tourism, (vi) forest fire, etc.

Importance of Forest

Following are the beneficial effects of forest to human and environment,

(i) Human Health benefits

Forests provide, directly or indirectly, important health benefits for all people. Health-enhancing qualities of forests are a result of multiple and mutually reinforcing benefits. For many communities in and near forests, in both developing and developed countries, biodiversity-rich forest ecosystems provide edible products that contribute to a healthy diet, such as fruits, leaves and mushrooms, as well as a vast number of medicinal plants. In terms of nutrition, some forest products have long contributed to diets even for these populations (e.g. mushrooms, berries). Globalization is contributing to expansion of the array of tropical forest foods reaching consumers, for example palm hearts and insects. Drugs derived from forest plants also have an important role in modern medicine.

(ii) Environment benefits

Forest environmental services include provision of freshwater resources, flood control, soil fertility, microclimate regulation and habitat for biodiversity. However, forests also contribute to human health in less direct ways, and for people less directly associated with forest habitat, including those living in urban areas.Transpiration from the forests affects the relative humidity and precipitation in a place. Forests clean the environment by muffling noises, buffering strong winds and stopping dust and gases. Forest also help to maintain nutrient cycling in the soil. Soil contains a myriad of organisms, such as earthworms, ants, termites, bacteria and fungi. This soil biodiversity helps regulate pest and disease occurrence in agricultural and natural ecosystems, and can also control or reduce environmental pollution.

(iii) Environmental Conservation

It is to manage and provide for rehabilitation and improvement of forests for their protective influences specially soil and water conservation. Forests purify the air we breathe, temper climate, cushion the rain and storms, protect the soil from the ravages of floods and erosion and help in regulating stream flow. Forest play vital role in maintaining healthy watershed. Rivers originate in a forest area and carry the organic matter from forest to the downstream thus supporting a variety of fishes and aquatic animals. The richness of forest in upstream decides the biological value of the river ecosystem supported by it.

Forests also influence nature's capacity to cope with natural hazards, acting as barriers against heavy rains, flooding and strong winds. They help control or reduce the risk of soil erosion, landslides and avalanches. Forests therefore have an important role in protecting the homes and communitiesof animals and people, and they help to maintain the environmental conditions needed for agricultural production.

Conclusion

Forests provide an environment for many species of plants and animals thus protects and sustains the diversity of nature. Due to decline of forest cover all over the world, increases heat, temperature, cold, rain, and vast climatic conditions. Forest plays a vital role to control most of them which hazardous to life on earth. If we lost cover of forest, we lost natural remedy of us forever.

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MATHEMATICAL STUDY OF EFFECTS OF INDUSTRIALIZATION ON INDIAN ECONOMY

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ABSTRACT

This paper assesses the mathematical study of contribution of industry to India's economic development, paying particular attention to throe of industry in the absorption of labour and the development of human capital in the economy. India's specialization in industry has been driven by two sorts of wage advantages that have reinforced each other. The impact of this growth, however, has been limited to a small section of the economy and the question being asked is whether the current growth can be sustained without a significant increase in domestic demand. We believe that export-led growth is sustained in the medium term. On the other hand, the success of the software industry has increases the relative value of professional workers not the programmers. The growing importance of human capital, in turn has lead to innovative model of entrepreneurship and organization, pioneered by the software sector and these are slowly taking root and spreading to other sector of India's industry and can have powerful long-term benefits for India's industrialization and growth.

Keywords: *Indian Industry, Growth, Human capital, Development, Performance, Mathematical Methods.*

Introduction

India's specialization in industry has been driven by two sorts of wage advantages that have reinforced each other. The impact of this growth, however, has been limited to a small section of the economy and the question being asked is whether the current growth can be sustained without a significant increase in domestic demand. We believe that export-led growth is sustained in the medium term. Manufacturing industries in India are a major contributor in India's economy. India is one of the leading industrialized nations in the world. It is due to the development of Indian industries that India has become a developing nation from an underdeveloped nation. The manufacturing sector is considered the backbone of any economy. Industries can be classified into two main types on the basis of their structures. They are (a) Manufacturing industry, which includes heavy and light industries, and (b) Small-scale and cottage industries. Manufacturing industries are those which are concerned with processing finished products from raw materials.The manufacturing industries contribute immensely to the economy of India. Industrial development leads to an increase in employment opportunities. As a result, the per capita income of the people increases. Moreover, excessive dependence on agricultural sector is reduced by the employment opportunities in the sectors of the economy. The agro-based industries place a huge demand on agricultural raw materials. Thus, advancement in agro-based industries also promotes agricultural development in India. The demand for skilled labour in the tertiary sector such as banking, education, transport and communication is closely related to economic development due to industrialisation. Regional development is encouraged by the eradication of poverty and unemployment. Industrial development provides employment opportunities. Industrial town and cities become trade centers. The production used in the defence sector of a country is manufactured in the country itself. In India, a large part of industrial development is supported by the demand from the defiance sector. The industrial products are item of foreign trade. This generates a higher income from exporting our industrial products and earning foreign exchange.

