

List of research papers published in the Journals notified on UGC website during the last five years (5)

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number
Understanding the Mechanism of SN2' vs. SN2 in Cascade Reaction of β -Naphthol and Nitrostyrene Derived MBH Acetates	Vadiga Shanthi Kumar,	Chemistry	Chemistry Select 2020, 5, 3080 –3084	March.2020	
Vote buying and 'Money-Politics' in village elections in South India	Srinivas Dusi	History	Commonwealth & Comparative Politics	19-Jan	ISSN: 1466-2043 (Print) 1743-9094 (Online)
Sodium Chromate Influence on Seed Germination and Seeding growth of Horse Gram (Delkhos wiflorus linn)	Sampath	Botany	International Journal of Current Research and Review	Jan-20	ISSN:2231-2196
Effective treatment for Kidney Stone with local Plants from adilabad. Telangana State. India	Sampath	Botany	European Journal of Medicinal Plants. Article No EJMP-51906	Oct-.2019	ISSN: 2231-0894.
An efficient, multi component, green protocol to access 4, 7-dihydro-tetrazolo [1, 5-a] pyrimidines and 5,6,7,9- tetrahydro-tetrazolo[5,1-b]quinazolin-8(4H)-ones using PEG-400 under microwave irradiation	Vadiga Shanthi Kumar,	Chemistry	Synthetic Communications- An International Journal for Rapid Communication of Synthetic Organic Chemistry	Sep-19	ISSN: 0039-7911 (Print) 1532-2432 (Online)
Xtal Fluor-E: An Efficient Reagent for Synthesis of Oxazolines from Car- boxylic Acids and O- Silylated Amino Alcohols	Vadiga Shanthi Kumar,	Chemistry	Journal of Heterocyclic Chemistry DOI 10.1002/jhet	Aug-2019	ISSN: 1943-5193
Analysis of Physico-chemical parameters to Assess Water Quality of Palair Reservoir From Khammam District	Sampath	Botony	Journal of Emerging Technologies and Innovative research(JETIR). Vol.6. Issue 6. (572-576)	June, 2019	ISSN: UGC Approved Journal No 63975
A Review on E-Waste Management: It impacts on Human Health and Environment	K. Sampath & A. Mahesh Kumar	Physics	JETIR (An International Open Access Journal	1-Jun	ISSN No:2349-5162. Volume 6. Issue 6
Influence of Social elements on photosynthesis and secondary metabolities in selected medicinal plants	Kovvada Vijaya Kumar,Gorrepati Rosaiah,Kakumanu Babu&Naragani krishna	Botany	Research Journal of Life Sciences,Bioinformatics,Pharmaceutical and Sciences	March-April -- 2019	E-ISSN:2454-6348
A Review on Zika Virus	Sampath	Botany	World Journal of Pharmaceutical research. Vol.8. Issue 2. 450-456	Feb.2019	ISSN:2277-7105

Geomagnetic field elements and their measurements	Dr. A. Mahesh Kumar	Physics	International Journal of Advanced research Development	Jul-18	ISSN No:2455-4030. Volume 3: Issue 4
Seasonal and Geographical variations in Antimicrobial activity of selected Mangroves from Krishna Estuary	Kovvada Vijaya kumar, Gorrepati Rosaiah, Kakumanu Babu, Tirupathi swamy Nattala & Raiesh Butti	Botany	International Journal of Current Research and Review	Mar-19	ISSN:2231-2196 (Print) 0975-5241 (Online)
A study on Phytochemical composition,GC-MS analysis and anti-microbial potential of Methanolic leaf extract of Alstonia Scholaris(L) R.BR.	Kovvada Vijaya kumar, Gorrepati Rosaiah, Nattala tirupathi swamy& Kakumanu Babu	Botany	International Journal of Pharmaceutical science and Research	Feb-19	0975-8232(Online) 2320-5148(Print)
Study on Antimicrobial properties of Herbal Nanoparticles of Selected Mangrove Plants	Kovvada Vijaya kumar, Gorrepati Rosaiah, Kakumanu Babu, Tirupathi swamy Nattala &Naragani kirshna	Botany	Research Journal of Life Sciences, Bioinformatics, Pharmaceutical and Sciences	Sept-Oct. 2018	E-ISSN:2454-6348
A Study on Ionospheric Variability and Its Causes	Dr. A. Mahesh Kumar	Physics	Globus An International Journal of Management & IT	Jan-Jun-2018	ISSN No:0975-721X. Volume 9/No2
Economic & Political Aspects of Small States in India	B.Vinod Kumar & R. Raghupathi reddy	Economics	International Journal of Multidisciplinary Educational Research	Jul-16	ISSN:2277-7881. Vol.5. Issue-7(2) Page 72
Tribal Education and Inclusive Growth	A. Venkata Ramesh	Economics	International Journal of Recent Trends in Management, Commerce, Accountancy, Economics, Public Administration,Politics, Law And allied Researches.	Sep-16	ISSN:2348-9413 (online) 2348-9405 (Print) Volume-3. Issue 11
Decadel Changes in the Cropping Pattern in the Telangana State	A. Venkata Ramesh	Economics	International Journal of Mutidisciplinary Advanced Expermental research	Nov-16	ISSN:2349-9648. Volume III, Issue II(2)

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RESEARCH PAPERS PUBLISHED

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RESEARCH PAPERS PUBLISHED IN 2019-20

ChemPubSoc Europe DOI: 10.1002/slct.201904618

PROFESSIONAL SELECT Communications

MARCH 2020

①
2019-20

Catalysis

Understanding the Mechanism of S_N2' vs. S_N2 in Cascade Reaction of β -Naphthol and Nitrostyrene Derived MBH Acetates

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Dedicated to Professor Irishi N. N. Namboothiri

The reaction of β -naphthol with nitrostyrene derived primary MBH acetates in presence of Cu_2CO_3 as base resulted in the formation of 3-nitro-4-phenyl-3,4-dihydro-2H-naphthopyran as the major isomer via S_N2' process. Due to the bio-electrophilic nature of MBH acetates, the minor product 3-nitro-2-phenyl-3,4-dihydro-2H-naphthopyran was also obtained presumably due to S_N2 process with γ -attack on MBH acetates. The state of the art density functional theory (DFT) calculations were carried out to account for these competitive pathways towards the formation of major and minor products.

Introduction

The efficient construction of multiple bond formation with the control of stereocenters in one-pot operation is a fundamental goal in cascade reaction. The Morita-Baylis-Hillman (MBH) reaction^[1] is one of the atom economy protocols for constructing a new C–C bond between an activated olefin and electrophiles in the presence of a tertiary amine/phosphine. MBH adducts are very interesting synthetic targets^[2] due to their potential applications as valuable synthons in allylic alkylation,^[3] diamine catalysis^[4] as well as construction of various bicyclic skeletons,^[5] pyranocoumarins,^[6] pyronaphthoquinones^[7] and tetrahydro-pyranquinolones.^[8] Presence of different functional groups in MBH adducts are useful in various regio- and stereoselective transformations

through appropriate tuning. The MBH acetate **4** derived from nitrostyrene have been widely employed as starting material in construction of fused heterocycles^[9] and asymmetric reactions.^[10] Various MBH adducts were used as synthons in organocatalysis and heterocyclic synthesis.^[11] Recently, Enders group reported a NiCl₂-catalyzed Michael/Michael/esterification domino reaction of cycloperitane using MBH acetate **4**.^[12] Very recently, Liu et al. established the cascade reactions of 4-hydroxy indole and (E)-2-nitro allylic acetates with different electronic and steric properties.^[13] Previously, kinetic resolution^[14,15] and synthesis of naphthofuran derivatives (Eqn. 8, Scheme 1)^[16–18] were studied extensively using MBH acetates. With our ongoing interest in the exploration of MBH adducts^[19] towards substituted pyran^[20] skeletons we were also specifically interested in cascade reaction of β -naphthol and MBH acetate **4**. We envisioned that reaction would exclusively yield substituted naphthopyran **5** via 6-endo-trig cyclization (Eqn. 9, Scheme 1).

Interestingly, to our observation apart from expected product **5** via S_N2' , we also obtained **6** as a minor product

Scheme 1. Annulation reactions of nitrostyrene derived MBH acetates

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Supporting information for this article is available on the WWW under <https://doi.org/10.1002/slct.201904618>

Chemistry 2020, 1, 3080–3084 Wiley Online Library 3080 © 2020 Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim

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through S_N2 reaction of nitroallylic acetate **4** with naphthol **2** using Cs_2CO_3 (Eqn. c, Scheme 1). The structures of both the products were further confirmed by X-ray crystallography (Fig. 1).

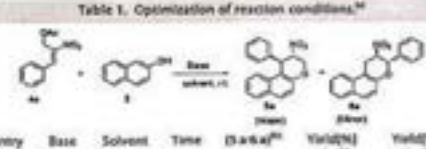
Results and Discussion

Intrigued by this observation, we started exploring the optimized condition towards formation of **5** as exclusive product using various bases (Table 1). The initial reaction carried out using DABCO in DCM gave regioisomers **5a** and **6a** in a ratio of 2:1 with 58 and 29% yield (entry 1, Table 1). Use of triethylamine didn't alter the regioselectivity but decrease in yield for formation of product **5a** and **6a** (entry 2 & 3, Table 1). A shift to inorganic bases such as $NaKPO_4$, retained the yield and regioselectivity (entry 4, Table 1). Change of base i.e. Cs_2CO_3 in THF retained the overall yield with the drop in regioselectivity (entry 5, Table 1). Change of solvent to methanol also couldn't increase the yield and regioselectivity (entry 6, Table 1). Use of acetonitrile as solvent improved the regioselectivity for the formation of product **5a** and **6a** in 3:1 ratio (entry 7, Table 1). Use of polar aprotic solvent also couldn't lead to improving the regioselectivity (entry 8, Table 1). Among chlorinated solvents, chloroform was the ultimate choice leading to the completion of reaction within 4 hours towards formation of **5a** and **6a** in 65 and 23% yield (entries 9–12, Table 1). Several attempts to further improve the regioselectivity or exclusive formation of the single product has failed. A background reaction was carried out in the absence of base, resulting in < 5% of **5a** even after 12 hours.

Using the current optimized reaction conditions, we carried out the generalization of the present protocol using substituted MBH acetates **4a-i** with β -naphthol **2** & **2a**. The reaction of 4-Bromo substituted acetate **4b** resulted in product **5b** and **6b** in 2:1 in 55 and 28% yield (entry 2, Table 2). Reaction of 2,4-dichloro substituted acetate **4c** gave corresponding **5c** and **6c** with regioselectivity of 3:1 in 62 and 21% yield (entry 3, Table 2). *p*-Fluoro substituted MBH acetate **4d** gave products **5d** and **6d** in **56** and 19% yield retaining the same regioselectivity (entry 4, Table 2). Electron donating substituents decreased the regioselectivity in the order of Me > OMe > OMe towards the formation of products **5e/6e**, **5f/6f**, **5g/6g** and **5h/6h** (entries 5–8, Table 2). Interestingly, the presence of 2,4-*ODMe*, drastically increased the regioselectivity to 10:1 towards formation of products **5i/6i** (entry 9, Table 2). Finally, 6-Bromo substituted naphthol on reaction with **4a** gave **5j** and **6j** in 55 and 36% yield for formation of **5j** and **6j** (entry 10, Table 2).

In order to get a detailed understanding of possible competitive pathways i.e. S_N2 vs. S_N2^{OT} we have undertaken a

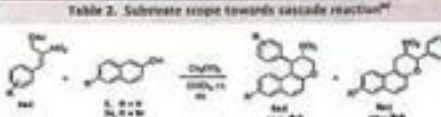
Table 1. Optimization of reaction conditions.^[a]



Entry	Base	Solvent	Time (h)	[5a/6a] ^[b]	Yield ^[c] (%)	Yield ^[c] (%)
1	DABCO	CH_2Cl_2	4	2:1	58	29
2	TEA	CH_2Cl_2	4	2:1	52	22
3	TEA	CH_2Cl_2	4	2:1	52	21
4	$NaKPO_4$	CH_2OH	6	2:1	58	29
5	Cs_2CO_3	THF	24	1:1	45	44
6	Cs_2CO_3	CH_2OH	24	1:1	44	44
7	Cs_2CO_3	CH_3CN	6	3:1	65	22
8	Cs_2CO_3	DMF	6	1:1	43	43
9	Cs_2CO_3	CH_2Cl_2	4	2:1	58	29
10	Cs_2CO_3	CCl_4	8	3:1	65	22
11	Cs_2CO_3	1,2- DCM	6	2:1	55	30
12	Cs_2CO_3	$CHCl_3$	4	4:1	65	23
13	–	$CHCl_3$	12	ND	< 5	trace

[a] Unless otherwise noted, reactions were carried out with (0.1 mmol) of **4a** with (0.12 mmol) of **2** using (0.15 mmol) of a base in 5 ml $CHCl_3$.
 [b] Determined by HPLC & ^{13}C NMR analysis of the crude reaction mixture.
 [c] Isolated yield.

Table 2. Substrate scope towards cascade reaction.^[a]



Entry	Substituent	[5/6] ^[b]	Yield ^[c] (%)	Yield ^[c] (%)
2	4-Bromo	2:1	55	28
3	2,4-Dichloro	3:1	62	21
4	<i>p</i> -Fluoro	2:1	56	19
5	Me	2:1	55	28
6	OMe	2:1	55	28
7	OMe	2:1	55	28
8	OMe	2:1	55	28
9	2,4- <i>ODMe</i>	10:1	55	28
10	6-Bromo	5:1	55	36

[a] Unless otherwise noted, reactions were carried out with (0.1 mmol) of **4** with (0.12 mmol) of **2** using (0.15 mmol) of a base in 5 ml $CHCl_3$.
 [b] Determined by ^{13}C NMR analysis of the crude reaction mixture.
 [c] Isolated yield.



