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RESEARCH ARTICLE

RHIZODEGRADATION OF PHENANTHRENE, ANTHRACENE AND PYRENE BY AUGMENTING BACILLUS CEREUS AND BACILLUS SUBTILIS STRAINS

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Abstract

Rhizodegradation is one of the best methods for the effective removal of dangerous polycyclic aromatic hydrocarbons pollutants from soil. This is operative due to the high persistent, non-bioavailability nature of PAHs and combined, sequential reactions of bacteria present in rhizosphere of plants. We have conducted pot-culture method to study the degradation of three PAHs compounds namely phenanthrene, anthracene and pyrene in artificially contaminated soils of rhizosphere and non-rhizosphere soil treatments of blackgram (*Vigna mungo* L.) that augmented by two potential PAHs degraders namely *Bacillus cereus* CPOU13 and *Bacillus subtilis* SPC14 isolated from naturally contaminated soils for 90 days. HPLC studies revealed that degradation percentages of the three PAHs in treatments were more where selected strains augmented to the soil treatments over the non-augmented soils. The rhizosphere treatments that have augmented strains recorded more degradation percentages of phenanthrene, anthracene and pyrene over the rhizosphere treatments that were non-augmented. Pyrene, a high molecular weight PAHs degraded maximum to 96.24% in rhizosphere soil treatment that is augmented with the strains while moderate degradation of pyrene recorded in non-autoclaved soil treatments that contain natural microbial communities. The study of counting of bacterial populations during the experimental period revealed that the populations of the selected and other natural bacteria were gradually increased from the first day, reached maximum by 60 days and became almost consistent in 90 days in all the treatments. It was also observed that the populations of bacteria were high in rhizosphere treatments compared to the non-rhizosphere soil treatments. With these results it has been predicted that degradation of PAHs in rhizosphere soil treatments is closely associated with the increasing PAHs degrading bacterial populations of selected bacterial strains that may consume more quantity of PAHs for their metabolic activities in rhizosphere soils. Key words: Rhizodegradation, PAHs, HPLC, pot culture.

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Combined effect of *Bacillus cereus* CPOU13 and *B. subtilis* SPC14 on polycyclic aromatic hydrocarbons degradation *in vitro*

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Abstract: Biodegradation of polycyclic aromatic hydrocarbons (PAHs) with suitable bacterial strains conveys much interest in recent years. We studied biodegradation of PAHs namely phenanthrene, anthracene and pyrene using two efficient PAHs degrading strains, *B. cereus* CPOU13 and *B. subtilis* SPC14 *in vitro* experiments. Standard HPLC chromatograms for phenanthrene, anthracene and pyrene were plotted separately based on HPLC peak area values and Retention time of known concentrations of the test PAHs and using software, 'Origin 6.0'. Biodegradation of PAHs mixture containing phenanthrene, anthracene and pyrene was studied *in vitro* for 13 days. We found that the combination of bacterial strains, *B. cereus* CPOU13 and *B. subtilis* SPC14 degraded high amounts of phenanthrene, anthracene and pyrene in 13 days of incubation. The recorded degradation percentages of phenanthrene, anthracene and pyrene were 85.31, 92.82 and 85.70 respectively. Concentration of phenanthrene was degraded from 217µg/5ml to 31.9µg/5ml. Concentration of anthracene was degraded from 211µg/5ml to 16µg/5ml. Concentration of pyrene was degraded from 233µg/5ml to 33µg/5ml in 13 days of incubation. We also observed biodegradation of phenanthrene, anthracene and pyrene from 1st day to 13th day.

Key words: Biodegradation; PAHs; *B. cereus* CPOU13; *B. subtilis* SPC14; phenanthrene; anthracene; pyrene

Introduction

Polycyclic aromatic hydrocarbons (PAHs) are ubiquitous environmental contaminants that formed by the incomplete combustion of organic materials, such as wood or fossil fuels. PAHs consist three or more benzene rings, at least two are fused with two neighboring rings and shares two adjacent carbon atoms (1). There are thousands of PAHs in the environment but in practice PAHs analysis is restricted to determination of 6 to 16 compounds. Individually all PAHs differ substantially in their physical and chemical properties (2). The ubiquitous occurrence of PAHs is largely due to their formation and release in all processes of incomplete combustion of organic materials and these organic contaminants are resistant to degradation, can remain in the environment for long periods (3, 4).

