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3.3.1 Number of research papers published per teacher in the Journals notified on UGC CARE list during the last five years

Academic Year 2021-22

Sr. No.	Title of paper	Name of the author/s	Name of journal	ISSN number	Page No.
1	A Permanent Solution to Baliaja (Farmer's) Sore Wound: Need of Time	Mr.Akshay Kale	International Journal of Science and Engineering Development Research	2455-2631	04-06
2	Investigation of Effect of Heavy Metal of Vegetable Plant Growth	Miss.Yashoda Neel	International Journal of Innovative Research In Technology	2349-6002	07-10
3	Mass Production And Quality Control of Azotobactor	Miss.Yashoda Neel	International Journal of Novel Research And Development	2456-4184	11-23
4	Phytochemical Investigation And Pharmacological Activities of Boerhavia Erecta	Mr.Navnath Warule	International Journal of Current Science	2250-1770	24-30
5	Toxic Effects of Mundulea Sericea Leaf Extract on Tilapia Sparramanii, Based on The Histology of Gills	Mr.Navnath Warule	International Journal of Current Science	2250-1770	31-36

A Permanent Solution to Baliraja (Farmer's) Sore Wounds: Need of Time

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Abstract: Agriculture is the backbone of the Indian Economy. One important thing that has always been felt in Indian planning is agricultural policy and industrial policy, if there is any conflicting relationship between them and what effect they have on each other. In economic planning, it is necessary to find the interrelationship of various factors in the economy and think about the results, but in Indian economic planning, the economist thinks and plans and the thoughts and researches done by the researchers do not show any relationship between the actual events and their results. Thinkers do research in one direction, think in another direction and prepare a planning package. Is it right that this has been deliberately ignored, that's why it is necessary to take a long-term solution to the grievances of the farmers. There are laws to collect a portion of farmers' income as tax. There are no laws to give to farmers. This is the misfortune of Indian farmers. The Reserve Bank says that there is a risk of inflation in the economy after giving loan waiver to farmers, which is not true, because the money received in the form of loan waiver will be deposited in the accounts of the lending banks, it will not reach the common people, so the money received by the banks will be subject to quantitative and qualitative data of the Reserve Bank. Of fall control. The guaranteed price is just a farce because if the price increases more than that, the export will be stopped, the export tax will be increased, but if the price falls, then the whole system will take the role of watcher. No decision is taken, so if the system can't do anything after the agricultural price goes down, then who gave the authority to reduce it after the price goes up? You are our representative. A thought on why it is time to legislate the crime of low bail. If there is a need for contemplation. Loan waiver to farmers is to speed up the country's economy. To those who look at the agricultural problem with an earful, the farmers look at this agricultural problem. I think the government needs to take some decisions.

Keyword: Baliraja agricultural problem farming agricultural problem

Introduction:

Agriculture is the backbone of the Indian Economy. One important thing that has always been felt in Indian planning is agricultural policy and industrial policy, if there is any conflicting relationship between them and what effect they have on each other. In economic planning, it is necessary to find the interrelationship of various factors in the economy and think about the results, but in Indian economic planning, the economist thinks and plans and the thoughts and researches done by the researchers do not show any relationship between the actual events and their results. Thinkers do research in one direction, think in another direction and prepare a planning package.

On June 2017, farmers' strike in Puntamba started and then farmers across the state showed what a strike for farmers' demands is. All those who were outside the ambit of the strike became speechless, lost their sleep, and before the government knew it, the wildfire of the strike was burning all over the state. Except for the BJP sitting in a cold room, everyone wanted to jump into the fire pit of this strike or become a victim. Is it right that this has been deliberately ignored, that's why it is necessary to take a long-term solution to the grievances of the farmers. There are laws to collect a portion of farmers' income as tax. There are no laws to give to farmers. This is the misfortune of Indian farmers. The Reserve Bank says that there is a risk of inflation in the economy after giving loan waiver to farmers, which is not true, because the money received in the form of loan waiver will be deposited in the accounts of the lending banks, it will not reach the common people, so the money received by the banks will be subject to quantitative and qualitative data of the Reserve Bank. Of fall control by controlling the aid, the appropriate effect can be brought about on the economy.

Long Term Tolution to Baliraja (Farmer's) Sore Wounds:

There is an old saying in Marathi 'Shetkari karjat janmto ani karjatch Marato' which means "Farmer takes the birth in debt and die in the same condition". This was the position of farmers before independence and it still continue after 75 years of independence. I have tried to summarize causes of suicides and suggested permanent remedies on farmer's sore wounds in the paper. Farmer's suicide is the main issue in the Indian economy as well as the world wide issue. Central and State Government have announced the

14. The government should deliberately make the best quality seeds available at a low price before the season of the agricultural crop.
15. It is necessary for the government to make a conscious effort to think about the fertilizer subsidy and think about how the prices of fertilizers can be made available at an affordable rate. 16. Appropriate penal action should be taken against the seed supplying company to deter the private bogus companies.
17. In relation to agriculture, due to the greed of revenue, the government should close the complicated system of separate 8A and 7 by 12 and stop the open looting by the officials of the farmers by making the process easy for the farmer. Have come for this, work should be done within the deadline to separate 7 by 12 and 8 A by giving orders on time. Discussion should be done, it is not right to take a decision without discussing it with anyone, but as a representative of the farmers, you should take a comprehensive decision yourself.

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relief packages to the suicide affected families in Maharashtra but not any change in the farmer's suicide frequency and situation. NABARD is the implementing agency of the package provided by Central Government. In the budget of 2008-09 Honorable Finance Minister has also announced massive write off to the tune of Rs.60000 crore of the outstanding loan of small & marginal farmers and OTS for other farmers.

Statistics say nearly 4, 00,000 farmers committed suicide in India between 1995 and 2018. In over two decades of The Statistics focused on data on farmer's suicide to human grief, struggle, brave fight-backs and several complex, crumbling worlds within that world – things that I hope to show in this narrative. Around the mid-1990s, a liberalized and globalized economy engulfed great many unsuspecting farmers in problems that were beyond their comprehension, triggering suicides that surged in the early 2000s. In the cotton hinterland, I was waking up to life and living against the backdrop of premature deaths of young and old farmers and a new India taking shape in the new millennium. India's economy was now fuelled by sectors other than agriculture, like services.