2019-20 (2)

ISSN: 1466-2043 (Print) 1743-9034 (Online) Journal homepage: <https://www.tandfonline.com/loi/iccj20>

Vote buying and 'Money-Politics' in village elections in South India

Clarinda Still & Srinivas Dusi

To cite this article: Clarinda Still & Srinivas Dusi (2020): Vote buying and 'Money-Politics' in village elections in South India, *Commonwealth & Comparative Politics*, DOI: 10.1080/14662043.2020.1790021

To link to this article: <https://doi.org/10.1080/14662043.2020.1790021>

 Published online: 19 Jan 2020.

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Vote buying and 'Money-Politics' in village elections in South India

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ABSTRACT

Vote-buying is such a common form of electoral 'malpractice' in India that it has become a key feature of election culture. And yet we know relatively little about how it works, what effects it has and the way in which voters view it. Analysis is dominated by an instrumentalist view; the very term 'vote-buying' assumes one meaning for an action that has several. Here, we examine how vote-buying is carried out, and various attitudes towards it, paying close attention to Dalits. We suggest that more attention should be paid to a wider political economy of coercion and control described and experienced by our informants.

KEYWORDS Elections; malpractice; vote-buying; caste; Dalits

India's Election Commission mounted a major operation to try to stop candidates breaking the rules. The Commission's director general of expenditure, Prasanna Dash, led around 120,000 police and magistrates to monitor candidates. Of vital importance was a new network of village awareness groups: about 50,000 people keeping watch for signs of electoral corruption with access to a special hotline. "We caught two fellows on a public transport bus with eight crore rupees (\$1.3 m) in cash," Dash told GlobalPost. "The money was in big sacks on the roof of the bus. We had a tip-off." The money weighed about 300 pounds; they probably could not carry any more. Officers also seized entire truckloads of illegal liquor in the central state of Madhya Pradesh. The Election Commission set up 11,123 "Flying Squads" of five people each including police officers and magistrates, armed with video cameras, to stalk candidates and deter them from illegal activities.¹

Rumours of the bounty offered for votes abound around election-time. In this article, the heroically portrayed Election Commission chase wayward politicians who, in ever more far-fetched ways, sneak election cash through the net until there is a swoop. In the area under study, one of the most infamous of such seizures involved the wife of former minister K. Parthasarathi who was caught carrying Rs. 4.5 million in cash. She was stopped whilst travelling on a

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Sodium Chromate Influence on Seed Germination and Seedling Growth of Horse Gram (*Dolichos Biflorus* Linn.)

2019-20

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JAN
2020

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ABSTRACT

Medicinal plant *Dolichos biflorus* L. used in traditional medicine is well known for its healing properties. Its seeds are majorly used in treatment of various ailments besides used as tonic, astringent, and diuretic. The main purpose of this study is Sodium Chromate (Na_2CrO_4) contamination in water, soil and plants is a serious health problem throughout the world. We studied the effect of aqueous solutions of 0, 0.5, 1.0, 1.5, 2.0, and 2.5 and 3.0 % Sodium Chromate on seed germination and seedling growth of *D. biflorus* at the end of 20 days of treatment, significant reduction in root length, shoot length, seedling length, Rooting length/shoot length ratio (cm) and fresh weight, % of germination were observed at increasing Chromate concentration. Response of *D. biflorus* varied on all growth parameters viz root, shoot, seedling length, dry weight and root / shoot ratio. There was also reducing rate of seed germination of *D. biflorus* with all treatment of chromium was recorded. The treatment of chromium at 3% produced significant 2.4 cm length of plant with effects on root, shoot and seedling length of *D. biflorus* as compared to control. The reduction in the seedling dry weight of *D. biflorus* at 3% of Sodium chromate was reduced and was more prominent with the increase in concentration at 3% of Sodium Chromate treatments. Tolerance indices and seedling vigor index of 3% for chromium treatment decreased with the increase in chromium concentration in the substrate as compared to control. More reduction in seedling tolerance and seedling vigor indices percentage of *D. biflorus* was recorded at 1.0 % for chromium treatment. There was further reduction in seedling vigor and tolerance indices of *D. biflorus* at 3% of Sodium chromate concentration as compared to control.

Key Words: Sodium Chromate and Seedling growth, Root length, Shoot length and Leaf length

INTRODUCTION

Dolichos biflorus Linn (Fabaceae), is commonly known as Mathina in Telugu and horse gram in English. It is a branched, and downy herb, sub-erect or trailing acausal, with small trifoliate leaves, bearing, when mature, narrow, flat, curved pods, 1½ - 2 inches long, tipped with a persistent style. The pods contain 5-6 flattened, ellipsoid seeds, 1/8 - 1/4 in long. The plant is native of India and is distributed throughout the tropical regions of the old world. It occurs all over India up to an altitude of 5000 feet. It is an important pulse crop particularly in Madras, Mysore, Bombay and Hyderabad.

Chromium is present in food and feed plants, but the form is not well characterized (Cary, 1982; Das *et al.*, 2005). The likely form is soluble in chromium (III) organic compounds such as chromium (III) oxalate in plants (Smith

et al., 1989). Chromium is an important micronutrient for animals and humans (Bahjri and Muhi, 2002). Humans must consume organically bound or chelated chromium as part of the proper metabolism of Glucose Tolerance Factor (GTF). Although chromium (VI) can be rapidly absorbed through the intestinal wall, any ingested chromium (VI) is believed to be quickly reduced in the stomach where the pH is around 1 and numerous organic reducing agents can be found.

Chromium plays a key role in the biological life but above critical level it is toxic (Balamurugan *et al.*, 2004; Han *et al.*, 2004); mutagenic (Gilli *et al.*, 2002; Puzon *et al.*, 2002; Wise *et al.*, 2005), carcinogenic (Codd *et al.*, 2003; Reddy *et al.*, 2003; Sato *et al.*, 2003) and teratogenic (Asmatullah *et al.*, 1998). Trivalent form of chromium is more common and its compounds are less soluble

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ISSN: 2231-2198 (Print)

ISSN: 0975-5241 (Online)

Received: 13.12.2019

Revised: 31.12.2019

Accepted: 16.01.2020



and less toxic than hexavalent chromium (Smith, E and K. Ghisassi, 2006). Trivalent chromium forms stable complex with ligands on DNA, proteins and small molecules such as glutathione (Adach and Cielak-Golonka, 2005). Trivalent chromium binds to the DNA template cause increased DNA polymerase processivity and decreased DNA replication fidelity. These alterations in DNA function can result in greatly increased bypass of oxidative DNA lesions, which are promutagenic (Adach and Cielak-Golonka, 2005).

D. biflorus belongs to the family Fabaceae. It was formerly called as Horse gram its vernacular names are Papanaka in Telugu, Badochandra in Hindi and Pampukalchchedi in Tamil. (Mathews, 1983) have reported the high Chromate concentration in ground water at Hyderabad Telangana state. The aim of the present study was to evaluate the effects of varying concentration of chromium on seed germination and seedling growth performance of legume crop *D. biflorus*. The results of the study could be useful as selection criteria for cultivation in chromium-contaminated areas.

MATERIAL METHODS

The healthy legume seeds of horse gram *D. biflorus* were collected from the Agriculture Research Station Hyderabad at Botanical garden, Osmania University Campus Hyderabad and soaked in distilled water. The percentage of germination was first checked. To prevent fungal contamination, seeds of the *D. biflorus* were surface sterilized using dilute Sodium hypochlorite for one minute. The seeds were washed with double distilled water and placed in Petri plates on filter paper (Whatman No.42) at room temperature. Twenty seeds were placed in each Petri plate for replicates. Solutions of chromium salt as Sodium chromate were prepared having five 0, 0.5, 1.0, 1.5, 2.0 and 3.0 percentage of concentrations for treatment. The concentration of zero (0) served as control. The experiment starts with 5 ml of metal solution of 0.5, 1.0, 1.5, 2.0, and 3.0 concentrations to each set of respective treatment was applied. After every two days, 2ml of 0.5, 1.0, 1.5, 2.0, and 3.0 percentage solutions of chromium were added to respective treatment. The control received only 2ml of distilled water on alternate days. The experiment was designed on the basis of three replicates, the Petri dishes were kept at room temperature (32±2°C) with 240 Lux light intensity, and the experiment lasted for 10 days. The experiment was completely randomized. Seed germination, root, shoot, seedling lengths and root/shoot, ratios were recorded. The seedling dry weight was determined by drying the 3 tallest seedling from each replicate for each concentration, the one having good growth and placing the seedling in an oven at 80°C for 24 hours. Seedling dry biomass was measured with electrical balance.

Analysis of Variance (ANOVA), standard error and Duncan's Multiple Range Test (DMRT) to determine the level of significance at $p < 0.05$ on personal computer using COSTAT version 3, statistically analyzed the seed germination and seedling growth data.

Tolerance indices of seedlings were determined with the help of the following formula.

$$\text{Tolerance index (TL)} = \frac{\text{Mean root length of treated seedlings}}{\text{Mean root length of control seedlings}} \times 100$$

RESULTS AND DISCUSSION

Sodium Chromate treatment also produce significant effects on seed germination percentage of *D. biflorus* as compared to control (Table -1). Chromium treatments at 0.5 % significantly ($p < 0.05$) affected root, shoot and seedling growth of *D. biflorus* as compared to control. The results indicated that root was strongly affected by all concentration of chromium treatments as compared to shoot length of *D. biflorus*. The results for shoot length of *D. biflorus* showed similar trend as in case of root growth. With the increase in concentration of chromium at 3% profound effects on seedling length of *D. biflorus* were recorded. Seedling size of *D. biflorus* which includes the length of root and shoot was recorded as compared to shoot length of *D. biflorus*. The results for shoot length of *D. biflorus* showed similar trend as in case of root growth. With the increase in concentration of chromium at 3% a profound effects on seedling length of *D. biflorus* were recorded. Seedling size of *D. biflorus* which includes the length of root and shoot was recorded as 6.5 cm for control and which decreased to 5.5 cm, 4.0 cm, 3.8 cm 3.0,2.8 and 2.4 cm when treated with 0.5, 1.0,2.0 and 2.5 % of Sodium chromate solution, respectively (Plate-1). A gradual decrease in seedling dry weight of *D. biflorus*, was recorded when treated with different concentration of chromium as compared to control. The seedling dry weight of *D. biflorus* was significantly decreased with increase in concentration up to 3.0 % of Sodium chromate.

The seedlings of *D. biflorus* showed different percentage of tolerance to Sodium chromate treatment as compared to control (Fig. 1). A high percentage of tolerance to chromium treatment at 0.5 % for *D. biflorus* as compared to control was recorded. The better percentage of chromium tolerance indices for *D. biflorus* seedlings was recorded at 1.0%. The lowest percentage of seedling germination indices for *D. biflorus* was recorded at 3% for Sodium chromate treatment. The Seed germination in seedlings of *D. biflorus* to chromium treatment were reduced with the values 95, 93, 90, 85, 84 and 82 percentage of seed germination when treated with 0.5, 1.0,2.0, 2.5 and 3% Sodium chromate concentration as compared to control, respectively.



European Journal of Medicinal Plants

29(3): 1-5, 2019; Article no.EJMP.51906
ISSN: 2231-0894, NLM ID: 101583475

OCT-2019
2019-20
4

Effective Treatment for Kidney Stone with Local Plants from Aadilabad Telangana State, India

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Authors' contributions

This work was carried out in collaboration among all authors. Author JC planned the work and programmed, experimental part was carried out by Authors SH, AS and PMS Monitoring, execution of the work and recording the data. Authors GP and KS collected the literature and assisted in bringing out the paper in the prescribed format. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/EJMP/2019V29I300158

Editorial:

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Complete Peer review History: <http://www.scirp.org/journal/view.php?id=51906>

Received 08 August 2019

Accepted 11 October 2019

Published 18 October 2019

Original Research Article

ABSTRACT

Aim: We aim to treat the poor and downtrodden tribal people of Aadilabad district of Telangana State, South India, who are suffering from kidney stones, with locally available plants and with any side effects also without financial burden on them.

Design of the study: Identifying the infected people with kidney stones based on the lab reports, explaining about our treatment, educating them, counseling them, treatment and precautionary measures.

Place and Duration of Study: Aadilabad district, Telangana State, South India. Duration of study is for two years that is 2018 to 2019.

Methodology: We have identified around 24 patients (male and female) suffering from kidney stone ailment, but we have presented only six patients details in table form. Treatment is with locally available plants for two days, the results were very much success.

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Results: After our treatment the kidney stones, though they are large in size they dissolved and were passed through the urinary tract.
Conclusions: Our treatment is pure with plants without any side effects and free of cost. The patients were very much satisfied with our treatment.

Keywords: Kidney stones; medicinal plants; calcium crystals.

1. INTRODUCTION

Kidney stone formation was recorded from the early Sanskrit documents that are from India between 3000 and 2000 BC. From centuries ago the caveman started using the plants for food, shelter, armory and medicinal. WHO identified 20,000 medicinal plants overall on our planet. The kidney stones are also termed as renal calculi, this is nothing but a group of calcium crystals formed in the kidney this formation of stone may not have any symptom in the beginning, hence it is difficult to realize or feel the formation of kidney stone. Only at 2 – 3 mm the size of the stone is identified due to colicky pain which causes severe pain in the lower back of the human being [1].