Presence of PAHs in the environment at high levels exerts negative impact on all life forms due to their carcinogenic, mutagenic, teratogenic and phytotoxic properties and this enforced the scientific world to concentrate on the immediate actions for remediation of PAHs (5-7). Biodegradation with suitable bacterial strains conveys much interest in recent years due to its low cost, effectiveness, restoration of medium where it operated and possesses several advantages. Few bacterial strains act as key participants in PAHs biodegradation as they possessing special enzymes. Strains suitable for PAHs biodegradation studies are frequently isolate from their native contaminated sites and this may be due to their long term exposure and tolerance

towards PAHs (8). However, consortia or multi-bacterial strains of PAHs degrading strains are more effective in biodegradation as compared to single strains (9, 10). In the present investigation, we used two effective PAHs degrading bacteria strains namely *B. cereus* CPOU13 (11) and *B. subtilis* SPC14 (12) those isolated from two different PAHs contaminated sites to study degradation of PAHs phenanthrene, anthracene and pyrene *in vitro* experiments.

Materials and Methods

Construction of standard chromatogram for HPLC studies:

Method for the construction of standard chromatograms for PAHs using high performance liquid chromatography (HPLC) was adopted from Boonchan (13). Phenanthrene, anthracene and pyrene with 99% purity purchased from Sigma-Aldrich, USA and used throughout the experimental work as test PAHs. Accurately weighed 100 mg of phenanthrene, anthracene and pyrene transferred to a 100 ml volumetric flask and 2-3 ml of acetonitrile was added to dissolve. Solution was diluted with acetonitrile to obtain 1000 mg/L stock solution. The stock solution further diluted to obtain the concentrations of 25, 50, 100, 200 and 250 ppm and the samples run in HPLC. Standard chromatograms for phenanthrene, anthracene and pyrene were plotted separately using software, 'Origin 6.0' by retrieving the peak area values at respective retention times of each PAH.

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RESEARCH ARTICLE

RHIZODEGRADATION OF POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) BY BACILLUS CEREUS CPOU13

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Rhizodegradation, PAHs,
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ABSTRACT

We conducted pot-culture experiments to study the rhizodegradation of three PAHs compounds namely phenanthrene, anthracene and pyrene with blackgram plants. PAHs compounds were accurately weighed then added to experimental soils viz., rhizosphere and non-rhizosphere sets and made the final concentration of PAHs 600ppm. Fresh cultures of PAHs degrading bacteria strain, *B. cereus* CPOU13 added to the soil and made final concentration of the strain 3.3×10^4 CFU, then the experiment was conducted for 90days. The PAHs compounds were extracted finally from soil samples after the 90days and their concentrations were determined using HPLC methods. High degradation of the PAHs was observed in the rhizosphere soil treatments over the non-rhizosphere soils. The strain from rhizosphere and non-rhizosphere soil treatments recorded high degradation when compared to natural microflora in non-autoclaved soils. In respect to the phenanthrene the strain recorded 83.03% of degradation in autoclaved rhizosphere soils. Anthracene was degraded up to 76.10% in the treatment of autoclaved rhizosphere soil by the strain and it was slightly decreased in non-autoclaved rhizosphere soil. The strain degraded pyrene up to 82.1% in autoclaved rhizosphere soil and its low degradation observed in non-rhizosphere soil treatments. During this 90days of experiment population of the bacteria was enumerated in the treatment soils at regular time intervals viz., 0, 15, 30, 60 and 90days using serial dilution technique. Population of the bacteria was increased more in rhizosphere treatments over the non-rhizosphere treatments and it gradually increased from the 0th day and reached at maximum by 60days. Afterwards, slight decrease was observed in bacterial population. Hence this study determined that the PAHs degradation under rhizodegradation perhaps associated with the increasing population of PAHs degrading strain and its increased biological activities.