1. First government measures should be an important and sustainable policy to increase exports and increase prices as an alternative to guaranteeing farmers' agricultural produce. Other than this option is just bandage Yes, other solutions work, but only temporarily There is no

2. The government does not have any definite policy regarding the farm electricity bill. During drought, there is no water from wells, bore wells, electricity bills are paid at random. Due to this, the electricity bill arrears increased. How is the overall electricity bill whether the size of the farm land is small or large? Electricity bills were paid even though electricity was not used during the drought when there was no water. If electricity Distribution Company is informed and electricity bill is paid according to usage, there will be no injustice to the farmers. All the meters installed for electricity farming are bogus and closed, this seems to be an injustice to the farmers.

3. The concept of farmers came forward, but many farmers spent for the farm, but due to lack of funds and the subsidy received is very less than the total cost, the farms remain incomplete. Expected product is getting despite spending money. As there is no, the farmer is in financial crisis. This needs to be thought and studied.

4. It is said that the milk brand of the leader's production (the turnover is large, the government's brand is small, the milk price is not correct that the ruling party and the opposition are trying to throw mud at each other. Although Mahan and milk is a government brand, milk manufacturers have tried to stop it from time to time, but today they are throwing mud at each other. It is the government's job to give a fair price to milk rather than doing it possible.

5. The guaranteed price is just a farce because if the price increases more than that, the export will be stopped, the export tax will be increased, but if the price falls, then the whole system will take the role of watcher. No decision is taken, so if the system can't do anything after the agricultural price goes down, then who gave the authority to reduce it after the price goes up? You are our representative. A thought on why it is time to legislate the crime of low bail.

If there is a need for contemplation.

Loan waiver to farmers is to speed up the country's economy. To those who look at the agricultural problem with an earful, the farmers look at this agricultural problem a situation arose to solve problems with the leaders directly. It is a big question mark why there has been such a deliberate neglect of the breadwinner, the breadwinner of our world. It is said that 'India is a rich 'country' of poor people. It is not necessary to waive off the loan of the farmer, but as a farmer, I think the government needs to take some decisions.

A Permanent Solution to Baliraja (Farmer's) Sore Wounds:

1. Farmers who have availed farm loan waiver earlier should not be given loan waiver again.
2. Farmers who have availed the benefit of other subsidy scheme of the government should not give loan waiver again if they have actually received full subsidy.
3. A farmer who is in arrears should not be in government employment anywhere. Loan waiver benefit should not be given in case of government employment.
4. Loan waiver should be given to dryland farmers.
5. This loan waiver should be given to the farmers who have taken loans for horticulture development, but could not harvest due to natural calamities. For that, the necessary crop record is required.
6. If the farmer's family whose parents have died due to some reason, then loan waiver should be given to the said family.
7. Loan waiver should be given to families whose parents are blind and disabled.
8. Loan waiver should be given to the families of soldiers who died on the Indian border.
9. Those families who have been affected by dams and have been resettled in new places should get this loan waiver.
10. If the farmers who have fully repaid the loan till date, 10 percent of the repaid loan or Rs. 11. In order to help the farmers who have not taken loan till date, their electricity bills for two years will be waived as subsidy or if the full electricity bill is paid, the amount paid as subsidy will be given as subsidy.
12. Old age pension scheme should be started for landless families. Also school admission fee should be waived for children from landless families.
13. If orchards, orchards are destroyed due to drought, floods, storms, pestilence, or hailstorms, then this loan should be waived.



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CONFIRMATION LETTER

Ref No : IJIRT 157136 / Volume 9 / Issue 6 /

**To,
Neel Yashoda Ramesh
Published in : Volume 9 | Issue 6**



Subject: Publication of paper at International Journal of Innovative Research in Technology

Dear Author,

With Greetings, we would like to inform you that your paper has been successfully published in the International Journal of Innovative Research in Technology (ISSN: 2349-6002). Thank you very much for your patience and cooperation during the submission of paper to final publication process. It gives us immense pleasure to send you the certificate of publication in our Journal. Following are the details regarding the published paper.

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Thank you very much for publishing your article with IJIRT. We would appreciate if you continue your support and keep sharing your knowledge by writing for our journal IJIRT

Neel Yashoda Ramesh

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Investigation of Effect of Heavy Metal of Vegetables Plant Growth. (*Trigonella Foenum groecam*)

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Abstract- "Waste materials are the major source of the soil pollution originates from mining, chemical, metal processing industries, heavy metal are insentric components of the environment with essential & non-essential both types. "Soil polluted with heavy metal are become common due to increase in geologic & androgenic activities. Heavy metal such as- $ZnSO_4$, $CuSO_4$, $MgSO_4$, cr, Ni, Magnase, Iron, Mercury is major environmental pollutants. The heavy metal effect of vegetables and plant growth through soil pollution, air pollution, water pollution, air pollution, water pollution were briefly discussed in this articles.

Keywords:- Heavy metal, toxicity, effect of plant growth, vegetables, heavy metal pollution & soil pollution, accumulation health risk.

INTRODUCTION

Soil pollution by heavy metal is great concern to public health. The source of heavy metal in plant is environment in which the grow and their growth medium (soil) from which heavy metal are taken up by roots or foliage of plants. Heavy metal are toxic because they tend to bioaccumulation in heavy metal such as- lead (pb), cadmium (cd), arsenic (As) ect. have toxic effect on human health. Heavy metal contamination of vegetables cannot be underestimated as these food staff are important component of human diet. Vegetable is rich source of vitamins, mineral & fibres & also have antioxidatives effect heavy metal contamination of food items is one of the most important aspect of food quality assurance (Marshall 2004, Radwan & Salma, 2006, Khan et al 2008). Heavy metal accumulation in vegetables plant growth [*Trigonella Foenum gracecum*] vegetables constitute as an important part of the human diet since, they contain carbohydrates, protein as well as vitamins, minerals and trace elements. The objective of present work to focus on biomonitoring contamination of heavy metal different vegetables.