Though kidney stone disease is common in developed and undeveloped countries and rampant in rural areas of India, the medical treatment is not within the reach and cannot afford for the treatment by the poor man, the people are suffering silently. The formation of kidney stone is mainly due to food habits, lifestyle, and geography. The composition of kidney stone is calcium phosphate. Our work carried out from Adilabad area of Telangana State, South India the people of Adilabad are mainly tribes dwell in forests of Adilabad. Many of the workers gave the names of plants used for the treatment of kidney stones, but no one mentioned the quantity of dosage, treatment, and period, etc. To this effect we have the doctors (i.e. radiologist report, before and after our treatment for kidney stone, our treatment was appreciated by the local tribal head and local political leaders, the treatment is free of cost.

Kidney stones formation is common in the country like Iran around 75% of cases were recorded [2], in India also it is observed in rural areas. Kidney stones are becoming more common [3,4] a large number of people are suffering from urinary stones problems all over the globe [1] the formation of kidney stones are influenced by lifestyle, food habits or dietary

habit, sometimes may be intake of proteins and geography. The kidney stone composition is of calcium oxalate or calcium phosphate [5]. Many people worked on medicinal plants used for kidney pain from Iran [6] they gave a list of plants used for therapeutic effect by reviewing related articles, they did not mention dosage of medicine and treatment. [1] gave a list of plants and their parts for the treatment of kidney stone, they also did not mention the dosage of the medicine and period of treatment. Pharmacological treatment of kidney stone disease worked in the USA by [7]. Our practical study carried out in the district of Adilabad Telangana State India. Here, the temperatures are between 5°C in winter and 47°C in the summer season, this kind of pattern shows extreme climatic conditions prevailing in this region. The people living in this area are mainly depending on agriculture and they are daily wage workers they cannot afford the medical expenditure for the treatment of kidney stones.

1.1 Symptoms

People suffering from kidney stone suffer from colic pains occur in the lower backside of the body, passing of blood in the urine, pus in the urine, burning sensation while passing urine, palpitation, restlessness, no free flow of urine it drops wise, the patient feels feverish, abdominal bloating, and indigestion.

2. MATERIALS AND METHODS

Leaves of *Bryophyllum pinnatum* (Lam.) were collected and given to the patient 12hrs before the treatment and patient is advised to eat the leaf.

Seeds of *Tectona grandis* L.f. collected, grind, and made them into a fine powder, out of this 25 g of powder is collected in a beaker to this added 4 g of potash and mixed it thoroughly. Out of this mixture 5 g (1 teaspoon full) taken and added to this 100 ml of water mixed this content without the formation of lumps and boiled it until it reduced to 50 ml. Later made it upto 1L with water.



Synthetic Communications

An International Journal for Rapid Communication of Organic Chemistry

Volume - 49, 2019 - Issue - 2

09-SEP
2019
2019-20
5

ISSN: 0039-7911 (Print) 1532-2432 (Online) journal homepage: <https://www.tandfonline.com/loi/tyc20>

An efficient, multicomponent, green protocol to access 4, 7-dihydro-tetrazolo [1, 5-*a*] pyrimidines and 5,6,7,9-tetrahydro-tetrazolo[5,1-*b*]quinazolin-8(4H)-ones using PEG-400 under microwave irradiation

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To cite this article: Shaik Firoj Basha, Tangella Nagendra Prasad, Veera Babu Gudise, Vadiga Shanthi Kumar, Naveen Mulakayala & Shaik Anwar (2019): An efficient, multicomponent, green protocol to access 4, 7-dihydro-tetrazolo [1, 5-*a*] pyrimidines and 5,6,7,9-tetrahydro-tetrazolo[5,1-*b*]quinazolin-8(4H)-ones using PEG-400 under microwave irradiation, Synthetic Communications, DOI: 10.1080/00397911.2019.1659973

To link to this article: <https://doi.org/10.1080/00397911.2019.1659973>

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An efficient, multicomponent, green protocol to access 4,7-dihydro-1H-tetrazolo[1,5-a]pyrimidines and 5,6,7,9-tetrahydro-1H-tetrazolo[5,1-b]quinazolin-8(4H)-ones using PEG-400 under microwave irradiation

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ABSTRACT

A facile one-pot synthesis of ethyl 5-methyl-4,7-dihydro-1H-tetrazolo[1,5-a]pyrimidine, 5-*tert*-butyl-4,7-dihydro-1H-tetrazolo[1,5-a]pyrimidine, 6,6-dimethyl-5,6,7,9-tetrahydro-1H-tetrazolo[5,1-b]quinazolin-8(4H)-one and 5,6,7,9-tetrahydro-1H-tetrazolo[5,1-b]quinazolin-8(4H)-one derivatives were described via a three-component reaction of aldehyde, 5-aminotetrazolo and diketones in PEG-400 under microwave irradiation at 110 °C for 30 min. A wide range of diketones such as ethylacetoacetate, *tert*-butyl acetoacetate, 3,5-dimethylcyclohexane-1,3-dione and 1,3-cyclohexanedione were utilized to carry out the synthesis of different dihydro-1H-tetrazolo[1,5-a]pyrimidines and tetrahydro-1H-tetrazolo[5,1-b]quinazolones. This method has the advantage of green protocol, operational simplicity, high yields, recyclability of the solvent and involves isolation of the final product without column purification. The scope of the reaction tolerates with aromatic, heteroaromatic and aliphatic aldehydes.

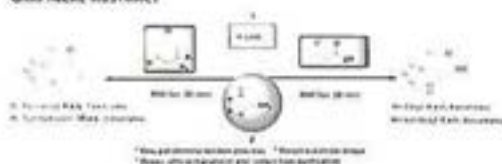
ARTICLE HISTORY

Received 26 June 2019

KEYWORDS

5-Aminotetrazolo; microwave irradiation; multicomponent reactions; tetrazolo[1,5-a]pyrimidine; tetrahydro-1H-tetrazolo[5,1-b]quinazolone

GRAPHICAL ABSTRACT



Introduction

Multicomponent reactions [MCR]^[1-7] are those in which two or more reactants react in a reaction vessel to form a single complex structure in which most of the atoms of

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Month 2019

XtalFluor-E: An Efficient Reagent for Synthesis of Oxazolines from Carboxylic Acids and *O*-Silylated Amino Alcohols

Vadiga Suresh Kumar, Veera Babu Godise, Eeda Koti Reddy, and Shank Aravamudan

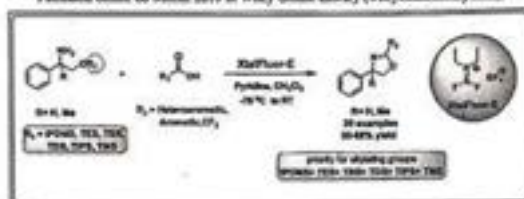
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Received March 3, 2019

DOI 10.1002/ol.2042

Published online 00 Month 2019 in Wiley Online Library (wileyonlinelibrary.com).



An efficient protocol has been developed for the synthesis of 2-oxazolines from carboxylic acids and silylated amino alcohols. The advantage of this method was demonstrated by preparing *O*-silylated amino alcohols. The reaction proceeds via *in situ* desilylation of *O*-silylated amide followed by cyclization. Studies on silyl deprotection were carried out to explain yield for 2-oxazolines.

J. Heterocyclic Chem., 00, 00 (2019).

INTRODUCTION

Oxazolines are the most common heterocyclic compounds in many natural products like dinorazolo and hexoxazole. They are valuable synthetic intermediates 1a, b, as IndPHOX ligands for asymmetric synthesis 1c, d, and also act as protecting groups. For more than a century now, oxazoline rings are the best surrogate to carboxylic acid [2]. 2-Oxazoline, containing natural products, are also known to reduce chronic neurodegenerative diseases [3]. Thus, the oxazoline moieties are versatile in synthetic utility, that is, synthetic intermediates, ligand scaffolds, chiral auxiliaries, and also chiral catalysts [4,5]. Because of the importance of oxazolines and oxadiazole scaffolds in biological applications like cytotoxic, antitumor, antibacterial, antidepressant, and anti-Alzheimer activities [6,7], many researchers are interested to work on methodologies to simplify the conditions, cost, and time. Some of the molecules such as alfosamidin, treharolin (insecticides), rilmesidine (antihypertensive), A289099 (tubulin polymerize inhibitor), and bistamide E (Fig. 1) are known to be biologically active due to an oxazoline fragment 7i, j. Ever since oxazolidine-containing natural products have shown promising medicinal value, chiral synthesis of 2-oxazolines is the research frontier in discovery as well as medicinal chemistry [8]. A common route to oxazolines is the reaction of an acid chloride with β -amino alcohol; the corresponding hydroxamide is then treated with thionyl chloride and cyclized with the base *in situ*

of the configuration. Several milder approaches have been developed for the cyclization of the β -hydroxamide, including the use of (diethylamino)azulfer trifluoride, Mitsunobu conditions, and $PF_5 \cdot CCl_4$ [9]. Cyclization of β -hydroxamide with $PF_5 \cdot CCl_4$ allows the direct synthesis of oxazolines from carboxylic acids [10]. These methods exhibit less tolerance towards functionalization and causes epimerization [11].

A number of synthetic methods are reported for the synthesis of functionalized oxazoline derivatives from carboxylic acids, aldehydes, nitriles, esters, olefins, carbonyl compounds, and β -hydroxamides. Piering and Tamey described the synthesis of oxazolines using polymer-bound tosyl chloride [12]. The commercially available fluorinating agents DAST and XtalFluor-E were used recently for cyclodehydration of β -hydroxamides in good yields and without epimerization of α -position [13,14]. Later, Marai et al. reported the synthesis of oxazoline from aldehydes and amino alcohols by using 1,4-Diazabicyclo [2.2.2] octane-DABCO and *N*-Chlorosuccinimide-NCS [15]. Chaudhry et al. reported the synthesis of oxazolines from aldehydes and 1,2-hydroxyalkyl azides using Lewis acid $BF_3 \cdot OEt_2$ followed by polymer-bonded tosyl hydrazine [16]. Crosignani and Swinnen reported a one-pot protocol using Mukaiyama reagent followed by polymer-bound tosyl chloride [17]. Hazra and his team reported the synthesis of oxazoline derivatives by the reaction of alkenes with NBS in the presence of nitriles and $Cu(OTf)_2/Zn(OTf)_2$ [18]. Gracia et al. reported the synthesis of oxazolines by the reaction

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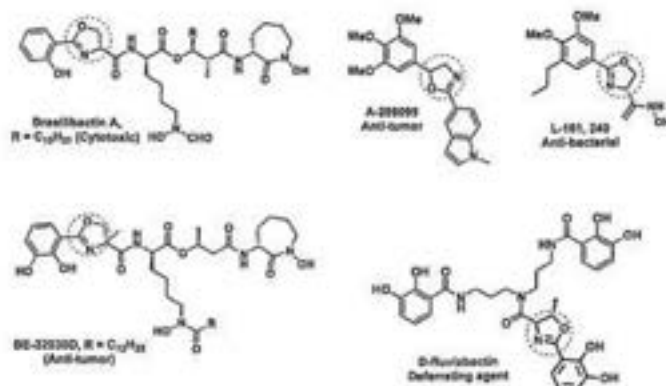


Figure 1. Examples of 2-oxazoline containing molecules. [Color figure can be viewed at wileyonlinelibrary.com]

of amides and alkenes in the presence of NIS and propionitriles [19].

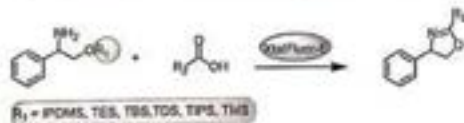
Orlic and coworkers reported the synthesis of amide by using XtalFluor-E [20]. This group utilized XtalFluor-E as a coupling reagent for optically active substrates without epimerization. Phillips et al. reported the synthesis of oxazolines from β -hydroxyamides using Deoxo-Fluor and DAST [21]. Recently, Brandstater and coworkers reported the synthesis of 2-oxazolines from silylated protected β -hydroxyamides using XtalFluor-E via *in situ* desilylation followed by cyclodehydration [22]. But there are hardly any reports towards the synthesis of oxazoline derivatives using *O*-silylated amino alcohols. As a part of our continuing research interest in methodologies [23], herein, we report the synthesis of substituted 2-oxazoline derivatives using *O*-silylated amino alcohols and carboxylic acids using XtalFluor-E under standard conditions (Scheme 1).