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INTRODUCTION

The extensive use of fossil fuel based products in our modern society and industrial production of chemicals has resulted contamination of soils with polycyclic aromatic hydrocarbons (PAHs) that have carcinogenic and mutagenic properties. Increasing accumulation of PAHs in the surrounding environment is threatening human health and the economy. As the PAHs categorized as priority environmental pollutants by United States Environmental Protection Agency (USEPA) and European Union (EU) fast amelioration of these compounds from soil has become an important task and ways to clean up the environments attracted the attention of the scientific world. The PAHs contaminated sites disfavor the growth of plants and living organisms, and only those plants or microorganisms that can tolerate the toxic effect of PAHs may

seldom grow in that environment. Hence, plants associated remediation systems have great potential for cleaning up root accessible soils (rhizosphere) contaminated with PAHs. This process is plant growth dependent and influenced by various biotic and abiotic factors in soil environment. Rhizodegradation of PAHs by bioaugmenting potent PAHs degrading micro organisms to soils systems may be effective than other classical methods that commonly applied for soil remediation systems. In view of this significance, we have investigated the rhizodegradation of PAHs by bioaugmenting one potent PAHs degrading bacteria namely *Bacillus cereus* CPOU13 that previously isolated from PAHs prone industrial area with blackgram [*Vignamungo* (L.) Hepper] plants using pot-culture methods. For this we have categorized the treatments soils into different rhizosphere and non-rhizosphere as autoclaved and non-autoclaved sets for effective screening of PAHs degradation. We have assessed the rhizodegradation of PAHs after 90days of experiment period

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IDENTIFYING DIVERSITY OF POLYCYCLIC AROMATIC HYDROCARBONS (PAHS) DEGRADING BACTERIA IN COAL SAMPLES OF BHADRADRI KOTHAGUDEM DISTRICT

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ABSTRACT

The present investigation is conducted to isolate polycyclic aromatic hydrocarbons degrading bacteria from an opencast coalmine samples located in Bhadradri-Kothagudem District. A total of five distinct PAHs degrading bacterial colony forming units were identified from the samples using minimal salt medium that supplemented with a PAHs compound phenanthrene. Lytic-zone formations on solid MSM also confirmed the PAHs compounds degradation. Cell and colony morphologies along with Gram reaction of the isolates studied. All the isolates are Gram-positive; and one isolate is rod shaped, two are coryne form and two are cocci. The isolates further screened for their ability to grow on three test PAHs compounds phenanthrene, anthracene or pyrene as sole source of carbon using MSM and the

results revealed that the isolates recorded optimum growth on the test PAHs. The isolates are differing vastly at both morphological and biochemical characterizations. Finally, the isolates characterized at molecular level by adopting 16S rDNA sequencing method and the isolates identified at last by the compilation of morphological, biochemical and molecular characterizations data as *Bacillus licheniformis* KMM11, *Brachybacterium muris* KMM12, *Brachybacterium muris* KMM13, *Micrococcus luteus* KMM14 and *Staphylococcus aureus* KMM15.

KEYWORDS: PAHs, Minimal salt medium, Phenanthrene, *Micrococcus*, *Staphylococcus*.



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**RESEARCH ARTICLE****EXISTENCE OF POLYCYCLIC AROMATIC HYDROCARBONS (PAHS) DEGRADING BACTERIA IN COAL SAMPLES.**

M. Poornachander Rao.

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PAHs, Minimal salt medium,
 Phenanthrene, *Bacillus*,
Achromobacter

Abstract

This study is conducted to isolate polycyclic aromatic hydrocarbons (PAHs) degrading bacteria from coal samples of an opencast coalmine. In this study five PAHs degrading bacteria were isolated on minimal salt medium (MSM) that priory enriched with a PAHs compound, phenanthrene. Lytic zone formations on MSM agar during culture growth also confirmed the PAHs degradation. Microscope assisted methods revealed the nature of cell type and Gram reaction type of the isolates as two are Gram-positive and three are Gram-negative and all are rod shaped bacteria. The isolates screened for their ability to grow on MSM broth that supplemented with three test PAHs compounds phenanthrene, anthracene or pyrene as sole source of carbon. In this assay, the isolates exhibited good range of growth on the tested three PAHs. Under morphological characterization and biochemical characterization the isolates recorded significant differentiation. Production of different enzymes on specific media determined as per standard protocols for the bacteria. Finally, the isolates characterized at molecular level by sequencing 16S rDNA genes. The isolated bacteria identified by the compilation of morphological, biochemical and molecular characterization data as *Bacillus thuringiensis* KMM1, *Achromobacter xylosoxidans* KMM2, *Bacillus cereus* KMM3, *Alcaligenes faecalis* KMM4 and *Brevibacillus laterosporus* KMM5.