SCIENTIFIC CLASSIFICATION

Kingdom:- Plantae

Order:- Fabales

Genus:- *Trigonella*

Species:- *Foenum gracecum*.

Effect of heavy metal on vegetables plant growth:-

Nature of heavy metal-

Heavy metal are natural components cannot be degraded or destroyed biologically. The latter group comparing both essential and non-essential elements including toxic element.

Essential heavy metal:-

Some heavy metal is essential for plants and vegetables their availability in medium very and metal such as.

Effect of heavy metal:-

The heavy metal are available for plants Aptech are those present as soluble components in the soil solution these heavy metals are hazardous to vegetables *Trigonella Foenum gracecum*. "heavy metal are effective to plant growth such as- Cu, Zn, Mg, Co, Ni,ect.

EFFECT OF HEAVY METAL

(1) Effect of $CuSO_4$ (copper) :-

Copper is essential metal for normal plant growth and development vegetables. It is a potentially toxic copper(cu) considered as micronutrient for plants and important role in ATP synthesis.

(2) Effect of zinc ($ZnSO_4$) on plant:-

Zinc is to help Produce chlorophyll zinc deficiency usually causes leaf discoloration called chlorosis tissue of vain to turn yellow zinc toxicity plants limited the growth of both roots and shoots.

(3) Effect of Cadmium in plants (Cd):-

The permissible limit of cadmium in agricultural soil is 100 mg soil [70] plant grows in soil containing high level of Cd show visible symptoms of injury reflected in the term of chlorosis growth inhibition growing of root tips and finally death [72,73]. Cd has been shows with the Aptech transport and

MATERIAL AND METHOD

Material :-

Trigonella plant was produced from the local vegetables market. Good quality fresh leaves were picked manually and washed to remove the adhering to dehydration Trigonella Foenum plants heavy metal Cr, Zinc, $Cuso_4$ ect.

Chemical analysis and quality control :-

Soil pH was measured in 1:2.5 of soil water suspension using a glass electrode. Soil organic matter (OM) content was determined by oxidation with potassium dichromate and colometric determination [33]. Cation exchange capacity (CEC) was a determined using the ammonium acetate metal after washing weight alcohol standard reference rises of this metal where 92%, 94%, 98% ,100%.

Statistical analysis :-

In this study, selected statistical method ANOVA, conserlation analysis and principle component analysis where use to determine the heavy metal accumulation

and its controlling factors and to identify the origin of days meta in soil sample collected.

METHODS

Preparation of samples :-

The seeds of selected plants are sown in polythene bags container. When after the seeds are grown that treatment of heavy metal. $Mgso_4$, $Znso_4$, $Cuso_4$, cordium, lead. Plants in constant time intervals.

Preparation of chemicals :-

Five rate of $Mgso_4$, $Znso_4$, $Cuso_4$, cordium, lead. (0.1N,0.2N,0.3N,0.4N,0.5N) prepared out and applied. When after seed grown at constant time interval after few days' morphological observation of plants i. e:- shoot length and roots length were recorded.

Observation Table: Accumulation of $Znso_4$, $Mgso_4$, $Cuso_4$, Metal (Weight of mg/kg) in water methi by different concentration of heavy metal treatment. 5 Diff. Conce. Solⁿ prepare - $Znso_4$, $Mgso_4$, $Cuso_4$ (0.1N,0.2N,0.3N,0.4N,0.5N)

Plant Name	Control	Treatment $Znso_4$ (mg)		$Mgso_4$ (mg/kg)			
		Root length	Shoot	Root length	Shoot	Root length	Shoot
Trigonella Foenum graecum							
1	0.1N	2.3	2.8	2.3	2.8	2.7	3.5
2	0.2N	2.9	2.6	2.8	2.9	2.8	3.4
3	0.3N	3.4	3.12	3.4	3.5	3.4	3.5
4	0.4N	3.9	3.8	3.8	3.8	3.8	3.9
5	0.5N	3.10	3.9	3.9	3.9	4.2	4.3

CONCLUSION

From the result off present study is clear that evaluated level of metal accumulation in edible parts of visitable plants is mainly from there growth habit like water and soil in in around industrial area of Allahabad long term conception of these metal different disease like brain and kidney damage cancer in human body.

ACKNOWLEDGEMENT

The another would like to place in record their social tables social to UGC New Delhi.

RESULT AND DISCUSSION

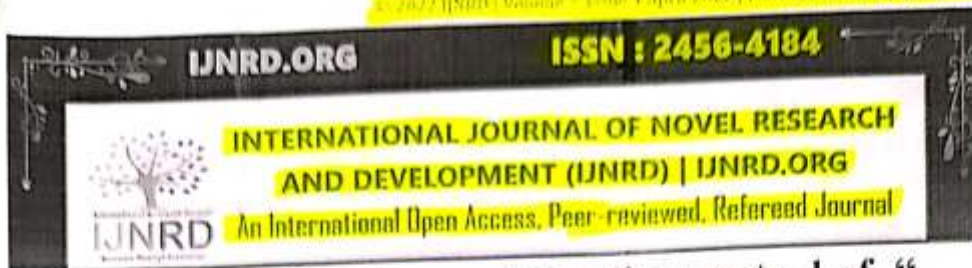
Heavy metal concentration shoot variation among different vegetable. The variation in heavy metal concentration in vegetable of same site may be describe to difference in their morphology and physiology for update, exclusion, accumulation. Among leafy vegetable zinc (Zn)concentration was highest in Trigonella Foenum graecum. The concentration of magnesium (Mg) was less in both plants.

RESULT AND DISCUSSION

- Heavy metal concentration showed variations among different vegetables.
- The variation in heavy metal concentration in vegetable of same site may be ascribed to the difference in their morphology and physiology for uptake, exclusion, accumulation.
- Among leafy vegetable Zn concentration was highest in *Trigonella Foenum graecum*.
- The concentration of Mg was less in both plant

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“ Mass Production and Quality control of “ *Azotobacter*”.