RESULTS AND DISCUSSION

The scope of 2-oxazoline synthesis was demonstrated here by taking carboxylic acid **2** and β -hydroxy amino alcohol **1** with tosyl chloride and triethylamine as a base in

tetrahydrofuran solvent. We observed the formation of the desired product (**3**) in ~10% yield along with side product (**4**) in 80% yield (Table 1, entry 1). Use of different sulfonyl chlorides like pentafluorosulfonyl chloride and 4-nitrobenzene sulfonyl chloride did not alter the yield of the product (Table 1, entries 2 and 3). Then, we switched the coupling reagent by using fluorinating agents like DAST, XtalFluor-E, and Deoxo-Fluor to observe the formation of product **3** in 20 to 25% yield. In these conditions, we observed ester **4** as a side product formed via esterification of intermediate **IV** and acid in the presence of triethylamine (Table 1, entries 4–6). In order to increase the formation of desired product **3**, we carried out the reaction of acid (**2**) with trimethylsilyl (TMS)-protected and triethylsilyl (TES)-protected β -hydroxyl amino alcohols (**1**) using XtalFluor-E as reagent and triethylamine as a base at -78°C in tetrahydrofuran solvent (Table 1, entries 7 and 8). Unfortunately, TMS protection was unstable with XtalFluor-E and resulted in ~25% yield, whereas TES-protected β -hydroxyl amino alcohol gave 60% yield towards the product formation **3**. Screening of different solvents such as CH_2Cl_2 , CHCl_3 , 1,4-dioxane, and 1,2-Dichloroethane-DCE resulted in improved yield with dichloromethane facilitating easy workup (Table 1, entry 9). In order to improve the yield of the reaction, various

Scheme 1. One-pot synthesis of 2-oxazolines from carboxylic acids and amino alcohols. [Color figure can be viewed at wileyonlinelibrary.com]



ANALYSIS OF PHYSICO-CHEMICAL PARAMETERS TO ASSESS WATER QUALITY OF PALAIR RESERVOIR FROM KHAMMAM DISTRICT (T.S.) INDIA

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ABSTRACT

The quality of surface water has progressively worse in many countries in the past few decades. As a result of the growing population, urbanization, agriculture, and increasing industrialization, the inland water bodies are confronted with the increasing water demand, as facing with extensive anthropogenic emissions of nutrients and sediments, predominantly the lakes and reservoirs. To resolve this problem, it is necessary to carry out water quality assessment, planning, and management, in which water quality monitoring plays an important role. This study aimed at assessing the water quality of Palair reservoir from Khammam district (TS) India. Palair reservoir used for irrigation, livestock-watering and fish production. This study carries using some selected physico-chemical parameters. The result of water samples shows high pH indicates the basic nature of water samples, sulphate in the dam water was high, the phosphate content of reservoir water were found high which lead to unpleasant taste and odor. The obtained values of each parameter were compared with the standard values set by the World Health Organization (WHO). The values of each parameter were found to be within the beyond safe limits set by the WHO. Overall, the water from all the locations was found to be not safe as drinking water. However, it is also important to investigate other potential water contaminations such as chemicals and microbial and radiological materials for a longer period of time, including human body fluids, in order to assess the overall water quality of Palair reservoir.

KEYWORDS: Water Samples, Physico-chemical parameters, water quality, Palair reservoir.

1. INTRODUCTION

Water is the most important essential component for the living being. Water plays a significant role in maintaining the human health and welfare. Clean drinking water is now considered as a fundamental right of human beings. Life on the earth is never imaginable without water. Water is one of the most vital irreplaceable elements of a basic human need. It is being used for many purposes such as irrigation, water supply, industrial, drinking, propagation of fish and other aquatic systems and generation of hydro-power plants. Water is the main source of power, energy and executes the evolution on the earth. 71% of earth surface is occupied by water (CIA, 2008), 96.5% of the world's water is marine water which is salty that is not to be directly useful for drinking, irrigation, domestic and industrial purposes. 1.7% in groundwater, 1.7% in



glaciers. Less than 1% water is present in lakes, ponds, rivers, dams, etc., which is used by man for domestic, industrial and agricultural purposes. According to an estimate about 70% of all the available water in our country is contaminated water bodies due to the discharge of effluents from industries and the domestic sewage waste.

Water pollution confronting serious problem in India as almost 70 per cent of its surface water resources and a growing percentage of its reservoirs are contaminated by biological, toxic, organic, and inorganic effluents. These resources have been rendered unhygienic for human consumption as well as for other activities, such as irrigation and industrial needs. This shows that degraded nature of water quality can contribute to water scarcity as it limits its availability for both human use and for the ecosystem. Due to growth of increasing population, agricultural usage, and industrialization, demand for domestic water has increased many times during the last few years. Improper waste disposal industrial effluents and over exploitation of resources has affected the quality, not only of tap water but also of ground water. Water pollution has many sources. The most polluting elements are the city sewage and industrial waste discharged into the rivers. The facilities to waste water treatment are not adequate in any city in India. Presently, only about 10% of the waste water is treated; the rest is discharged as it is into our water bodies. Therefore pollutants enter groundwater, rivers, and other water bodies. The Central Pollution Control Board monitoring results obtained during 2005 indicate that organic pollution continues to be predominant in aquatic resources.

1.1 Physico-chemical Parameters:-

The availability of good quality water is an contributing characteristic for preventing diseases and improving quality of life. It is necessary to know details about different physico-chemical parameters such as temperature, acidity, hardness, pH, sulphate, chloride, DO, alkalinity used for testing of water quality. Some physical test should be performed for testing of its physical appearance such as temperature, pH, turbidity, while chemical tests should be perform for its dissolved oxygen, alkalinity, hardness and other characters.

2. MATERIAL AND METHOD

Water samples were collected in previously cleaned polythene bottles. Water samples were collected during January 2017 to June 2017 from 4 stations decided in the reservoir in the morning (9.00 to 10.00 a.m.). Temperature, EC and pH of water samples were measured in the field immediately after collection with help of thermometer, conductometer and pH meter. Other physico-chemical parameters were analyzed in the laboratory and all other parameters were analyzed by titration methods outlined in standard methods (2002).

A review on E-Waste Management: It impacts on Human Health and Environment

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Abstract:

The reduced life span of electrical and electronic devices is termed as e-waste, electronic devices, which includes computers, cell phones, printers, scanners, laptops, TVs, CRT monitors, household electronic machinery and laboratory electronic equipments, after completion of their life span they are turned as e-waste. Presently, the quantity of electronic waste is a burning problem in our country. This work is based on survey conducted on different people of society regarding e-waste management awareness. Electronic items consists of many toxic metals such as cadmium, lead and brominated flame-retardants. In E-waste areas, the residents had a high occurrence of headaches, skin diseases, nausea, vertigo, ulcers and gastric problems. When landfills having e-waste are burned, heavy metals and hazardous chemical substances like toxic furans and dioxins from condensers and halogenated flame retardant products can be evolved. To avoid dumping of E-waste in land filling, should implement the 3R (Reduce, Reuse and Recycle).

Key words : E-Waste, health hazards, landfills, management.

1. Introduction :

As electronic up gradation of country, increasing the usage of electronic devices, which includes computers, cell phones, printers, scanners, laptops, TVs, CRT monitors, household electronic machinery and laboratory electronic equipments, after completion of their life span they are turned as e-waste, which contains various hazardous chemicals, heavy metals and non-decomposable plastics.

The reduced life span of electrical and electronic devices is termed as e-waste. Every year high quantity of electronic waste is produced in the country. Presently, the quantity of electronic waste is a burning problem in our country. Riddance of e-waste is an emerging world's human health and environmental issue (Monica and Jugal Krishna, 2010). In India most of the people stored electronic waste at their household as they do not know how to dismantle or recycling the items. This ever increasing the e-waste in the country every year, this impacts the environment and public health.

Electronic waste is a complex matter and is also huge source of important metals such as copper, gold, mercury and silver, which can be required and get back into production line. So dismantling the items of electronic waste and recycling the elements properly. Recycling centres furnish employment to the people and trained them in handling, dismantling and recycling the electronic items. Unscientific dismantling and recycling of e-waste creates hazards to public health and environment. Hence, the proper e-waste management has been required (Pandve HT, 2007). It is needed to review the human health peril and strategies to prevent this growing imminence.

2. Methodology:

This work is purely based on survey conducted by us on different people of society regarding e-waste management awareness, collected and gathered information from Sasi e-recycle solutions, Hyderabad and various research articles on e-waste regarding sources, methods of disposal, heavy metals, hazards chemicals and their effects on environment and public health.

3. Source of E-waste:

The electronic equipment that is at the end of its useable life period is termed as e-waste. All used and damaged electronic items are treated as e-waste such as Televisions, printers, scanners, cables, electronic circuit boards, calculators, mobilephones, cameras, radios, DVD players, mice, batteries, CRT tubes, computer monitors, key boards and home used electronic items such as washing machine, fridge, grinder, AC, microwave ovens, laboratory equipments etc.

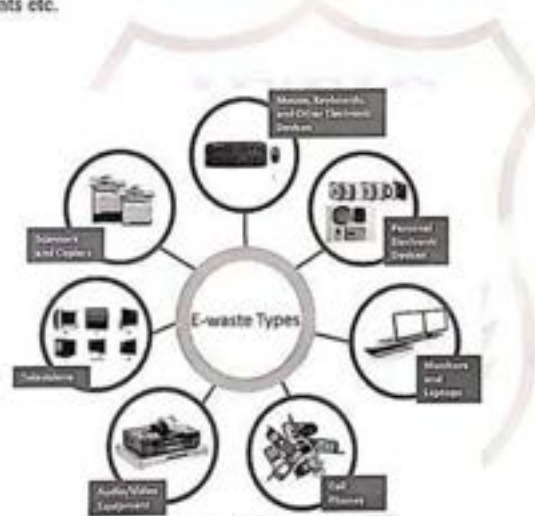


Figure 1: Types of e-waste

4. Impact of E-waste on human health:

Electronic items consists of many toxic metals such as cadmium, lead and brominated flame-retardants. The part including copper, gold, aluminum and other metals in e-waste is approximately 60 percentage while plastics about 30 percentage and the toxic pollutants comprise only 2.70 percentage (Widmer R. et al,2004), lead is the major component of many electronic devices, which causes different health hazards due to contamination of environment (Jang YC. and Townsend TG,2003). Lead enters biological systems through soil, water, air, and food. It causes nervous disorders in children (Bathurst PA, et al. 1992). In E-waste areas, the residents had a high occurrence of headaches, skin diseases, nausea, vertigo, ulcers and gastric problems (Qin B. et al,2004).



Original Research Article

DOI: 10.26479/2019.0502.68

**INFLUENCE OF SOIL ELEMENTS ON PHOTOSYNTHESIS AND
SECONDARY METABOLITES IN SELECTED MEDICINAL PLANTS**

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Kovvada Vijaya Kumar, Naragani Krishna

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Guntur, Andhra Pradesh, India.

ABSTRACT: The influence of mineral nutrients on photosynthesis and production of secondary metabolites was studied and analyzed in the plants *Alstonia scholaris*, *Tabebuia argentea* and *Jacquinia barbasco* growing in Botanical Garden of Acharya Nagarjuna University, Guntur during 2015 and 2016. Of all the plants maximum mineral nutrients uptake was observed in *T. argentea*. The rate of photosynthesis (A_{max}), rate of transpiration (E) and stomatal conductance (g_s) were found to be more in *T. argentea* i.e. $7.09 \mu\text{moles m}^{-2}\text{s}^{-1} \text{CO}_2$, $2.95 \text{ mmol m}^{-2}\text{s}^{-1}$ and $0.07 \text{ mmol CO}_2 \text{ m}^{-2}\text{s}^{-1}$ respectively. Results also indicated that an optimum accumulation of mineral nutrients increased the rate of photosynthesis and secondary metabolite production in *T. argentea*.

KEYWORDS: photosynthesis, soil nutrients, phytochemicals, secondary metabolites.

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INTRODUCTION

Photosynthesis is a key physiological process influences all other cellular activities by providing ATP requirements. Adenosine tri phosphate produced during phosphorylation reactions not only utilized in sugars production but also involved in synthesis of so many metabolic intermediates and precursors for various secondary metabolites [1,2,3]. But the rate of photosynthesis depends on so many factors. Availability of minerals is one of such factors regulating the photosynthetic process [4]. These mineral nutrients may include both macro and micro elements/nutrients such as N, P, K, Zn, Fe, Mn, Mg, Cu and S. Of these mineral nutrients some are metal ions. These metal

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2019 March – April RJBPCS 5(2) Page No.908



ions may bound to proteins and make them ready for the transport of molecular species [5,6]. Copper is an important constituent of plastocyanin (Pc) and Cu/Zn superoxide dis mutase. Former acts as an electron carrier between PS I and PS II in photosynthetic reactions [7] and latter acts as a protection agent during oxidative stress [8,9]. In leaves 'Fe' present in Ferretin forms and mineralized with phosphate [10]. These Ferretins may be potential 'Fe' donors in buildup of chloroplast. On the other side 'Fe' also plays an important role in formation of PS I, PS II, Cyt b 559 [11] and Ferridoxin. Previous literature reported that in order to catalyze the water oxidation process with in the OEC complex plants require 'Mn' to form the 'Mn' cluster in PS II which is located in the donor side [12,13,14]. Photophosphorylation in chloroplasts membranes may be accomplished by the reversal of ATPases activated by Ca^{+2} . Thus reduction in 'Ca' results in disturbances in energy conversions in chloroplasts [15,16]. The catalization of the rapid inter-conversion of CO_2 and H_2O to HCO_3^- during photosynthetic 'C' fixation is promoted by Zn containing metalloenzyme β -carbonic anhydrase (β -CA) which is located in the stroma of chloroplast [17]. The coordinated action of both nitrogen and phosphorus influence Ribulose 1,5-bisphosphate carboxylase oxygenase (Rubisco) the key enzyme in photosynthetic fixation [18,19]. As the phospholipids are important constituents of membranes, decreased availability of phosphorus may disturb the membrane integrity of cellular organelles [16,20]. Potassium plays a significant role in ' CO_2 ' assimilation, where it is involved in stomatal regulation, ATP synthesis and enzyme activation [21]. However non stomatal regulation of 'K' deficiencies like reduced chlorophyll content, inhibition of PS II activity and 'e' transport were also observed [22]. Magnesium (Mg) involved in grana stacking and LHC II was found to participate in the cation mediated formation of grana [23]. Magnesium also catalyzes many enzyme reactions involving phosphate transfer and ATP metabolism [24]. Chloroplasts contain protein rich in sulfur. The decrease in chlorophyll content might result in 'S' deficiency which further results in disruption of chloroplast structure [25]. Sulfur is an important component of Fe-S cluster which are co-factors of proteins that perform electrons transfer, redox and nonredox catalysis [26]. The opening and closure of stomata is mediated by the fluxes of potassium and accompanying anions such as malate and chloride [27]. Chloride is necessary for the water-splitting reaction in PS II. Besides 'Mn' chloride plays a fundamental role in the water-splitting system of PS II [28]. On the other side 'Cl' acts as a bridging ligand for stabilization of the oxidized state of manganese [29]. As discussed, the impact of nutrient availability on assimilatory process was well established in most of the medicinal plants. On the other side it is well evident that effective photosynthetic processes will enhance the production of primary and secondary metabolites in so many plants including medicinal plants [30,31,32]. The available literature confirmed that there is a strong correlation between nutrients, photosynthesis and secondary metabolite production. Plants such as *Alstonia scholaris*, *Tobebuia argentea* and *Jacquinia barbasco* are the traditional medicinal plants and the


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2019 March - April RJBPCS 5(2) Page No.909



RESEARCH PAPERS PUBLISHED IN 2018-19



WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.974
Volume 8, Issue 2, 450-456. Review Article ISSN 2277- 7105

FEB-2019
2018-19
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A REVIEW ON ZIKA VIRUS

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Article Received on
28 Nov. 2018,
Revised on 19 Dec. 2018,
Accepted on 09 Jan. 2019
DOI: 10.20913/wjpr.2019.14082


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ABSTRACT
Zika virus has become a major serious concern in African and Asian countries. This virus was first reported from Zika forest in Uganda, in 1940s, this virus is mosquito born disease spread to human beings. The transmission of diseases is through the female *Aedes aegypti* mosquito bite, through sex, blood transfusion and also from the infected mother to the child. Temperature plays a major role in completion of life cycle of the virus. This disease is associated with chickungunya, dengue and Guillain-Barre syndrome. ZIKV is a asymptomatic and causes neurological disorders in the new born babies. It is single standard RNA virus, this zika will not cause death. There is no proper treatment for the disease, only rest more intake of fluids and use of pain killers are suggested.