Objective of the study

1. Liberalizing the industry from the regulatory devices such as licenses and controls.
2. Enhancing support to the small scale sector.

3. Increasing competitiveness of industries for the benefit of the common man.
4. Providing more incentives for industrialisation of the backward areas.
5. Ensuring rapid industrial development in a competitive environment.

Research methodology

Research type: descriptive research. **Data collection**: this study based on the secondary data. This Mathematical information has been collected from different sources. These are as under. - Journal, articles, books.

Positive effects of industrialization

Industrialization had many positive effects on society in Europe in the 18th and 19th centuries. The creation of power machines and factors provided many new job opportunities. The new machinery increased production speed of good and gave people the ability to transport raw materials.The growth of industries has resulted in large scale production of goods which are available to the consumer at much cheaper rates.Industrialization has resulted in a considerable rise in the standard of living of the people. Industrialization also leads to urbanization. Urbanization is the movement of people into cities and city building. Citizens wanted to live closer to the factories that they worked at. The western world went from rural and agricultural to urban industrial. The newly invest steam engine provided cheap movement of goods through waterways. Canals were built so resources are transported with ease.John McAdam, a Scottish engineer improved roads a lot. He created a new layout for roads a lot. He created a new layout for roads so they are safer and more effective. The road beds consisted of large stone which helped with drainage. On the top were finely crushed rocks. Overall, industrialization helped life in Europe a lot. It raised the standards of living since new materials and products were available for public use.Industrialization has also resulted in the development of new modes of transport making quick export and import possible. The world has become a small place.Industrialization has resulted in a considerable rise in the standard of living of the people.A number of substitutes in consumer goods are available. The customer gets wide variety of choices.

Negative effects of Industrialization

Despite its many positive effects, industrialization had a negative impact on Europe too. Urban areas doubled, tripled, or quadrupled in size which led to overcrowding in cities. Something a large population is a good thing, but in this case the population was too big and caused many health problems. Living conditions were dirty and unhealthy. Cities were unsanitary and diseases filled the streets. There were no sanitation codes in cities. Many citizens got very sick.Factory work was dirty and dangerous. Bosses strictly disciplined their employees and treated them harshly. The works were underpaid and overworked. They didn't get enough money for the labour they were providing. One also had a short life expectancy if they worked in a factory. The hours in a workday were very long too because the factories were indoors and didn't have to use sunlight to decide business hours. The government also provided no regulations for the treatment of business employees.Businesses started to hire children to work in factories because their small could reach into tiny holes and it is easier for them to do things which require small hands or bodies. Revolution helped Europe in so many ways, it also harmed Europe, the lack of sanitation got many people sick. Work conditions also hurt citizens a lot by causing fatigue and illnesses. Children were also taken from their homes on the farm to work in dirty and scary factories. The immediate result is in the gradual disappearance of many natural resources, the pollution of land, water and air.The increase in vehicular traffic, launching of space ships and rockets by competing nations, the incessant working of machines in factories have affects human health and happiness. There has been a steady decline in spiritual values and well-being of man consequent upon the growth of an artificial, mechanical and materialistic civilization brought about by industrialization**.**

The growth and contribution of the Industrial sector in Indian GDP by Mathematical Methods

The industrial sector is one of the main sectors that contribute to the Indian GDP. The country ranks fourteenth in the factory output in the world. The industrial sector is made up of

manufacturing, mining and quarrying, and electricity, water supply, and gas sectors. The industrial sector accounts for around 27.6% of the India GDP and it employs over 17% of the total workforce in the country. The growth rate of the total workforce in the country. The growth rate of the industrial sector in India GDP came to around 5.2% in 2002-2003. In this year, writhing the India GDP, the mining and quarrying sector contributes 4.4%, the electricity, water supply, and gas sector contributed 2.8% and the manufacturing sector contributes around 5.7%.