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Abstract –

“The main objective of this paper to form a manufacturing facility of microbial fertilizers.”
Bacteria required nutrients for their growth –such as a)organic carbon source b)variety of other elements dissolved in water c) Nitrogen source , BGA (blue green algae) that can fix atmosphere carbon dioxides does not require source.A medium is an aquatic solutions of a variety of organic and inorganic compounds that can supplements the requirement for the growth of different micro-organism genrally the medium is of two types-1) Genral media 2) Specific media . genral media is constituted for the growth of most of the micro-organism such a medium contains all the ingredients required for the growth of any micro-organism . the quality of inoculum depends on the vible cells count and the presence or absence of contaminents. The good culture must contain about vible cells of culture. The contaminations are permisible at dilution. In case of Azotobacter the enumeration of cells density contaminants are important in the production of microbial biofertilizers. Biofertilizer is the substance which contains living microorganism.

Key word-

Biofertilizers, inoculum, Quality control, Azotobacters , Phosphobacter , Cyanobacteria, Azolla, Rhizobium , Endophytic Dizotrophs and PSB are presently used as Biofertilizer.

Introduction-

Industralization and green revolution have brought about an increase in Productivity but they have also resulted in massive abuse of environment. extensive use of chemical fertilizer to improve plant health and productivity and for control of pathogen has disturb the ecological balance it has leads to depletion of nutrients, hence thereis a need to search alternative strategies to improve soil health without causing damage to enviornments as well as soil. Biofertilizer are the important as they are eco- friendly , non – hazardous and non- toxic. biofertilizer refers to products consist of selected and beneficial living microbes which are added to soil as microbial inoculants.

Several micro-organism like *Cyanobacteria*, *Azolla*, *Rhizobium* , *Endophytic Dizotrophs*, and PSB are presently used as biofertilizer .this microbes are known to improve plant health by increasing availability of micronutrients .The biofertilizers harness atmospheric nitrogen with the help of specialized soil microbes. The biofertilizer can be make significant contribution towards the development of strategies for productivity improvement.

Present study deals with isolation and mass production of *Azotobactor* bacteria and there use as a biofertilizers.

Types Of Biofertilizers:-

A)Nitrogen Fixer

(a) Non-symbiotic organism – *Azotobactor*

(b) Symbiotic organism – *Rhizobium* , *Acetobactor*

(B) Phosphate solubilizing bacteria – *Bacilus* , *Pseudomonas*

(C) Celluolytic and lignolytic Fungi- *Aspergillus* , *Trichoderma*

Introduction To Azotobactor-

Scientific Classification-

Kingdom – Bacteria

Phyllum – Proteobacteria

Class- Gammaproteobacteria

Order- Pseudomonadales

Family- Pseudomonadaceae

Genus- Azotobacter

Species- A. chroococcum

SPECIES OF AZOTOBACTER-

1. A. chroococcum.
2. A. agilis
3. A. paspali
4. A. vinelandii
5. A. armeniacus
6. A. nigricans
7. A. beijerinckii

This genus has wide variety of metabolic abilities including atmospheric nitrogen fixation and convert it into ammonia. Most of nitrogen fixing bacteria form symbiotic association with leguminous plant. Azotobacter is free living in soil, water and do not form symbiosis. Azotobacter spp. Are easy to isolate from soil by growing on nitrogen free media, where the bacteria are forced to use atmospheric nitrogen gas for cellular protein synthesis. Azotobacter spp. Are polymorphic i.e different size and shape, about 1 -2 μ m wide, 2-10 μ m long arrange in pairs. There are about 7 spp. Of Azotobacter are found. Out of this A. chroococcum is most widely distributed. Azotobacter is a gram negative bacteria. It is present nearby all monocots associated with soil.

Old cells have ability to form thick walled, optically refractile cysts, which have capsules consist large amount of alginate and other polysaccharides enhance their resistance to heat, desiccation and adverse environmental conditions. Under favorable condition the cyst germinate and grow as vegetative cells.

Chemical Constituion of Jansen's Medium(500ml)

Sr.No	Chemical	Weight(gm)
1	Sucrose	10
2	CaCO3	5
3	MgSO4	0.25
4	K2HPO4	0.5
5	NaCl	0.25
6	FeSo4	0.25
7	Agar	6

Observations:-

size	2-10um long,1-2um wide
colour	Brown
consistency	slimy
motility	Motile
Margin	Smooth
Opacity	Turbid
Elevation	convex
Pigment production	Present

Microscopic Observation:-

Character	Observation
Gram name	Gram negative
Morphology	Rod shape

Mass Multiplication of Azatobactor-

1. Mother coulture Production
2. Large scale production of culture
3. Carries for Azatobactor

4. Quality control of lignite powder
5. Mixing of culture with carriers
6. Packing
7. Quality control of Bofertilizer

Control -

Plate no	Shoot length (cm)	Root length (cm)	Total	Fresh weight (gm)	Dry weight(g m)
1	3.8	4.4	8.2	5.8	0.5
2	2.5	4.5	7	6.1	3.6
3	2.7	5.5	8.2	6.2	3.1
Mean	<u>3</u>	<u>4.8</u>	<u>7.8</u>	<u>6.0</u>	<u>2.4</u>

Culture no. 1

1% solution:

Plate no	Shoot length (cm)	Root length(cm m)	Total	Fresh weight(gm)	Dry weight(g m)
1	3.2	4.5	7.7	7.1	2.9
2	3.4	4.9	8.3	7.3	2.8
3	4	4.6	8.6	7.4	2.5
Mean	<u>3.5</u>	<u>4.6</u>	<u>8.2</u>	<u>7.2</u>	<u>2.7</u>

4% solution:
Plate no / cm

2 % solution

Plate no	Shoot length (cm)	Root length(cm)	Total	Fresh weight(gm)	Dry weight(gm)
1	3.5	5.1	8.6	8.4	2.6
2	3.3	3.9	7.2	7.9	2.44
3	3.6	5.	8.6	5.6	2.54
Mean	3.4	4.6	8.1	7.3	2.5

3 % solution:

Plate no	Shoot length (cm)	Root length(cm)	Total	Fresh weight(gm)	Dry weight(gm)
1	2.5	3.6	6.1	7.5	2.7
2	3.3	5.2	8.5	8.3	3.5
3	2.3	4.1	6.4	8.1	3
Mean	2.7	4.3	7	7.9	3.0

4% solution:

Plate no	Shoot length (cm)	Root length(cm)	Total	Fresh weight(gm)	Dry weight(gm)
1	1.6	3.1	4.7	4	3.7
2	1.5	4.4	5.9	4.6	3.54
3	2.1	3	5.1	4.8	2.94
Mean	1.7	3.5	5.2	4.4	3.3

5% solution:

Plate no	Shoot length (cm)	Root length(cm)	Total	Fresh weight(gm)	Dry weight(gm)
1	1	3.1	4.1	4.4	2.7
2	2.4	3.6	6	7.5	2.65
3	2.9	3.3	6.2	6.7	3.4
Mean	2.1	3.3	5.4	6.2	2.9

Culture No -2

1% solution:

Plate no	Shoot length (cm)	Root length(cm)	Total	Fresh weight(gm)	Dry weight(gm)
1	1.4	3.1	4.5	5	2.64
2	2.5	4.2	6.7	7.2	2.4
3	3.2	3.9	7.1	7.5	2.8
Mean	2.3	3.7	6.1	6.5	2.6

2% solution:

Plate no	Shoot length (cm)	Root length(cm)	Total	Fresh weight(gm)	Dry weight(gm)
1	3	3.3	6.3	7.3	2.61
2	2.9	3.6	6.5	6.1	2.3
3	2.7	3.1	5.8	6.2	2.9
Mean	2.8	3.3	6.2	6.5	2.6

3% Solution

Plate no	Shoot length (cm)	Root length(cm)	Total	Fresh weight(gm)	Dry weight(gm)
1	2.4	3.3	5.7	6.5	2.7
2	3.1	4	7.1	5.2	2.62
3	1.2	1.6	2.8	4.6	2.69
Mean	2.2	2.9	5.2	5.4	2.6

4% solution:

Plate no	Shoot length (cm)	Root length(cm)	Total	Fresh weight(gm)	Dry weight(gm)
1	2.8	2.9	5.7	6.2	2.64
2	1.5	3.8	5.3	6.6	2.35
3	2.2	3	5.2	4.8	2.58
Mean	2.1	3.2	5.4	5.8	2.5

5% solution:

Plate no	Shoot length (cm)	Root length(cm)	Total	Fresh weight(gm)	Dry weight(gm)
1	1.3	1.3	2.6	3.8	2.32
2	3.4	4.3	7.7	6.4	2.66
3	1.7	1.9	3.6	5	2.35
Mean	2.1	2.5	4.6	5.0	2.4

Culture No- 3

1% solution:

Plate no	Shoot length (cm)	Root length(cm)	Total	Fresh weight(gm)	Dry weight(gm)
1	2.8	2.7	5.5	2.6	2.5
2	3	3.8	6.8	4.6	5.4
3	2.9	3.5	6.4	4.1	4.7
Mean	2.9	3.3	6.2	3.7	4.2

2% Solution

Plate no	Shoot length (cm)	Root length (cm)	Total	Fresh weight (gm)	Dry weight (gm)
1	1.7	3.8	5.5	5.3	2.54
2	0.4	0.9	1.3	5	2.44
3	2.3	3.3	5.6	6.4	2.46
Mean	1.4	2.6	4.1	5.5	2.4

3% solution:

Plate no	Shoot length (cm)	Root length (cm)	Total	Fresh weight (gm)	Dry weight (gm)
1	3	3	6	7.8	2.66
2	2	3.1	5.1	6.7	2.81
3	2.4	3.4	5.8	6.9	2.44
Mean	2.4	3.1	5.6	7.1	2.6

References-
1) Mr
2)

4% solution:

Plate no	Shoot length (cm)	Root length(cm)	Total	Fresh weight(gm)	Dry weight(gm)
1	2.3	3.6	5.9	5.7	2.63
2	2.3	3.9	6.2	6.9	2.37
3	2.9	5	7.9	4.3	2.1
Mean	2.5	4.1	6.6	5.6	2.3

5% solution:

Plate no	Shoot length (cm)	Root length(cm)	Total	Fresh weight(gm)	Dry weight(gm)
1	3.1	4.9	8	6.9	2.67
2	2.4	3.3	5.7	4.3	2.27
3	1.5	2.6	4.1	7.1	2.2
Mean	2.3	3.6	5.9	6.1	2.3

Conclusion :

In the Culture No-1 (1% solution)

The root & shoot growth is Better than culture 2 & 3 No Culture.

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PHYTOCHEMICAL INVESTIGATION AND PHARMACOLOGICAL ACTIVITIES OF *BOERHAVIA ERECTA*.

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Abstract

Present study deals with to investigate phytochemicals as well as Minimum inhibitory concentration (MIC) activity of aqueous methanol and water extract of leaves of *Boerhavia erecta*. In this study aqueous extract of this plant exhibit primary and secondary metabolites like protein, carbohydrate, lipid, flavonoids, alkaloids, phenolics, saponin etc. are present. This plant extract also shows antimicrobial and Minimum inhibitory concentration activity against bacterial strains like *E. coli* and *Klebsiella pneumoniae*. The phytochemical activities observed in screened species are indicative of these plants could be a possible source to obtain new and effective herbal drug to real treatments.

Keywords: *Boerhavia erecta*, Metabolites, Antibacterial, Minimum Inhibitory concentration (MIC)

Introduction:

In India, use of different parts of several medicinal plants to cure specific ailments has been in vogue from ancient times. The plants supply us with large number of excellent chemicals which form sources for different types of drugs. Present study of modern medicine is towards a change from the use of cellulose coated medicinal pills to extract from medicinal plants and supplied either in pure form or in a synthetic form to cure many human diseases. *Boerhavia erecta* commonly known as the erect spiderling, erect boerhavia, in hindi shweta and in Marathi pandhari punarnava. Is an herbaceous member of the family *Nyctaginaceae* and mainly used as a traditional medicinal plant in Africa. *Boerhavia erecta* is an erect annual to perennial herb upto 1m in height. It is branched ascending from an erect stem with a thick taproot. The leaves are opposite, simple, about equal, with absent stipules and a 2.5- 8.0CM blade to ovate dimension. The use of plant extracts and phytochemical both with known antimicrobial properties can be a great significance in therapeutic treatments. The medicinal plants are god's gift to cure a number of diseases among the living organisms. Leaf is one of the highest accumulated plant parts of such compounds and it is preferred for therapeutic purposes. Some of the active compounds inhibit the growth of disease causing microorganisms.