KEYWORDS: *Aedes aegyptica*, Zika virus, Asymptomatic, Neurological disorders.

INTRODUCTION
The name zika came from Ugandas zika forest, the zika is a virus identified in the year 1947. The virus belongs to the family Flaviviridae and genus *Flavivirus*. This is a mesquite borne disease, it spreads all most more than 70 countries of the glob, and fortunately zika virus is not reported from Indian sub continent. Though the India is infected with chickungunya, dengue and also a rare Guillain-Barre syndrome disease, zika virus will not lead to death. The symptoms of zika viruse are skin rashes, mild fever, joint pains and neurological disorders. Due to urbanization of India and also to be a tropical region the county is infected with vector born disease, for example dengue and chickungunya. The disease transmits through *Aedes aegyptica* female mosquitoes. Few cases of sexually transmitted were reported. The disease is endemic to African countries. Presently the zika virus disease is reported by South America and Brazil. The incubation period of mosquitoes are ten days, the possible transmission of disease is not only through mosquito bite but also by blood transmission. The infection

www.wjpr.netVol 8, Issue 2, 2019.450

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transmit to the newly born babies from the infected mothers, the infection is detected in the breast milk of infected mother.

Sadie J. Rayan *et al.*, (2016) worked on out break of zika virus infections from Florida USA and says zika is a congenital syndrome, which causes birth defects of the new born babies. Sonia R. Lambert Passos *et al.*, (2017) evaluated 210 samples from the infected petition of the middle aged persons from Rio de Janeiro, Brazil and found some of the people are infected by zika virus. Constanca F J Ayres (2016) says zika virus is a vector born disease there is every possibility of spread in disease from infected women through sex. A brief communication was made Zika virus infection and solid organ transplantation by M.L.Nogueira *et al.* from Brazil in 2017. First large scale zika virus among humans outside Africa and Asia this disease associated with microcephaly and Guillain-Barre syndrome. The patients are from one hospital and this region is endemic to dengue virus.

Hafsa Aziz *et al.*, (2016) published a review article on zika virus global health challenges and its threat in the present conditions from Pakistan. According to him our health is always been threatened by viral diseases, the infection of zika virus disease linked to miss carriage in pregnant women and neurological disorders such as microcephaly in infant or new born babies and also Guillain-Buarre syndrome. In the life cycle of zika virus man serves as incidental host, but where as the mosquito is primary host.

David F *et al.*, (2016) worked on risk factor analysis for dengue fever in South Africa which is also spreads through *Aedes* mosquitoes which is associated with zika virus. Geogr Priya Doss *et al.*, (2017) says there is no evidence of zika virus transmission in India and the Indian government has taken enough measures to control zika out break. A review of literature on zika virus by Anna R Ploude and Evan M. Bloch (2016) in 1947 flavi virus was first isolated from Zika forest Uganda and named it as zika virus, nearly 73% of population was infected in Yap. Zika virus infection and menace was studied by Smrati Bajpai and Milind Y Nadkar (2016) the zika virus was first identified by humans in 1968 from Nigeria WHO noted the infection was spread in 23 countries and also from America. The most effected countries are Brazil.

DGHS GOVT of India (2016) the development of symptoms of infected persons can be seen only one out of five, the out come of the clinical test is almost same to dengue fever. The male mosquito has no role to play transmission of disease. The female *Aedes* mosquito is

JULY
2018

2018-19

Impact Factor: 5.26



Geomagnetic field elements and their measurements

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Abstract

The geomagnetic field of the world was first accomplished within the thirteenth century by Petrus Peregrinus and was clearly envisioned within the sixteenth century by William Gilbert. Inside the mid nineteenth century, C.F. Gauss made utilization of number-crunching to show that ninety nine of the found geomagnetic field starts. In the Earth's inside and furthermore the rest of the one Chronicles originates from outside sources which relate electrically Conducting district of the air may represent varieties inside the Earth's attractive transition. The part is that layer of the Earth's climate that stretches out from eighty to a thousand kilometer. It affects the proliferation of radio waves extensively. Part is being utilized by a few correspondence frameworks to repeat radio flags over long separations. The part will imitate floods of frequencies beneath with respect to thirty MHz, allowing (HF) radio correspondence to separations of the large number of kilometers. The imperative frequency (foF2) is that the constraining frequency at or beneath that a radio radiation is reflected by part in HF radio engendering. In the event that the frequency is to finish everything of this price the wave penetrates through associate part F-layer. Variations within the vital frequency give hints on the happenings among the F2-layer. Observations show that when sunrise foF2 rises, reaches to its most price within the early afternoon, and there's a fast fall shortly when sunset. This layer of the part is stricken by many influences admire solar radiation, star radiation, neutral atmosphere, geomagnetic activity and electrodynamics effects. (Rishbeth and Mendillo, 2001) numerous authors have examined ionospheric variability. Adebisin (2012) had investigated the depiction of foF2 ionospheric variability throughout numerous seasons, time of the day latitudes and star cycles. Adcinyi *et al.* (2007), pondera on changeability fluctuate from individuals who dissect particular parameters on an outsized geographic district, to individuals who are limited to various or one station.

Keywords: field, foF2, frequency, layer

Introduction

Evaluating to what degree found F2-layer fluctuation is a direct result of the varying sources, is staggeringly fundamental because of this can permit a far extra expound comprehension of the area. This information would be rudimentary for creating and rising connected arithmetic models of ionospheric changeability significant to help HF administrators in outlining and keeping up practical administration of HF radio correspondences.

Previously, the investigation of ionospheric fluctuation was performed abuse totally unique scattering lists. The foF2 month to month middle qualities region unit at times thought of as illustrative of a peaceful condition of the area, and therefore a few investigations identifying with ionospheric inconsistency were directed by breaking down the connected science circulations of scattering files bolstered the month to month middle qualities. The downsize deviations from the month to month medians for different seasons, land scopes, and change of star action, were acclimated display each day foF2 and M (3000) F2 varieties (Davis and Croome, 1964). This connected science model of ionospheric changeability was implemented by the International Communication Union

(ITU) (ITU, 1997) to supply Associate in nursing estimation of diurnal MUF fluctuation as a fundamental for the determination the very pinnacle of usable frequencies to be utilized in radio interchanges.

Review of Literature

Conena and Varela (2014) built up an existence cycle displaying system upheld down to earth investigation at the dynamic style arrange utilizing a dimensional examination approach. Amid this investigation contemplate, the specializations have thought of various life-cycle stages as regular logic frameworks faraway from balance. This reconsiders each life-cycle area produces entropy and can send out indistinguishable entropy to the framework (e.g., the planet surface and furthermore the space).

Candido *et al.*, (2010) the star least measure of star cycle twenty three was astoundingly long and tranquil when contrasted with past star least in 1996, numerous reports are breaking down its choices and effect underneath particular reason for read (Solomon *et al.*, 2013; Lei *et al.*, 2008; Verkhoglyadova *et al.*, 2013). Amid this work, we tend to break down the low scope part in South America and its

conduct beneath the effect of this unconventional sun. The ionospheric variety is dissected through run of the mill ionospheric parameters comparing to the vertical aggregate negatron content, VANC, the thickness statute of F2 layer, hof2, and Appleton layer basic recurrence, foF2, in 2008, round the south peak of Equatorial Ionization Anomaly (EIA), in Cachoeira Paulista (45.0° W, mag. lat: sixteen ° S, plunge point: - 32.3o). We tend to examine of the part of High Speed Streams (HSSs) on the ionospheric changeability.

Weight Watcher Bilitta *et al.*, (2011) The global reference part is that the universally perceived and proposed typical for the particular of plasma parameters in Earth's part. It portrays month to month midpoints of negatron thickness, negatron temperature, molecule temperature, molecule creation, and various other farther parameters inside the elevation shift from sixty to 1,500 km. A joint unit of the Committee on zone examination and furthermore the International Union of Radio Science (IURS) is liable of creating and up the IRI demonstrate. As asked for by COSPAR and IURS, IRI is relate degree experimental model being upheld the vast majority of the offered and dependable learning hotspots for the ionospheric plasma. The study portrays the latest form of the model and surveys endeavors towards future improvements, together with the occasion of late global models for the F2 top thickness and tallness, and a substitution way to deal with clarify the negatron thickness inside the haven deck and plasma circle. Our pressure will be on the negatron thickness because of it's the IRI parameter most significant to geophysical science procedures and studies. Yearly IRI gatherings territory unit the most setting for the discourse of IRI exercises, future upgrades, and suggestions to the model, a substitution uncommon IRI team action is that represent considerable authority in case of a period IRI (RT-IRI) by consolidating learning absorption systems with the IRI show an essential RT-IRI team meeting was control in 2009 in Colorado Springs. We'll survey the consequence of this gathering and furthermore the plans for the long run.

Ionosphere Variability

All the more as of late, a regular MUF changeability has been explored above review factors computed with data from very 100 ionospheric stations unfurl around the world, and contrasted and those of the ITU, by and by utilized by the worldwide radio network (Fotiadis *et al.*, 2004). It should be noticed that month to month medians and deciles have their confinements. Truth be told, it's unforgiving to plot a parameter that precisely speaks to a "tranquil" district. The foF2 month to month middle qualities create to a few fake impacts and may be insufficient to clarify a "calm" district.

Different calm time reference exceeds territory unit required. Also, Fox and scientific expert (1988) found that though the review factors were compelling every so often, they for the most part significantly under- or over-evaluate the found changeability. From these issues, thus as to detect a scattering file that is prepared to dispassionately evaluate ionospheric changeability, the creators found that it's of urgent significance to layout the delegate parameters of a "calm" area.

An instrument for evaluating scattering of estimations over a given sun is difference. On account of normal variances of the ionospheric reflector, foF2 estimations change. A few foF2 estimations on the purpose of the regular cost show a dreadfully little changeability and consequently such estimations will be thought of "agent" of a calm sun. Subsequently, change appears to be adequate to spot periods amid which the found varieties of foF2 don't appear to be critical. Consequently, this parameter was wide acclimated examine ionospheric fluctuation.

It is standard that there are stores of varieties inside the district as a result of the effect of star, brilliant and geomagnetic exercises. Barring star cycle variety, regular effect, rakish separation reliance, there are a unit consistently and hour-to-hour varieties.

Notwithstanding the mass or 'climate-consistent' conduct of the locale, there's an industrious consistently changeability or 'climate'. given that totally extraordinary ionospheric layers region unit ruled by specific forms, the vulnerability at its mean random height may emerge from poor information of its mean conduct or of its fluctuation a couple of better-knowns mean. That is, the predominance of 'atmosphere' versus 'climate' is itself associate in nursing ionospheric variable. A few investigations of those impacts were connected inside the claimed 'applications' writing that pre-dated the present 'space climate' thinks about by numerous decades. These investigations were normally detailed at specialized gatherings or in contract reports, anyway weren't everlastingly uncovered in standard examination diaries for ionospheric material science, incidentally, Rush and scientist (1973) explored the remaining of short-run forecasts of radio spread conditions at hours by looking at the hourly vital frequencies foE, foF1, and foF2 of the E, F1 and F2 layers. For the E-layer all through 0900-1500 standard time (LT), the found standard deviations for foE zone unit ordinarily underneath 6 June 1944 of the month to month mean, inferring that sixty fifth of all perceptions lie among a12% of their standard. For foF1, the extent deviations region unit exclusively marginally greater, being most prominent in star generally years.



IJCRR
Section: Life
Science
Vol. Journal Impact
Factor: 5.281 (2017)
ISSN: 11.54 (2015)

Seasonal and Geographical Variations in Antimicrobial Activity of Selected Mangroves from Krishna Estuary

3

cit scd-2020-02
2019-0-0

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2018-19

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ABSTRACT

Objective: To determine the seasonal and geographical impact on plant secondary metabolite production and antimicrobial activity.