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Introduction:-

Coal has been become a more important energy source in the 21st century. It contains large quantities of organic and inorganic matter. When it burns chemical and physical changes take place and many toxic compounds are formed

**INTERNATIONAL JOURNAL OF ADVANCES IN
PHARMACY, BIOLOGY AND CHEMISTRY**

Research Article

**Isolation of polycyclic aromatic hydrocarbons (PAHs)
degrading bacteria from an open coalmine samples-
Kothagudem, Telangana, India**

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ABSTRACT

The present investigation conducted to isolate polycyclic aromatic hydrocarbons (PAHs) degrading bacteria strains from coal samples of an opencast coalmine located in Kothagudem of Khammam district, Telangana state, India. A total of five (5) bacterial strains were isolated from this coalmine using minimal salt medium (MSM) that priory enriched with phenanthrene, a PAHs compound and observing lyses zone formations on Petriplates contained media. Primary microscopic observations of the bacterial isolates revealed that three isolates are Gram-positive and two isolates are Gram-negative bacteria and all are rod shaped. The isolates were further screened for their ability to grow on three test PAHs compounds such as phenanthrene, anthracene and pyrene provided as sole source of carbon in the media. In the study, all the isolates recorded good ability to grow on these three test PAHs. The isolates under morphological characterization are significantly differed. Biochemical characterization was done by using 'Rapid bacterial identification kits (Himedia) and production abilities of different enzymes on special media by the isolates were determined. All the strains reacted differently with the reagents of biochemically characterizing media. Finally the isolates are characterized at molecular level by sequencing 16S rDNA genes. The bacterial strains finally indentified as *Bacillus cereus* KMM6, *Bacillus pseudomycooides* KMM7, *Pseudomonas aeruginosa* KMM8, *Bacillus cereus* KMM9 and *Pseudomonas stutzeri* KMM10.

Key Words: PAHs, Minimal salt medium, Phenanthrene and Characterization.

INTRODUCTION

Polycyclic aromatic hydrocarbons (PAHs) of coal origin have great interest in environmental research since huge state of coal mining for energy production around the world. Our nation, India stands at 3rd position among the top eleven hard coal producing countries with 0.4 billion tons after China and USA. Worldwide hard coal production has increased from 1 to 4.96 billion tons from 1900 to 2005. In 2004, China, the U.S.A. and India produced about 2, 1 and 0.4 billion tons of hard coal and held about 60, 100 and more than 80 billion tons of reserves respectively. These activities around the globe are effecting the present global environment and its inhabitants¹.

Bacteria are ubiquitous in existence and reported from all environments segments that ranged from natural to extreme². They adapt too many adverse

conditions and exhibit high tolerance levels. Earlier researchers registered the existence of bacteria in extreme high and low temperatures, high pressure, acidified habitats etc. However existence of high density of bacteria restricted to the places like coalmines and till dated few bacterial strains reported in coal beds and their particles from coal mines³. This situation is mainly due to unfavorable growth conditions in those sites for the existence of natural and commonly found soil microorganisms⁴. Coalmine regions are prevalent with adverse bacterial growth conditions like high temperatures, low pH and nutrients deficiency⁵. However, scanty studies reported indigenous group of bacterial species from natural coal samples^{6, 7}. Biodegradation of PAHs using indigenous bacterial strains from PAHs polluted sites like coalmines has getting prime



**RHIZODEGRADATION OF PAHS BY AUGMENTING PGPR STRAIN *BACILLUS
SUBTILIS* SPC14**

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ABSTRACT

Utilization of PGPR strains for organic pollutants bioremediation systems has been become one of the common trends in recent years as it offers various advantages over the physical and chemical remediation methods. The present investigation was taken up to study the rhizodegradation of three PAHs compounds namely phenanthrene, anthracene and pyrene contaminated soils with a PAHs degrading PGPR strain, *Bacillus subtilis* SPC14 in pot culture experiments for 90days. Soil treatments of the study divided into rhizosphere and non-rhizosphere treatments then they were further divided broadly into autoclaved and non-autoclaved sets. After 90days of experimental period the treatment soils assed for PAHs concentrations. Present study revealed that the bioaugemted strain degraded phenanthrene, anthracene and pyrene upto 73.61%, 70.68% and 70.42% respectively in the treatments of rhizosphere autoclaved soils. However, PAHs degradation is very low in case of non-rhizosphere soils when compared to the rhizosphere soils. Upon the determination of effect of bacterial population on the rhizodegradation, we found that the strain's population was gradually increased with the PAHs degradation and its degradation started from 0th day and reached maximum by 60days of the experimental period and then after bacterial population and PAHs degradations were gradually decreased. The strain was accomplished nearly 70% of degradation of PAHs compounds in all the soil treatments.