The prehistoric era, herbs have been the basis for nearly all medicinal therapy until synthetic drug were developed in the nineteenth century. Traditional knowledge of medicinal plants has always guided the search for new cures. There are many reports on bioactivity of *Boerhavia erecta* such as, antibacterial, antifungal, antioxidant activity also reported. However there is little research report on the antioxidant potential and chemical profiling of leaves of this plant. Hence the present study is aims to qualify the phenolics, Flavonoids, like primary and secondary metabolites as well as antibacterial, MIC activity of the aqueous extract of *Boerhavia erecta* leaves to investigate the antidrug activity of plant.

Materials and Methods:

- 1) **Plant Collection-** *Boerhavia erecta* plant were collected from region of Sangamner, Ahmednagar District, Maharashtra, India.
- 2) **Preparation of extract** – The leaves of the selected plant were removed from the plant and then washed under running tap water to remove dust. Plant leaves were air dried under shade, for few days and then leaves were crushed into powder and stored in polythene bag.

Hot water extraction- 5gm of dried finely powdered plant material was taken in a beaker and heated on a hot plate with continuous stirring at 30^o-40^oC for 20min. The solution filter through filter paper and filtrate used for the phytochemical analysis.

Solvent extraction: Crude plant extract were prepared by soxhlet extraction method. About 20 gm of powdered plant material uniformly packed into thimble and extraction with 250ml of methanol. The process of extraction continuous for 24hrs or till the solvent in siphon tube of an extractor become colourless. After that the extract taken in beaker and kept on hot plate and heated 30^o-40^oC till all the solvent got evaporated. Dried extract kept in refrigerator at 4^oC For used in phytochemical analysis.

- 3) **Phytochemical Analysis :** The qualitative phytochemical assay was done in order to detect the presence of several primary and secondary metabolites.

Preliminary Phytochemical Test For Plant Extract:

Phytochemicals	Test	Observation
Carbohydrate(Iodine Test)	Crude extract +2ml of Iodine solution (mix)	Dark blue or purple colour.
Protein Test	Crude extract+ Boil with 0.2% solution of Ninhydrin.	Violet colour
Lipid Test	1 drop of extract placed on filter paper and solvent allowed to evaporate.	An oily stain on filter paper.
Alkaloids	2ml extract +few drops of wagner's reagent	Redish- brown precipitate.
Flavanoids	2ml extract +few drops of NaOH.	Intense yellow colour that becomes colourless on addition of few drops of few drops of diluted HCL.
Phenolics	2ml extract + 1% ferric chloride.	Bluish Black colour / dark green colour
Saponin (foam test)	1ml extract+ 20ml Distilled water + slowly shake in graduated cylinder for 15 min.	1cm layer of foam.

Antimicrobial Screening:

Antibacterial activities –The antibacterial activity assay was performed for aqueous and methanol extract by agar well diffusion method. The Molten Muller Hinton agar was inoculated with 100µl of inoculums (1x 10⁸CFU) and poured into the sterilized petri plate. For agar disc diffusion method, the disc (0.7cm) was saturated with 100µl of the test compound, allow to dry and was introduced on the upper layer of seeded agar plate. The plate was incubated overnight at 37°C. Microbial growth was determined by measuring the diameter of zone of inhibition. For each bacterial strain control was maintained in pure solvent were used instead of extract. The result was observed by measuring of zone of inhibition in a diameter. The experiment was repeated 3 times and mean values are reported. The obtained results were compared with standard antibiotics Penicillium (100µg/disc) and Gentamicin (10µg/disc).

5) Minimum Inhibitory Concentration (MIC):

The minimum inhibitory concentration activity was studied systematically against methanol and water extract of *Boerhavia erecta* by broth dilution method. Plant crude extract 100mg/ml was dissolved in DMSO to dilute it and used for further analysis.

Result and Discussion:

I) Preliminary phytochemicals screening: It was found that *Boerhavia erecta* leaves extract contained primary and secondary metabolites.

Table-1 showing used plant.

Sr.No.	Plant species	Family	Vernacular Name	Part used
1)	<i>Boerhavia erecta</i>	Nyctaginaceae	Punarnava	Leaves

II) Qualitative analysis of Phytochemical constitute.

Table-2 Showing primary metabolites

Sr.No.	Name of plant	Carbohydrate	Protein	Lipid
1)	<i>Boerhavia erecta</i>	+	+	+

Table -3 Showing secondary metabolites .

Sr.No	Test	<i>Boerhavia erecta</i>
1)	Alkaloids	+
2)	Flavonoids	+
3)	Phenolics	+
4)	Saponin	+

+and - indicates presence and absence of phytochemicals.

III) Antimicrobial Activity : Zone of Inhibition

Table-4 plant extract showing antibacterial activities

Sr.No.	Plant species	<i>E. coli</i>		<i>Klebsiella pneumonia</i>	
		Water	Methanol	Water	Methanol
1)	Standard	40mm	38mm	28mm	25mm
2)	<i>Boerhavia erecta</i>	25mm	19mm	12mm	11mm

Antimicrobial activity of the extract of *B.erecta* medicinal plant was studied against *E. coli* and *Klebsiella pneumonia*. Plant extract shows antibacterial activity against this strains.