Methods: Three mangrove plants viz., *Cerops legal*, *Bruguiera cylindrica* and *Lumnitzera racemosa* commonly found in G-lakaladindi and Malakayalanka regions of Krishna Estuary, Andhra Pradesh, India were selected for the present study. The study was done during 2014-15 summer, rainy and winter in both the stations. Leaf samples were extracted with methanol and subjected to preliminary phytochemical screening. The methanolic leaf extracts were tested against bacterial pathogens *Bacillus cereus*, *B. subtilis*, *Staphylococcus aureus*, *Escherichia coli* and a fungal pathogen *Candida albicans*.

Results: The methanolic extracts of leaves collected during rainy season showed maximum zone of inhibition at both the stations. Among the studied plants leaf methanolic extract of *C.legal* was recorded maximum antibacterial activity against *B. subtilis* and *B. cereus* (18±0.05 mm), followed by *Bruguiera cylindrica* both at G-lakaladindi and Malakayalanka respectively. But the extracts of *L.racemosa* showed less inhibition activity (7±0.00 mm) in all the seasons at both the stations.

Conclusion: The study demonstrated that mangroves produce bio-active compounds optimally in rainy season that are effective against microbial proliferation which may further help in synthesis of natural antibiotics in place of commercial antibiotics to heal infectious diseases.

Key Words: G-lakaladindi, Malakayalanka, Phytochemicals, Rainy

INTRODUCTION

Mangroves are a specific group of plant communities, habituated to adverse environments includes high salt content, relative humidity with fluctuated water currents.^[1] These contrary conditions consequently results in reduced photosynthetic rate and thereby reduced growth.^[2,3] Of all the stressors soil and water salinity inflict more on plant development especially in semiarid and arid regions.^[4] In order to cope up with these unfavorable conditions, mangrove switch on to different modifications at morphological, physiological, biochemical and molecular levels.^[5] Production of secondary metabolites is one of such physiological change which tends the plant to protect themselves against harmful microorganisms along with grazing threat.^[6] Bryant et

al.^[7] have hypothesized that when plants are stressed, an exchange occurs between carbon to biomass production or formation of defensive secondary compounds.

The local geo-climate, seasonal changes, external factors such as light, temperature and humidity may affect composition of secondary metabolites. The synthesis of secondary metabolites in response to environmental factors is nothing but an adoptable strategy leading to tolerance to abiotic stress.^[8,9] On the other side the mangrove plant extracts have proven activity against human, animal and plant pathogens and have been used in folklore medicine since ages.^[10,11] Till now more than 200 bio-active compounds have been isolated from true mangroves of tropical and subtropical population.^[12] As said, seasonal changes influence much on production

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ISSN: 2231-2196 (Print)

ISSN: 0975-5241 (Online)

Received: 10.02.2019

Revised: 29.02.2019

Accepted: 06.03.2019



of secondary metabolites which is less explored and badly overlooked. On the other side right season for the collection of leaf material to extract maximum secondary metabolites is inevitable in order to get much benefit. Krishna estuary is one such neglected area with less exploration specifically on seasonal changes. The Krishna deltaic region is in subtropical humid climate with hot summers and moderate winters, which get annual rainfall due to south west monsoon.^[14,15] Gilakaladindi and Malakayalanka are the prominent biodiversity mangrove reserves in Krishna estuary on East Coast of India located at latitudes 16° 8' 56.1624", 15° 58' 34.5354 and longitudes 81° 9' 46.029", 81° 5' 53.3616" respectively. Coupled with their richness and diversity mangroves of Gilakaladindi and Malakayalanka have also physiological peculiarities as a result of environmental conditions to which they belong. Each species of mangroves has a particular range of tolerance to environmental factors.^[16,17]

The present study aims to identify the seasonal and geo-climatic changes on secondary metabolite production in terms of antimicrobial activity on selected mangrove species *Lumnitzera racemosa*, *Ceriops tagal* and *Bruguiera cylindrica*.

MATERIALS AND METHODS

Collection of Plant Material

Leaf samples were collected during summer (March to May) rainy (July to September) coinciding with South west monsoons and in winter season (October to February). Two different sites were chosen and the distance between the sites was about 25 kms. Healthy and fresh leaves were collected from selected three mangroves i.e. *Lumnitzera racemosa*, *Ceriops tagal* and *Bruguiera cylindrica* of Krishna estuary. The collected leaves were washed with tap water and double distilled water until dust is removed from surface of the leaves. The leaves are shade dried at room temperature. Dry leaf material was powdered with the help of mechanical grinder and sieved.

Extraction

The leaf powders were extracted with 80% methanol using Soxhlet apparatus for about 18 hours. The crude extracts obtained were evaporated and concentrated by using vacuum rotary evaporator (Buchi Labortechnik Ag, model I, R-215) under reduced pressure. The dried extracts were preserved at 4°C until further use.

Antimicrobial screening

The antibacterial activity of the obtained leaf extracts was carried out by agar well diffusion method. Nutrient agar (NA) was used for culturing the test bacteria. Nutrient agar medium was sterilized at 15 lbs pressure (121 °C) for 15 min,

later cooled and inoculated with 0.1 ml of test bacterial suspension. The inoculated medium was poured into petri plates under aseptic conditions. After solidification, wells of about 5 mm diameter were made with sterilized cork borer^[18]. Solvent extract (50 µl, 100 µl and 150 µl) was added to each well and the addition of solvent alone served as control. The inoculated plates were incubated at 30 °C and the diameter of the inhibition zone was measured after 24 h on bacterial pathogens such as *Staphylococcus aureus* (MTCC 3160), *Bacillus subtilis* (ATCC 6633), *Bacillus cereus* (MTCC 430) *Escherichia coli* (MTCC 43) and fungal pathogen *Candida albicans* (ATCC 10231).

Phytochemical screening

Shade dried plant material was extracted with 80% methanol and were tested for qualitative phytochemical screening.^[19,20]

Alkaloids

The methanolic extract was evaporated to dryness and the residue is dissolved in 1% HCl. To this solution Mayer's reagent was added. Appearance of any precipitate or turbidity indicates the presence of alkaloids.

Saponins

The plant extract is evaporated to dryness. Tap-water was added and shaken vigorously. Formation of persistent foam of about 2 cm is taken as a positive reaction.

Terpenoids and steroids

A 50% H₂SO₄ is added along the sides of the test tube containing a mixture of methanolic HCl and acetic anhydride. If there is any change in color, from green to blue-green (sometimes via red or blue) indicates the presence of terpenoids and steroids.

Tannin

The methanolic extract is evaporated to dryness and the residue was dissolved in water and tested with 1% gelatin solution and 1% gelatin salt solution (1 g gelatin dissolved in 10 g of NaCl (w/w) to separate volumes. The appearance of white precipitate will be regarded as a positive reaction.

Anthocyanin

To the plant extract was added equal volume of methanolic HCl. Appearance of red or purple color indicates the presence of anthocyanidins.

Phenolic compounds

The formation of intense color in the extract, on adding 1-2 drops of 1% ferric chloride to the extract is considered as a positive reaction test.



Feb 2019
2018-19
(Research Article)
2018-19
4

Received on 25 May 2018, received in revised form, 09 September 2018; accepted, 20 September 2018; published on 01 February 2019

A STUDY ON PHYTOCHEMICAL COMPOSITION, GC-MS ANALYSIS AND ANTI-MICROBIAL POTENTIAL OF METHANOLIC LEAF EXTRACT OF *ALSTONIA SCHOLARIS* (L.) R. BR.

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Keywords:

Alstonia scholaris, Bio-active compounds, Spectrophotometer, UV-Vis, FTIR, GC-MS

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ABSTRACT: The present study was carried out to assess the various phytochemical composition, GC-MS analysis, and antimicrobial potential of methanolic leaf extract of *Alstonia scholaris* (L.) R. Br. by using different solvents. Phytochemical analysis revealed the presence of alkaloids, coumarins, flavonoids, glycosides, phenols, quinines, saponins, tannins, steroids and terpenoids. Susceptibility testing by Agar well diffusion assay showed significant antimicrobial activity with ethyl acetate and methanol extracts of leaves against bacterial strains such as *Bacillus subtilis*, *Bacillus cereus*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Escherichia coli* and fungal strain *Candida albicans*. The methanolic leaf extract exhibited better antimicrobial activity than ethyl acetate extract. The UV-Vis, FTIR, and GC-MS have been employed to characterize the bioactive compounds present in methanolic leaf extract of *Alstonia scholaris*. The crude extract was scanned in the wavelength ranging from 200-900 nm by using Perkin Elmer Spectrophotometer, and the characteristic peaks were detected. The FTIR spectrum confirmed the presence of alcohol, alkanes, amides, alkyl aldehydes, halogen, and aromatic compounds. The results of the GC-MS analysis provide different peaks determining the presence of 9 phytochemical compounds with different therapeutic activities. The major phyto constituents were oxime-methoxy-phenyl, 2-methoxy 4-vinyl phenol, 2(4H)-Benzofuranone 5, 6, 7, 7a-tetrahydro-4, 4, 7a trimethyl, (-)-Loliolide, Neophytadiene, Hexahydrofarnesyl acetone, Phytol, 4, 8, 12, 16-Tetramethylheptadecan-4-olide, and Squalene.

INTRODUCTION: The use of plants as therapeutic agents, in addition to being used as food, is age-long and there is a great awareness in the use and significance of these medicinal flora¹. Plants are a rich source of secondary metabolites with interesting biological activities.

In general, these secondary metabolites are an important source with a variety of structural arrangements and properties².

Natural products from microbial sources have been the primary source of antibiotics. But with the increasing recognition of herbal medicine as an alternative form of health care, the screening of medicinal plants for active compounds has become very significant³. The active substances of many drugs found in plants are secondary metabolites⁴ such as alkaloids, phenols, tannins, saponins, flavonoids, terpenoids, glycosides and lactones⁵.

	<p>DOI:</p> <p>10.13040/IJPSR.0975-8232.10(3).747-55</p>
	<p>The article can be accessed online on www.ijpsr.com</p>
<p>DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.10(3).747-55</p>	



The phytochemical analysis of the plants is commercially very important and holds great interest for pharma industry which pursues the discovery of novel drugs for curing various diseases. This increased importance makes the study of phytochemicals, and bioactive compounds are inevitable⁶. The knowledge of the chemical constituents of plants would further be valuable in discovering the actual value of folk medicines⁷. The plant kingdom holds a great promise for medicinal substances in many plant species and still unexplored.

Alstonia scholaris Linn. R. Br. (Apocynaceae) which is popularly known as the "Saptarni" or "The Devil tree" is an evergreen tree of the Indian subcontinent of South Asia and Africa. Different parts of the plant are used in medicines as antimicrobial, antihelminthic, astringent, anti-periodic, diarrhea, dysentery, antimalarial and bowel disorders⁸. *Alstonia scholaris* is one such plant showing multifarious pharmacological properties viz: diarrhea⁹, wounds and carache¹⁰, Leucorrhoea¹¹, dog bite¹², fever¹³, malignancy, jaundice, hepatitis, malaria, skin diseases¹⁴, astringent, thermogenic, cardiotoxic¹⁵ and antimicrobial activity¹⁶.

To validate the pharmacological properties of *Alstonia scholaris*, the present study was attempted to evaluate the phytochemical composition and the antimicrobial properties using various solvent extracts of leaf material. An attempt was also made to determine the bioactive compounds present in the *Alstonia scholaris* leaves with the aid of UV-Vis, FTIR and GC-MS techniques, which may provide an insight into the use of traditional medicine.

MATERIALS AND METHODS: Healthy *Alstonia scholaris* plant with plant authentication voucher specimen number ANUBH01190 is selected in the Botanical Garden of Acharya Nagarjuna University, Nagarjunanagar, Andhra Pradesh (India). Fresh leaves were collected and thoroughly washed with distilled water to remove dust particles and subjected to shade drying at room temperature for about two weeks. Dried leaf material was powdered with the help of a mechanical grinder and sieved. Powdered leaf material (150g) was Soxhlet extracted with hexane, chloroform, ethyl acetate, and methanol for about

12-18 h. The crude methanol extracts were evaporated by a vacuum rotary evaporator (Buchi Labortech Ag, model 1, R-215) under reduced pressure. The different solvent extracts were filtered and concentrated under reduced pressure in a rotary evaporator. The dried extracts were kept in the refrigerator at 4 °C until use.

Preliminary Phytochemical Screening: Shade dried plant material was extracted with hexane, chloroform, ethyl acetate, and 80% methanol, and preliminary phytochemical screening was done by using the standard tests^{17,18}.

Alkaloid Test (Dragendroff's Test): 2 ml plant extract was acidified with few drops of dilute hydrochloric acid. To this acidic medium, 1 ml of Dragendroff's reagent (Potassium bismuth iodide) was added. An orange or reddish brown precipitate produced indicates the presence of alkaloids.

Flavonoid Test (Shinoda Test): The presence of flavonoids was confirmed by treating the alcoholic plant extract with few fragments of magnesium ribbon and hydrochloric acid. The reaction mixture develops pink, scarlet or crimson red color, indicating the presence of flavonoids.

Saponin Test (Foam Test): 1 ml of each extract shaken with 10 ml of distilled water and it was agitated in a graduated cylinder for 10 min. The formation of persistent honey-comb like froth indicated the presence of saponins.

Quinone Test: A small amount of extract was treated with concentrated HCl and observed for the formation of a yellow color precipitate.

Tannin Test (Lead Acetate Test): To 2 ml of each extract add a few drops of 10% Lead acetate were added. The appearance of white precipitate indicates the presence of tannins.

Terpenoids and Steroids: 50% H₂SO₄ is added along the sides of the test tube containing a mixture of methanolic HCl and acetic anhydride. If there is any change in color, from green to blue-green (sometimes via red or blue) indicates the presence of terpenoids and steroids.

Phenol Test: When 0.5 ml of FeCl₃ (w/v) solution was added to 2 ml of rest solution, the formation of an intense color indicated the presence of phenols.