Keywords: PGPR, rhizodegradation, *Bacillus subtilis* SPC14, PAHs, pot culture



Original Research Article

Abilities of *Bacillus Cereus* CPOU13 in Biodegradation of Polycyclic Aromatic Hydrocarbons (PAHs)

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ABSTRACT

In the present study the biodegradation of three PAHs (phenanthrene, anthracene and pyrene) and effects of different factors (PAHs concentrations, pH and incubation time) on PAHs biodegradation using a novel bacterial strain, *Bacillus cereus* CPOU13 have been reported. Results revealed that growth of the strain decreased with increasing PAHs concentrations from 10 ppm to 250 ppm in MSM. In concern to the incubation period of 13 days, the strain grew gradually from 0 to 3rd day and became consistent between 3rd and 7th days. Growth of the strain was dropped from 7th day onwards. Growth of the strain was tested at different pH and found that it was grown better from pH6 to pH8. Biodegradation of PAHs was studied in vitro for 13 days using HPLC and rate of PAHs degradation (%) was determined at regular time intervals. The strain degraded phenanthrene about to 73.46% and its initial concentration declined from 216.32 µg to 56.57 µg. The strain degraded anthracene to 85.76% and its initial concentration reduced from 209.20 µg to 32.63 µg. Degradation of pyrene was recorded up to 47.88% and its initial concentration reduced from 230.14 µg to 119.95 µg.

Keyword: PAHs; pH; incubation time; *Bacillus cereus* CPOU13; MSM; biodegradation

INTRODUCTION

Now a day, pollution that arises due to the contamination of polycyclic aromatic

hydrocarbons (PAHs) has been becoming a global issue and is increasing very rapidly in urban areas [1-2]. Very recent and

**PLANT GROWTH PROMOTING (PGP) ACTIVITY OF
ACTINOMYCETES ISOLATED FROM THE RHIZOSPHERE OF
*CAPSICUM ANNUUM L.***

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ABSTRACT

A total 72 actinomycetes strains were isolated from 17 rhizosphere soils of *Capsicum annuum L.* of Warangal, Khammam, Karimnagar and Mahabubnagar, Telangana, India. Actinomycetes were isolated on chitin medium by serial dilution plate method. Among the 72 actinomycetes, 25 were screened for Plant Growth Promoting traits (PGP) viz., indole acetic acid production, ammonia production, phosphate solubilization and hydrogen cyanide production. These 25 strains showed IAA and ammonia production, 11 strains showed phosphate solubilization and no strain showed HCN production. Only 4 strains (OUA8, OUA17, OUA18 and OUA27) were tested and showed siderophore production and biochemical activity.

KEYWORDS: actinomycetes, *Capsicum annuum*, PGP activities, biochemical activity.

INTRODUCTION

The rhizosphere is much richer in bacteria and actinomycetes than the surrounding bulk soil.^[1] Actinomycetes are gram positive bacteria with high G+C content in their DNA. Soil actinomycetes particularly *Streptomyces* sp. enhance soil fertility and have antagonistic activity against wide range of soil borne plant pathogens.^[2] Actinomycetes control plant pathogens and play an important role in the decomposition of organic material, production of secondary metabolites of pharmacological and commercial interest. Actinomycetes are unparalleled sources of bioactive metabolites including antibiotics, plant growth factors and other substances.^[3] Actinomycetes were not only biocontrol agents but also enhances the



Biodegradation of Phenanthrene, Anthracene and Pyrene *in vitro* by *Bacillus subtilis* SPC14

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ABSTRACT

Polycyclic Aromatic Hydrocarbons (PAHs) are a group of organic pollutants, containing carbon and hydrogen, composed of two or more condensed benzene rings in linear, angular, and cluster arrangements. Number of benzene rings may vary between 2 to 13. Sometimes sulphur, nitrogen and oxygen atoms may get readily substituted in the benzene ring¹. These are non-polar, hydrophobic and readily soluble in hydrophobic solvents like fat, oil, ethereal solvents. The aqueous solubility of PAHs decreases with increasing molecular size. The hydrophobicity of PAHs plays key role in high persistence and low bioavailability to microbial attack and retained environment for longer times without degradation². The PAHs namely phenanthrene, anthracene and pyrene are common PAHs pollutants that occur in all contaminated sites.