IV) Minimum Inhibitory concentration:

Table -5 Water plant extract against *E. coli*

Sr.No	Plant extract (μ l)	Broath (μ l)	<i>E. coli</i> (μ l)	Optical density (600nm)	
				T ₀	T ₂₄
Blank	-	2000	-	0.00	0.00
1)	10	1990	100	0.04	0.18
2)	20	1980	100	0.03	0.13
3)	30	1970	100	0.02	0.12
4)	40	1960	100	0.02	0.02
5)	50	1950	100	0.03	0.06
6)	60	1940	100	0.04	0.14
7)	70	1930	100	0.02	0.13
8)	80	1920	100	0.05	0.15
9)	90	1910	100	0.03	0.20
10)	100	1900	100	0.04	0.12

Minimum inhibitory concentration of extract -20 μ l

Table-6 Methanol plant extract against *E. coli*

Sr.No	Plant extract (μ l)	Broath (μ l)	<i>E. coli</i> (μ l)	Optical density (600nm)	
				T ₀	T ₂₄
Blank	-	2000	-	0.00	0.00
1)	10	1990	100	0.01	0.10
2)	20	1980	100	0.01	0.01
3)	30	1970	100	0.01	0.02
4)	40	1960	100	0.02	0.06
5)	50	1950	100	0.03	0.05
6)	60	1940	100	0.04	0.07
7)	70	1930	100	0.01	0.17
8)	80	1920	100	0.02	0.02
9)	90	1910	100	0.03	0.04
10)	100	1900	100	0.04	0.14

Minimum inhibitory concentration of extract - 20 μ l

Table-7 Water plant extract against *Klebsiella pneumonia*

Sr.No	Plant extract (μ l)	Broath (μ l)	<i>Klebsiella pneumonia</i> (μ l)	Optical density (600nm)	
				T ₀	T ₂₄
Blank	-	2000	-	0.00	0.00
1)	10	1990	100	0.01	0.16
2)	20	1980	100	0.01	0.18
3)	30	1970	100	0.02	0.21
4)	40	1960	100	0.04	0.22
5)	50	1950	100	0.02	0.23
6)	60	1940	100	0.03	0.15
7)	70	1930	100	0.03	0.19
8)	80	1920	100	0.02	0.23
9)	90	1910	100	0.02	0.26
10)	100	1900	100	0.01	0.18

Minimum inhibitory concentration of extract - 10 μ l

Table-8 Methanol plant extract against *Klebsiella pneumonia*

Sr.No	Plant extract (µl)	Broath (µl)	<i>Klebsiella pneumonia</i> (µl)	Optical density (600nm)	
				T0	T24
Blank	-	2000	-	0.00	0.00
1)	10	1990	100	0.05	0.24
2)	20	1980	100	0.02	0.22
3)	30	1970	100	0.01	0.20
4)	40	1960	100	0.01	0.23
5)	50	1950	100	0.02	0.24
6)	60	1940	100	0.03	0.20
7)	70	1930	100	0.02	0.18
8)	80	1920	100	0.01	0.21
9)	90	1910	100	0.01	0.18
10)	100	1900	100	0.01	0.19

Minimum inhibitory concentration of extract - 30µl.

This study has revealed the presence of phytochemicals considered as active medicinal chemical constituents. Important medicinal phytochemicals such as alkaloids, saponin, flavonoids, phenolics, carbohydrates, proteins, lipids were present in the samples. The result of the phytochemical analysis showed in water extract that the selected plant were rich in alkaloids, flavanoids, saponin, carbohydrates, protein, lipid. plants phytochemicals have been reported for its wound healing properties, these are anti-inflammatory and analgesic, and antioxidant. Present study the extract obtain from *Boerhavia erecta* shows strong activity only in Gram negative bacteria. The results were compared with standard as an antibiotic (Gentamycin). This study also showed that the activity of methanolic and water extract of *Boerhavia erecta* showed significant antibacterial activity (table 4) and also showed MIC activity. (Table 5, 6, 7, 8) against selected bacterial strains.

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TOXIC EFFECTS OF *MUNDULEA SERICEA* LEAF EXTRACT ON *TILAPIA SPARRAMANII*, BASED ON THE HISTOLOGY OF GILLS.

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Abstract

Fish toxins or fish stupefying plants have historically been used by many hunters gather culture to stun fish, so they become easily to collect by hand. Some of their toxins paralyze fish, which can they easily collected. So, the aim of the current investigation was to assess the effect of aqueous leaf extract of *Mundulea sericea* plant on the survival and health status of *Tilapia sparramanii*. The laboratory determination of lethal concentration (LC₅₀) through a static bioassay test were performed. The 24hrs, 48hrs, 72hrs, and 96hrs LC₅₀ of *Mundulea sericea* leaf extract was estimated in 33.9ppm, 30ppm, 24.5ppm, 22.5ppm respectively. Where fish showed abnormal behaviour such as erratic swimming, mucous secretion, haemorrhages and stiff fin rays prior to death.

Keywords : *Mundulea sericea*, leaf extract, *Tilapia sparramanii*, LC₅₀.

Introduction:

A large number of pesticides having chlorinated hydrocarbons are being extensively use in integrated farming and agricultural fields. All types of pesticides and herbicides sprayed on the fields ultimately reach non target organisms through air, water and food chain. keeping in view the problems caused by the synthetic pesticides to the nontarget organisms ,biologically active compounds of plants are being use to produce biopesticides.The genus mundulea consist of about 15 species wide spread throughout africa, madagaskar, Mauritius, india, sri lanka, and Papua new guinea. Only single species Mundulea is found in southern Africa. This species occurs in south Africa,Botswana,Namibia and angola,north to tropical africa,and east to madagascar,India,Sri Lanka and Papua New Quinea. *Mundulea sericea* is one of the commenest fish poisons where both bark and seeds are used

The antioxidants derived from plants have been gaining more attention due to their therapeutic application and fewer side effects. Moreover, the published research literature reveals that the large number of plants including aromatic, spicy and medicinal plants contains important secondary metabolites that exhibit antioxidant properties. In addition, several experimental studies conducted on some of these plants, viz, rosemary, sage, oregano, resulted in the development of natural antioxidant formulations for food, cosmetic and other applications. However, scientific data on antioxidant properties of plants that are less widely used in food and medicine is still rather scarce. Therefore, the screening of plants having such properties remains an interesting and useful task, particularly for finding new sources of natural antioxidants *Mundulea sericea* (Wild.) A.Chev. is a small tree belonging to the family fabaceae, distributed in dry forests and rocky hills of West and South India. The plant is reported to have an insecticidal properties and also reported in stupefying fishes. In Africa, bark, leaves, seeds and roots of this plant have been used as fish poison, insecticide and as an aphrodisiac. There are many reports on bioactivity of *M. sericea*, such as insecticidal. Anti-mycobacterial, antimicrobial and analgesic activity is also reported. However there is little research report on the antioxidant potential and chemical profiling of leaves of this plant. Hence, the present study is aims to quantify the total phenolic and total flavonoid contents of the aqueous methanolic extract of the *M. sericea* leaves and to investigate the antioxidant capacity using six different methods. Furthermore, the extract was further analyzed by spectroscopic and chromatographic techniques (FTIR, GC-MS and RP-HPLC) for the characterization of chemical composition.