Original Research Article

DOI: 10.26479/2018.0405.41

**A STUDY ON ANTIMICROBIAL PROPERTIES OF HERBAL
NANOPARTICLES OF SELECTED MANGROVE PLANTS**

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ABSTRACT: Homogenous plant powder at nanoscale is the need of the hour for existing and newly emerging biomedical applications, and novel drug delivery with less side effects. Several methods are used for the synthesis of nanoparticles (NPs) such as physical, chemical, enzymatic and biological. Ball milling is one of the physical methods used for synthesis of homogeneous nanoparticles. The herbal nanoparticles were prepared from shade dried selected mangrove plant leaves i.e. *Avicennia marina*, *Rhizophora apiculata*, and *Excoecaria agallocha* of Krishna estuary by employing ball milling technique. The XRD analysis revealed that the obtained nanoparticles ranged between 14.38 to 28.70 nm. The nano size of the powdered leaf material was also confirmed by Transverse Electron Microscopy (TEM) and UV-VIS spectrophotometry. The FTIR analysis and EDS confirmed the presence of various functional groups and mineral elements present in the herbal nanoparticles. The nanoparticles with less size formed from *R. apiculata* showed maximum antibacterial and antifungal activity with a zone of inhibition of 26 mm on *Bacillus subtilis*. The present study confirms that smaller nanoparticles are found to exhibit maximum zone of inhibition when compared with larger particles.

KEYWORDS: herbal nanoparticles; mangroves; ball mill; Krishna estuary**Corresponding Author: Dr. Gorrepati Rosaliah* Ph.D.**Department of Botany and Microbiology, Acharya Nagarjuna University
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2018 Sept - Oct RJBPCS 4(5) Page No.498

1. INTRODUCTION

The 21st century revolutionized by the development of nanotechnology and is predicted to be one of the key technologies of this century [1]. Nanoparticles are defined with a particle size between 1 and 100 nm and their size probably occupying major role in all types of industries. Because of their astonishing properties many of these nanomaterials are playing a pivotal role in optics [2, 3], electronics [4] photocatalysis [5], automotive industry [6], water and air treatment [7], fabrics [8, 9], cosmetics [10], and health products [11]. Silver, gold, zinc, copper are generally used as composite metals in preparation of nanoparticles especially in the field of pharma and medicine as drug delivery agents. Of these composite metals silver is widely used metal in a number of biological activities. Silver has been known for its antibacterial effect since ancient times in Greece, Rome, and Macedonia [12]. Nowadays, silver is used for many bactericidal applications, such as wound healing [13], water treatment [14], and flower preservation [15]. Currently the most effective application for silver nanoparticles appears to be their usage as antibacterial/antifungal agent [16, 17]. In spite of silver nanoparticles occupied key role in human health system with wide medicinal uses, several studies have evaluated that Ag-Nps accumulation inside the body may lead to an irrecoverable end to the human life [18]. At present concerns have been raised concerning the environmental impact of nanoparticles and the possible human exposure. Nanomaterial risk assessment is mainly influenced by the mobility of nanoparticles [19] along with nanoparticle size, shape, and surface modification. In addition, due to the large surface area of nanoparticles pollutants can be easily adsorbed to nanoparticles. As nanoparticles such as silver nanoparticles can be absorbed by plants or other living organisms, the particles can reach the food chain [19]. The main nanoparticle uptake possibilities into the human body were via the skin, respiratory tract and gastrointestinal tract [19]. Nanoparticles absorbed via the respiratory tract can reach the lymph stream and the blood circulation [20]. Some studies showed that nanoparticles are able to pass through the blood-brain-barrier [21] and through cell membranes [22, 23] and can thus deposit in organs and interact with biological systems. It has been shown that silver nanoparticles can induce a toxic response of different mammalian cell lines [24-28]. Cytotoxic and genotoxic effect of silver nanoparticles in human cells revealed the dysfunction of mitochondrial as well as induction of reactive oxygen species (ROS) by Ag-nanoparticles results in DNA damage and chromosomal aberrations [29]. Because silver nanoparticles are used in many application fields and previous studies showed the possible hazardous effects of these materials it is important to develop silver devoid non toxic nanoparticles. Nowadays, new discoveries have helped to develop herbal drugs that have no side effects and have high therapeutic activities [30]. Herbs have been an integral part of our therapeutic use since thousands of years, but are still under investigation. Herbal extracts were used initially as crude drugs in the form of powder, tincture, poultice and other formulations [31]. The antimicrobial activity of herbal products has already been investigated in traditional

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ISI IMPACT FACTOR: 2.542

Globus An International Journal of Management & IT

A Refereed Research Journal

Vol 9 / No 2 / Jan-Jun 2018

ISSN: 0975-721X

Web of Science Group

A STUDY ON IONOSPHERIC VARIABILITY AND ITS CAUSES

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2018-19
JOM-300
2018

ISI IMPACT FACTOR - 2.542

Abstract

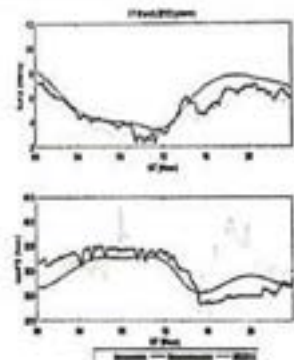
Investigations of ionospheric changeability were assigned inside the past about the hourly estimations of the essential frequencies and furthermore the comparing four month to month modifiers of the E layer, and of the F1 and F2 ionospheric layers. At mid-scope it had been discovered that, contrasted with the E layer and furthermore the F1 layer, the F2 layer is out and away the premier variable. Unlike the month to month middle estimations of foF and foF1, the month to month middle estimations of foF2 can't satisfactorily speak to the everyday inconsistency of the relating layer. As an outcome, middle expectations of foF2 would be liable to day by day forecast mistakes inside the request of 0.6 to 9.0 megacycles for each second once utilized for radio transmissions on a daily practice (Rush and Gibbs, 1973). From these outcomes, and moreover considering that the F2 layer is out and away the principal fundamental ionospheric layer for HF band radio correspondences, it rises that F2-layer changeability is of rich bigger significance than that of the E layer and F1 layer. Thus, throughout the years a few examinations have focused on the F2 layer and its fluctuation. Numerous investigations have as of now incontestable that F2-layer fluctuation occurs over a decent shift of your chance scales, from hours to years, and depends basically on 3 totally unique physical sources: star transition changes, geomagnetic movements, and meteorological procedures.

Keywords: Ionospheric, Layer.

Introduction

The star supply seems, by all accounts, to be fairly more indispenable for foF2 month-to-month and year-to-year fluctuation (i.e., following the multi year star cycle), notwithstanding assuming every day varieties of the F2-layer tallness territory unit observed to be connected with day by day varieties in star movement (Rishbeth, 1993), the ionospheric changeability identified with day by day star transition changes is measurable regarding the standardized fluctuation to concern three and consequently it's little looked at immediately as a result of meteorological impacts (18%).

Diurnal varieties of foF2 and hmf2 from the ionosonde information (green), remote learning (red), and IRI 2012 (blue) on seventeen March 2013 (a geomagnetic storm happened) at Boulder. (For elucidation of the references to paint amid this figure legend, the poster is talked the online variant of this content.)



Similarly indispenable zone unit the "meteorological impacts," i.e., those dynamic wonders spreading from the lower environment. Elective examinations, intended to work out that part of the found F2-layer inconsistency might be ascribed to the different causes, demonstrated that the brilliant sources zone unit tantamount the geomagnetic sources.

Review of Literature

Anja Nagar et al., (2015) This study presents relate

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degree investigation of the F-locale fluctuation of the ionospheric parameters (foF2 and M (3000) F2) at 3 low scope stations all through low star movement periods from Jan 2006 to December 2016. The diurnal, occasional and day by day attributes of these ionospheric F-district parameters are considered altogether. With the use of co relational insights examination we have processed the relationship between's the variety of those parameters and diverse variables comparing to the star radio motion 10.7cm (F10.7) and furthermore the geomagnetic AP list. It's been found that the greatness of the inconsistency of proliferation parameter M (3000) F2aresmoother and littler than all things considered of foF2. It's conjointly found that for every parameter there aren't any outstanding changes in day by day fluctuation with geomagnetic action all through low star action.

Aana Depueva et al., (2011) The temporary review of variety of recent publications relating to pre-earthquake anomalies of part segatron density is given. It's shown that the consequences of earthquakes with their epicentres situated at completely different latitudes area unit discernible within the low-latitude part. The study analyses the retrospective plasma frequency knowledge obtained by a shelter deck ionosonde aboard the satellite Alouette one at the height height of the ionospheric Appleton layer before many study earthquakes. These is area unit the earthquakes of magnitudes $M \geq 6$ that have occurred within the year's longitudinal zone with their epicentres situated among the $\pm 20^\circ$ vary of magnetic dip. Bottom sidionograms of near ionospheric stations Huancayo, La Paz, Talara and Bogota are used. Solely the information for quiet geomagnetic conditions area unit thought of. The most peculiarities of the F peak segatron density modification at low latitudes area unit summarized. Their attainable clarification among the framework of already existing approaches is planned.

Bitup Govern Kalita et al., (2015) The qualities of the F2 layer parameters NmF2 and h_pF2 over Dibrugarh (27.5° N, 95° E, 17° N geomagnetic, 5our3° plunge) estimated by a Canadian Advanced Digital Ionosonde (CADI) for the measure of August 2010 to Gregorian date-book month 2014 zone unit reportable for the essential time from this low mid-scope station lying among the daytime pinnacles of the longitudinal recurrence 4 structure of central irregularity (EIA) round the northern edge of peculiarity peak. Equinoctial unevenness is unmistakably found at all star action levels while the high twelve winter inconsistency is found exclusively all through high star movement years and vanishes all through the brief dusk in star action in 2013 anyway morn winter peculiarity will

be found even at direct star action. The NmF2/h_pF2 varieties over Dibrugarh region unit thought about immediately of Okinawa (26.5° N, 127° E, 17° N geomagnetic), and furthermore the eastbound proliferation speed of the frequency four longitudinal structure from 95° E to 127° E is measurable. The speed is observed to be on the purpose of the hypothetical speed of the frequency four (WN4) structure. The relationship of day by day NmF2 over Dibrugarh and Okinawa with star movement shows diurnal and regular contrasts. The specific best relationship in daytime is found all through the moon hours in equinox. The connection of day by day NmF2 (direct or non-straight) with star movement shows change. a tendency for intensification with star action is found inside the morning period of time period) and late night measure of vernal equinox and furthermore the post sunset time of December inestimable time. NmF2 immersion result is found exclusively inside the high twelve measure of equinox. Non-straight variety of nonpartisan piece at higher elevations and variety of recombination rates with star movement by means of temperature reliance is likewise in regards to the non-direct pattern. The hour time most NmF2 over Dibrugarh shows higher relationship with tropical electrojet (TEJ) than with star action and, in this way, extraordinary failure scope NmF2 exceed is arranged taking each star movement and EEJ quality under thought.

B. Jayachandran et al., (2004) The ionospheric square thickness τ illustrated as a size connection of the entire segatron content to the F-locale top segatron thickness (NmF2) has been relate degree analysed all through the star most (1981) and least (1985) periods of an exceptional, the 21st, star cycle. Hourly estimations of policeman and NmF2 gathered at Hawaii (low-scope), Boulder (mid-scope) and Goosebay (high-scope) territory unit utilized in the investigation. meteorology of the square thickness is portrayed by the diurnal, occasional, star and attractive action varieties of τ for the different scope zones. It's discovered that, for attractively calm long periods of star most, enlarged ionization of NmF2 relate degree policeman all through the daytime is amidst an expanded thickness of the part contrasted with the evening time for non-auroral scopes. Be that as it may, the switch is observed to be valid all through the star least remunerating policeman against a powerless evening ionization of NmF2. For the high-scope the evening square thickness is higher contrasted with the daytime for each the star stages. Proportions of day by day top to least estimations of square thickness differ from one.3 to 3.75 with the pinnacles of τ typically found at pre-dawn and post-dusk hours. The basic night-to-day proportions of τ change from zero.68 to 2.23. The

RESEARCH PAPERS PUBLISHED IN

2016-
17

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN: 2277-7881; IMPACT FACTOR - 3.318; IC VALUE: 5.16; ISI VALUE: 2.286
Volume 5 Issue 7(2), July 2016

July-16

2016-17



①

ECONOMIC AND POLITICAL ASPECTS OF SMALL STATES IN INDIA

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Abstract

Federalism as an idea and a process enriches democracy in a multinational/cultural country like India, as it tends to promote democratic values and temperament by recognizing, accommodating and protecting diverse regional identities and rights. The creation of smaller states would contribute to the federal agenda of enhancing democratic development based on decentralized governance and greater autonomy for units. The last few years have seen a constant tug of war between the champions of smaller states and larger states. There have been persistent demands for the creation of separate state. Political parties such as the BJP and the BSP are in favour of small States on the grounds that such States are administratively more convenient and give greater chance to the local populace in matters of governance.

Division of states means that every state will have its own leaders. By simple maths, there will be more efficiency in the administration and less pressure of performance on the governance. Better administration fuels growth. It is a known fact that the capital city is where the people of the state go to air their grievances as all major government offices, judicial houses like state high courts and political quarters are housed there. In a larger state, the problem is the allocation of funds by the centre can never be evenly distributed. So some parts stand to lose and thus remain backwardly developed, while the part which holds maximum political affiliate gains. Dividing states definitely solves this problem. A small state is likely to face limitations in terms of the natural and human resources available to it. Moreover, it will lack the kind of agro-climatic diversity required for economic and developmental activities. All these factors would only make it more dependent on the Centre for financial transfers and centrally-sponsored schemes. A new small state may find itself lacking in infrastructure (administrative and industrial), which requires time, money and effort to build. There is massive amount of infrastructure needed for building up new capital and to make new states self-sufficient. Mobilizing capital required for such big infrastructure setup is a herculean task, which will add more pressure on the already dwindling fiscal reserves of India. Rather a systematic and planned approach for development within the current state can handle the issue of growth better than division.