Keywords: Polycyclic Aromatic Hydrocarbons, PAHs, phenanthrene, anthracene, pyrene.

INTRODUCTION

Polycyclic Aromatic Hydrocarbons (PAHs) are a group of organic pollutants, containing carbon and hydrogen, composed of two or more condensed benzene rings in linear, angular, and cluster arrangements. Number of benzene rings may vary between 2 to 13. Sometimes sulphur, nitrogen and oxygen atoms may get readily substituted in the benzene ring¹. These are non-polar, hydrophobic and readily soluble in hydrophobic solvents like fat, oil, ethereal solvents. The aqueous solubility of PAHs decreases with increasing molecular size. The hydrophobicity of PAHs plays key role in high persistence and low bioavailability to microbial attack and retained environment for longer times without degradation². The PAHs namely phenanthrene, anthracene and pyrene are common PAHs pollutants that occur in all contaminated sites.

In the pioneer research PAHs degrading bacteria were isolated from an oil contaminated site³. Davies and Evans⁴ for the first time presented the metabolic pathway and the enzymatic reactions resulting in the mineralization of simple PAH, naphthalene. These results encouraged the scientific community towards the studies on the degradation of PAHs by diversified microbes. Intensified work succeeded and paved the way in the identification of PAHs degrading life forms such as bacteria, fungi, and algae and their utilization⁵⁻⁹. Studies that related to the degradation of phenanthrene, anthracene and pyrene has extendable interest around the world and number of articles has been publishing every year.

In the present research we have used a novel bacterial strain of *Bacillus subtilis* SPC14 that was isolated from a

PAHs contaminated site¹⁰. The strain has capability to degrade phenanthrene, anthracene and pyrene *in vitro* conditions. We have studied the effects of different factors on the degradation of phenanthrene, anthracene and pyrene and also recorded the respective degrading quantities of phenanthrene, anthracene and pyrene during a course of time *in vitro* using High Performance Liquid Chromatography (HPLC) methods.

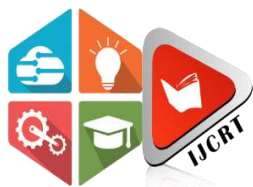
MATERIALS AND METHODS

Effect of phenanthrene, anthracene and pyrene concentrations on the growth of *B. subtilis* SPC14

To determine the effect of phenanthrene, anthracene and pyrene concentrations on *B. subtilis* SPC14 growth, precisely 75 ml of Minimal Salt Medium (MSM) was dispensed into 250 ml flasks and sterilized by autoclaving. The flasks were then divided into six sets of six flasks. Further, 10, 50, 100, 150, 200 and 250 ppm levels of phenanthrene, anthracene and pyrene which were separately dissolved in acetone were followed by inoculation with each isolate. Inoculated flasks were then incubated at 28 C for 3 days with a speed 130 rpm. 5 ml of sample was aseptically collected from each flask and assayed for the level of microbial growth. Growth was recorded in terms of Optical Density (OD) readings at 600 nm using a UV spectrophotometer¹¹.

Study of growth curve on MSM enriched with phenanthrene, anthracene and pyrene

Bacterial growth curve study on MSM enriched with PAHs was adopted from Toledo¹². Overnight culture of *B. subtilis* SPC14 in nutrient broth was harvested by centrifugation (10,000 g, 10 min) and re-suspended in



ONE- STEP DIRECT REGENERATION OF *GYMNEMA SYLVESTRE* (RETZ) R. BR. EX ROEMER & SCHULTES FROM LEAF EXPLANTS INDUCED BY THREE CYTOKININS

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A current study is underway to investigate the possibility of developing a one-step direct plant let regeneration in *Gymnema sylvestre* (Retz) R. Br. For this, the effect of leaf explants was cultured in MS medium containing different concentrations of three cytokinins TDZ / BAP / Kn (0.5–3.0 mg / L). The maximum number of shoot bud expansion was observed at (2.0mg / L). TDZ, compared to all other concentrations of Kn / BAP. Shoot bud stimulation in TDZ / BAP / Kn gradually decreased as the concentration increased above (2.0mg / L). The high frequency of shoots (2.0mg / L) was induced at TDZ. In vitro regenerated shoots produced the largest number of IBA-containing roots in the MS medium (1.0mg / L). Thus, the plant developed *in vitro* using leaf cultures was established in pots containing garden soil outside in the shade at room temperature and mild conditions. These plants bloom 8 weeks after transfer to pots. The established protocol can be used to quickly multiply the actual product to type plants.