The reasons for the rise of industry growth rate in India GDP: the reasons for the increase of industry growth rate in India GDP are that huge amounts of investments are being made in this sector and this has helped the industries to grow, further the reasons for the rise of the growth rate of the industrial sector in India are that the consumption of the industrial goods has increased a great deal in the country, which in its turn has boosted the industrial sector. Also the reasons for the increase of Industrial growth rate in India GDP are that the industrial goods are being extended in huge quantities from country.The Indian government must boost the Industrial sector: Industry growth rate in India GDP thus has been registering steady growth over the past few years. This has given a major boost to the Indian economy. The government of India thus must continue to make efforts to boost the industrial sector in the country. For this will in turn help to grow the country's economy. GDP growth rate: (2000 to 2017).

Year	Growth (real) (%)	Year	Growth (real) (%)	Year	Growth (real) (%)
2000	**5.6**	**2001**	**6.0**	**2002**	**4.3**
2003	**8.3**	**2004**	**6.2**	**2005**	**8.4**
2006	**9.2**	**2007**	**9.1**	**2008**	**7.4**
2009		**2010**	**7.1**	**2011**	**6.8**
2012	**6.5**	**2013**	**5.1**	**2014**	**6.9**
2015	**7.3**	**2016**	**8.0**	**2017**	**-**

Major industries in India

Textile industry

This industry covers a wide range of activities rangingfrom generation of war materials such as jute, wool, silk and cotton to greater value added goods such as readymade garments prepared fromdifferent type of manmade or natural fibres, textile industry provides job opportunity to over 35 million individuals thus plying a major role in the nation's economic. It has 4 percent share in GDP and share 35% of the gross export income besides adding 14% of value addition in merchandizing sector.

Food processing industry

In term of global food business, Indiaaccount less than 1.5% in spite of being one of the key food producing nations worldwide. But this on the other hand also indicates the economic possibilities for the growth of this industry. Supported by the GDP estimates, the approximate expansion of this sector is between 9-12% and during the tenth plan period the growth rate was around 6-8%. Food processing Industry provide job opportunities from people.

Chemical Industry

India chemical industry generates around 70,000commercial goods ranging from plastic to toiletries and pesticides to beauty products. It is regarded as the oldest domestic sector in India by featuring as the 12 largest producer of chemicals. With an approximate cost of 28 billion, it amounts to 12.5% of the entire industrial output of India and 16.2% of its entire exports. Indian chemical industries some of the other rapidly emerging sectors are petrochemical, agrochemical, and pharmaceutical industries.

Cement Industry

India has 10 large cement plants governed by thedifferent state governments. Besides this India have 115 cement plants and around 300 small cement plants. The big cement plans have installed competence of big cement plans have installed competence of 148.28 million tones per annum whereas the mini cement plants have the total capacity of 11.10 millions tonners per annum. This totals the capacity of 11.10 million tonnes per annum. This totals the capacity of Indian cement industry at 159.38 million tonnes. Ambuja cements, k cements, aditya cement and L&T cements.

Steel Industry

Indian steel Industry is a 400 years old sector which has apast record of registering 4% growth in 2005-06. The production during this period reached at 28.3 million tones. India steel

industry is the 10th largest in the world which is evident from its RS 9,000 cr of capital contribution and employment opportunities to more than 0.5 million people. The key players in steel industry are steel authority of India (SAIL), Bokaro steel plant, Rourkela steel plant, Durgapure steel plant and bhilai steel plant.

Software Industry

Software industry registered a massive expansion inthe last 10 years. This industry signifies India's position as the knowledge based economy with a position as the knowledge based economy with a compounded annual growth Rate (CAGR) of 42.3% In the year 2008, the industry grew by 7% as compared to 0.59% in 1994-95.

Limitations

(i) This study based on secondary data.
(ii) There may some changes.
(iii)This study has done in very short period of time.

Conclusion

It is time emphasis is put on a planned and balanced industrialization keeping in view the preservation of environment. Man should be less dependent on the machine, which once a slave, tends to become the master. Excessive dependence on the machine makes man unfit for many things and renders him a helpless creature. Heavy industries and cottage industries must be complementary to each other, so that sustained development would be possible. It will employ local and regional manpower and utilize the local and regional resources.

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