The current study involved extraction and evaluation of leaf of *Mundulea sericea* for toxic activities on *Tilapia sparramanii* based on histology of gills.

Materials and Methods

1) Plant Collection :

The *Mundulea sericea* plants were collected from region of Savargaon Ghule, Taluka Sangamner, district Ahmednagar, Maharashtra, India.

2) **Fish collection:** *Tilapia sparramanii* ranging 4 to 5 cm long and 2 to 3 cm width about 10 gm weight were collected from Sawali Vihir lake near Shirdi, Taluka Rahata, Ahmednagar districts, Maharashtra, India. The fishes were stocked in 100 Lt fish aquarium containing dechlorinated tap water for 15 days, they were feed twice daily with commercially available pelletes. The water was renewed every 24 hour daily.

3) **Preparation of Aqueous Extract :** Mature leaves of *Mundulea serisea* plant were thoroughly washed and dried in shade for 15 day and then pulverised to fine powder in an electric blender. Aqueous leaf extract was prepared by dissolving 25 gm of powdered leaves in 500 ml distilled water and was stirred with help of magnetic stirrer and kept at room temperature for 24 hours. After 24 hr the mixture was filtered and the extract was used immediately on the experiment

Result and Discussions:

The toxicity of *Mundulea sericea* plant leaf extract was tested against *Tilapia sparramanii* at different Concentration 24hr, 48hr, 72hr and 96hr Lc50 respectively. Hence the result of 24hr, 48hr, 72hr and 96hr Lc50 is 33.9ppm, 30ppm, 24.5ppm and 22.5ppm. The gills of the control fish is shown in figure 1. Below operculum there are 5 brachial arches consist of two hemibranches consisting of two rows of tapered and flattened gill filaments. On the upper and lower surfaces of each gill filament there are a series of flattened leaf like structures, called secondary leaf lamellae, which form the respiratory surface. Epithelial wall of each secondary gill lamellae is held apart and supported by pillar cells. The gills of the fish exposed to aqueous leaf extract for 7 days showed curling of the tips, slight bending and shortening of the secondary gill lamellae in figure 2. The gills of the fish exposed to the leaf extract for 14 days demonstrated curling and bending of secondary gill lamellae, cells masses between the secondary gill lamellae thickened to such an extent that inter lamellar spaces were completely occluded, giving the gill filaments a compact appearances in figure 3.

Pesticides plays an important role in removing weed fishes and other pests from aquaculture ponds, several plants have phyto toxic compounds which have pesticidal properties. The present investigation result demonstrated that *Mundulea sericea* leaf extract were extremely toxic and harmful to fresh water fishes. There for creating awareness among to local inhabitants and fisherman about adverse toxic effect of *Mundulea sericea* leaf extract and providing to fisherman for fish harvesting may possibly pave the way to bring constructive outcome in the near future.

This kind of study has been reported by several reserchers (Adewole AM 2002, Akinwande et.al 2007, Ayoola et.al 2011, Fafioye oo.2012). The extract of *Mundulea serisea* can poison the fish leading to pathological altrations in their tissues and organs (Gabriel et.al 2007). Similer damage in the form of curling of secondary gill lamellae, epithelial hyperplasia and enhanced mucous production have been reported in after exposed phenol (Butchiram MS et.al 2013).

Table showing the LC₅₀ of *Mundulea sericea* plant leaf extract on

Tilapia sparramani

Sr. No	Concentration in ppm.	No. of Fish	Mortality in %			
			24hr	48hr	72hr	96hr
1	18	10	00%	00%	00%	10%
2	20	10	00%	00%	10%	20%
3	22	10	00%	00%	40%	40%
4	24	10	00%	00%	40%	60%
5	26	10	10%	20%	60%	10%
6	28	10	20%	40%	30%	10%
7	30	10	20%	50%	30%	00%
8	32	10	30%	60%	10%	00%
9	34	10	50%	30%	20%	00%
10	36	10	70%	30%	00%	00%
11	38	10	90%	10%	00%	00%

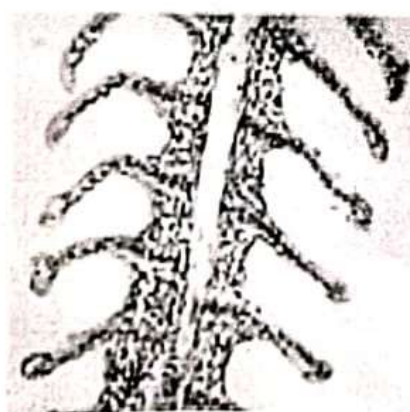


Fig. 1 Gills of Control Tilapia.

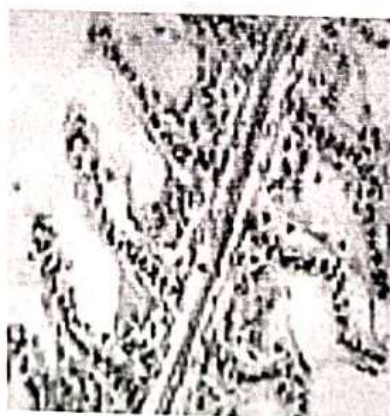


Fig. 2 Gill of tilapia sparramani exposed to *Mundulea sericea* leaf extract After 7 days.



Fig. 3 Gill of *Tilapia sparramanii* expose to *Mundulea sericea* aqueous leaf extract after 14 days.

Conclusion

The present study showed that aqueous leaf extract of *Mundulea sericea* is toxic on *Tilapia sparramanii* and affects the structure and function of its respiratory system at sub lethal concentrations causing considerable deterioration in fish health. Therefore it is concluded that the use as a biological control in eradicating predators and unwanted organisms in the pond by the farmer instead of using agrochemicals, although, because of its toxicity, its use should be monitored well.

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