INTRODUCTION:

The Indian 'model' of federalism has several marked differences from the classical federal models one finds in countries like the United States, Canada, and



Australia. One notable difference has been the unilateral power of the union parliament to reorganize the political structure of the country by forming new states and to alter the areas, boundaries or names of existing states. Despite having the constitutional power, overwhelming concern for nation-building and economic reconstruction based on the development planning model, initially dissuaded the national leadership from conceding to demands for the creation of smaller regional states. Even states formed based on language, an accepted basis of the formation of independent

Nation-states in 19th century Europe. Only after India witnessed popular unrest, were linguistic states created in the late fifties and sixties, and this process remained incomplete. During the last few years have seen a constant tug of war between the champions of smaller states and larger states. There have been persistent demands for the creation of separate states of Telangana in Andhra Pradesh, Vidharba in eastern Maharashtra, Bodoland and Gorkhaland in the North East, etc. Mayawati even proposed to divide Uttar Pradesh into four smaller states - Purvanchal, Bundelkhand, Awadh Pradesh and Pashchim Pradesh. Political parties such as the BJP and the BSP are in favour of small States on the grounds that such States are administratively more convenient and give greater chance to the local populace in matters of governance.

The recent announcement by the congress government declared that a new state Telangana by separating from Andhra Pradesh, everyone in India started to discuss about the advantages and disadvantages of small states. In this present paper attempt has been made to analyze the Economic Prospects and problems of small States.

OBJECTIVES:

1. To analyze the Economic and Political aspects of Small States.
2. To analyze the advantages and disadvantages of Small States.

NEED FOR STUDY:

Some of the public argues that the division of states into smaller states is nothing but political drama for cheap electoral gains. It's just because of their vested interest they try to rake up the issue of caste, creed and insist a sense of insecurity in their minds and even go to the extent of saying that bifurcation of the state is the only viable option to elevate their standard of living which the present government is not focusing upon.

Contrary to this some argues that there would be chances of better governance and administration, better government policies, better use of funds allocated by government etc., as there will be less population. They also argue that Smaller the state betters the management of it. "Federalism is not only good politics but also good economics."

2016-17



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Volume: 3rd & Issue: 11th (July - September 2016) PP: 41-48 Date: 25-09-2016

TRIBAL EDUCATION AND INCLUSIVE GROWTH

By: Mr. A. Venkata Ramesh

Sep-2016
②

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2016-17
Sep-2016
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Author's Introduction:

Sri. A Venkata Ramesh was born on 10-08-1962 at Eluru, west Godavari district, Andhra Pradesh in India. He did his M. A. in Economics. He joined as DL first at Sri Ramachandara Govt. Degree College at Kothagadam. He has completed 28 years of teaching experience. So far he has participated in 4 national seminars. Presently he is serving at Government Degree College at Sathupally in Khammam District.

Abstract:

Inclusive growth is a process across all strata of society interests of benefits flowing through more employment, income and better living standards to those sections of society which have been over looked in the growth process. The XI five year plan defines inclusive growth to be "A growth process which yields broad based benefits and ensures equality of opportunity for all". Since then the government of India has been striving to make growth faster and more inclusive. Tribals are 10.43 crores in India accounting for 8.06 percent of the population. They are relatively more backward in education and health status even when compared to the scheduled castes, the other neglected community. Inclusive growth becomes meaningful with the expansion of educational facilities to the tribal as education alone can ensure all round development of the Indian tribals. The tribals on their part are still innocent and have limitation in

demanding their due share. It is high time to think seriously about tribal children, their health, education and overall growth. School statistics 2011 show that the dropout rates are relatively more among the ST boys and girls when compared to the general population. In secondary and higher levels of education both enrolment rates and dropout rates are not favourable to promote tribal education. For this study 100 respondents from two villages, Bhogamavolu Thanda and Laxshita Thanda of Nangaraju Mandal in Khammam District are randomly selected as sample, and to examine the Socio-Economic conditions, reasons for dropout rates and education level of the Tribal in the study area.

Keywords: National Policy on Education, Scheduled Tribes, Inclusive Growth, dropouts, Constitutional Provisions.

Page 41

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Title of the Paper: TRIBAL EDUCATION AND INCLUSIVE GROWTH / Author: Mr. A. Venkata Ramesh
Pages: 41-48 / Date of Publication: 25/09/2016



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Introduction:

Inclusive growth is a process across all strata of society in terms of benefits flowing through more employment, income and better living standards to those sections of society which have been overlooked in the growth process. The XI five year plan defines inclusive growth to be "A growth process which yields broad based benefits and ensures equality of opportunity for all". Since then the government of India has been striving to make growth faster and more inclusive. Tribals are 10.43 crores in India accounting for 8.06 percent of the population. They are relatively more backward in education and health status even when compared to the scheduled castes, the other neglected community. National Policy on education in 1986, revised policy of 1992 launched special drive to improve the educational status of the scheduled tribes. Over the years there has been improvement but still enrollment of the tribal children in schools and dropouts are high. Since education is of vital importance for inclusive growth to be faster the status of the education of the tribal be improved.

The directive principles of the state policy of the Indian constitution provide free and compulsory education for all the

children up to the age of 14 years. Article 46 of the Indian constitution also states that "the state shall promote with special care of the education and economic interests of weaker sections of the people, particularly the scheduled castes and scheduled tribes and shall protect them from social injustice and all forms of exploitation". Indian Constitution has also provided reservations and special consideration to STs. Over the years, despite the constitutional provisions and reservations, education of the tribals has not improved when compared to the general population. It is just 63.1 percent as per the census figures of 2011 against the literacy rate of 74 percent the general population. The tribals on their part are still innocent and have limitation in demanding their due share. It is high time to think seriously about tribal children, their health, education and overall growth. School statistics 2011 show that the dropout rates are relatively more among the ST boys and girls when compared to the general population. In secondary and higher levels of education both enrollment rates and dropout rates are not favourable to promote tribal education. In technical education tribal children are limited and most of them end dropouts. Easy access, more opportunities and facilities should be provided to increase enrollment and to

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Title of the Paper: TRIBAL EDUCATION AND INCLUSIVE GROWTH / Author: Mr. A. Venkatesh Ramiah

Pages: 41-48 / Date of Publication: 25/05/2016



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2016-17

ISSN : 2349-9648
VOLUME III, ISSUE II(2), NOVEMBER 2016

DECADEL CHANGES IN THE CROPPING PATTERN IN THE TELANGANA STATE

NOV-16

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This paper is divided into two parts to facilitate the presentation, Part-I deals with the introduction, objectives and methodology and Part-II explains the discussions and results, major findings, suggestions and conclusions.

PART-I

Introduction

Telangana state came into existence on 2nd June 2014 as the 29th state of India under the Andhra Pradesh reorganization Act 2014. The state is spread over an area of about 1,15,000 sq.kilometers and its population is 3.53 crores as per 2011 census. It is situated on the Deccan plateau in the stretch of eastern sea board of the Indian Peninsula. The annual rainfall in the state is between 900 mm to 1500mm in the northern Telangana and 700 mm to 900 mm in the southern Telangana. The soil types in the state include chelaka, redsandy, dubba, deepred, loamy and they are more suitable for horticulture, plantation crops and vegetable and flower growing. The state has hot and dry climate as it is a semi-arid area.

As in many Indian states agriculture is important in Telangana state. Its share in GSDP in 2011 is 19.5 percent and its contribution to total employment is 56 percent as per socio-economic survey of AP 2012-13. Between 2004-2011 growth rate of agriculture has been 7.1 percent on an average. Net sown and gross cropped areas in 2011-12 were 46.2 and 57.2 lakh hectares respectively. Rice, jowar, millets and pulses are the main food crops while chillies, cotton, sugarcane and tobacco are commercial crops. Since 1990's a shift in cropping pattern has taken place in the state. Dug wells and Tube wells are important sources of irrigation followed by canals and tanks in the state.

Objectives of the Study

The primary objective of this research paper is to analyse the changes in the cropping pattern in the Telangana state over the years. Other objectives include cropping intensity, contribution to GSDP and employment and irrigation intensity in the state, since cropping pattern depends to a large extent on the availability of water.

Methodology:

Secondary data published by CESS, statistical abstracts of AP, socio-economic survey 2011-12, Area and land use statistics of AP and the like are used for the study. Simple averages and indices shall be used to analyse the data along with the crop intensity and irrigation intensity values. The study covers the entire state of



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Telangana over a period of four and half decades. The study makes an attempt to analyse decadal changes in the cropping pattern as well as irrigation potential.

Part-II

Discussions and Results:

Table-I here under shows the importance of agriculture in the state of Telangana in 2011. Contribution of agriculture and allied components to GSDP is 19.5 percent which is higher than that of all India share. About 56 percent of the workforce depends on agriculture of which cultivators are just 22 percent against 34 percent of agricultural labourers. Labour productivity in agriculture at constant prices (2004-05) is Rs 34,476 per annum and the trend of growth rate between 2004-11 is 7.1 percent per annum which is higher than that of the nation.

Table-I
Contribution of Agriculture to Income and Employment in Telangana State - 2011

S.No	Details	Share In percentage
1	Share of agriculture in GSDP (Constant prices 2004-2005) of which a) Agriculture crop output including floriculture. b) Animal husbandry (livestock). c) Forestry d) Fishery	19.5 percent 9.8 percent 5.6 percent 1.0 percent 2.6 percent
2	Contribution of agriculture to total employment of which a) Cultivators b) Agricultural labourers	56 percent 22 percent 34 percent
3	Labour productivity in agriculture (in constant prices of 2004-2005) (agricultural GSDP/workforce)	Rs 34476 p.a
4	Growth of agriculture (trend rate 2004-2011, percent per annum)	7.7 percent (7.1 percent)

Source: Socio-Economic survey, AP 2012-13, census of population 2011.

Table II as given below reveals the land use pattern in Telangana state between 1970-71 to 2010-11 (4 decades). The state has near one fourth of the land under forests and the changes are marginal. However, net sown area decreased from 51.5 hectares in 1970-71 to 46.2 hectares in 2011-12. It implies that agricultural land has been converted to non-agricultural use due to industrialisation and urbanisation. Gross cropped area decreased up to 2000-01 and then increased marginally in 2010-011 and 2011-12. The increase may be attributed to good rainfall during these two years. In the absence of canal irrigation agriculture in the state of Telangana depends mostly on rainfall and ground water.

TABLE II
Land Use Pattern Telangana State (In Lakh Hectares)

Year	Geo-geographical Area	Forest Area	Net Sown Area	Gross Cropped Area

2016
Characterization and Gamma Irradiated MA-EMA Copolymer by ESR and FTIR Techniques

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Abstract

Gamma irradiation effect of methacrylamide-ethyl methacrylate (MA-EMA) copolymer has been investigated by electron spin resonance (ESR) and Fourier Transform infrared (FTIR) spectroscopic techniques. The ESR spectrum observed for gamma irradiated MA-EMA copolymer has shown resolved hyperfine (h) pattern at lower temperatures (77K), while at higher temperatures the spectrum is appeared to be broadened. Fourier Transform infrared spectra of pure and gamma irradiated MA-EMA copolymer have been recorded for the copolymer irradiated to different radiation doses to ascertain chemical changes induced by gamma irradiation. The variation in intensity of 1420, 1600, 1250, 1160 and 1020 cm⁻¹ absorption bands is observed, which are attributed cleavage of ester, amide groups on irradiation.

Keywords: Electron Spin Resonance (ESR), Infrared (IR), Spectroscopy, Gamma irradiation, MA-EMA copolymer, radiation

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INTRODUCTION

Although various types of polymer materials are widely available, synthesis and characterization of new materials is still needed, to meet various scientific and technological applications. Polycrylates and acrylamide polymers and copolymers find applications in industry as well as science [1]. Homopolymer of methacrylamide is known to crosslink; while ethylmethacrylate homopolymer is reported to degrade under the influence of high energy radiation [2]. Thus, it is interesting to note the degradation characteristics of copolymer with methacrylamide and ethylmethacrylate as comonomers.

Electron spin resonance spectroscopy is a useful tool in indentifying the radical species formed on irradiation of polymers [3]. Infrared spectroscopy, together with ESR technique has been successfully used to probe radiation induced changes in polymers and copolymers [4]. In the present studies the authors have made an attempt to characterize gamma irradiation effects in MA-EMA copolymer by ESR and FTIR techniques.

EXPERIMENTAL METHOD

Synthesis and characterization of methacrylamide - ethylmethacrylate MA-EMA copolymer has been described by Sreenivasulu [5]. ESR spectra of irradiated copolymer have been recorded on a GEOL spectrometer operating at X-band frequencies and 100 KHz modulation. Infrared (FTIR) spectra of pure and gamma irradiated MA-EMA copolymer has been recorded on PERKIN-ELMER 283 model spectrometer and intensities of various absorption bands are noted. Potassium Bromide (KBr)-MA-EMA copolymer pellets have been used for IR measurements. Gamma irradiations were carried out with a cobalt 60, gamma source at a dose rate of 0.2 Mrad/h in air at room temperature (RT).

RESULTS AND DISCUSSION

ESR spectrum of Gamma Irradiated MA-EMA copolymer at liquid nitrogen temperature (LNT) is as shown in Figure 1; whereas the spectrum recorded at RT as shown in Figure 2.