Keywords: *Gymnema sylvestre* (Retz) R. Br, multiplication, Leaf explants, TDZ, BAP, Kn and IBA. IAA

Abbreviations: TDZ- Thidiazuron BAP- 6-Benzylaminopurin, Kn-Kinetin and IBA- Indole-3 butyric acid. IAA- Indole-3-Acetic Acid.



STUDIES ON ANTIMICROBIAL ACTIVITY OF *ANOGEISSUS LATIFOLIA* (ROXB. EX DC.) AND *TERMINALIA TOMENTOSA* WIGHT & ARN.

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Abstract:

The global burden of bacterial infections is very high and has been exacerbated by increasing resistance to multiple antibiotics. Antibiotic resistance leads to failed treatment of infections, which can ultimately lead to death. To overcome antibiotic resistance, it is necessary to identify new antibacterial agents. In this study, two medicinal important plants Namely *Anogeissus latifolia* (Roxb. ex DC.) Wall. Ex Guillem. & Perrplants from and *Terminalia tomentosa* Wight & Arn. The present investigation was aimed to focus on the antibacterial activity of two selected plants of *Anogeissus latifolia* and *Terminalia tomentosa* in aqueous, ethanolic and Chloroform extracts. Different concentrations of Chloroform, ethanol and aqueous extracts were used for antibacterial activity. Maximum zone of inhibition was observed in 30% w/v Ethanolic extract than other extracts. Different extracts of *A. latifolia* and *T. tomentosa* has the medicinally useful secondary metabolites and also act as antibacterial agent on various bacterial strains. The findings of this research suggest that the extracts of both plants can be a source of natural antibacterial agents with pivotal applications in pharmaceutical companies to control pathogenic bacteria causing severe illness in humans

Key Words: multiple antibiotic resistances; human pathogens; antibacterial activity; ethanolic, Chloroform extracts *Anogeissus latifolia* and *Terminalia tomentosa*

Introduction:

Medicinal plants have long been used to treat diseases (Mohanta *et. al.*, 2012, Mohanta *et.al.* 2014). Plants are commonly used as sources of new pharmaceuticals due to the presence of promising therapeutic compounds. Infectious diseases play a significant role in the deaths of millions of people worldwide, in part due to the mutagenic nature of the bacterial genome. Moreover, the exchange and uptake of plasmids among bacteria results in the development of multiple antibiotic resistant strains. Antimicrobials from different plants



***IN VITRO* PROPAGATION FROM LEAF EXPLANTS OF SPONGE GOURD (*LUFFA AEGYPTIACA* (MILL.) A MEDICINALLY IMPORTANT PLANT**

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Abstract

Luffa aegyptiaca Mill is important plant of family Cucurbitaceae, which have not been much investigated for their *in vitro* cultivation and propagation of multiple shoots. In the present investigation shoots propagation initiation was reported after 21-30 days of leaf culture, In *Vivo* Leaf explants were cultured on MS medium containing various concentrations of cytokinins TDZ/BAP/Kn (0.5-2.5mg/L) alone and also in combination with auxins IAA (0.5 mg/L). Maximum number of shoot bud proliferation was observed at (0.5 mg/L) IAA + (1.5 mg/L).TDZ, compared to all other concentrations of Kn/BAP alone. As the concentration was increased above (2.0mg/L) the shoot bud induction was reduced gradually in both the cytokinins tested. Maximum and High number of shoot bud's proliferation was observed at (1.5 mg/L) TDZ, compared to all other concentrations of BAP/Kn alone. As the concentration was increased above (2.0mg/L) and below (1.5mg/L) the shoot bud induction was reduced gradually in both the cytokinins tested. The concentric effect of cytokinin was found to be effective in inducing maximum number of shoots. Maximum frequency of shoot buds was induced at (0.5 mg/L) IAA (1.5mg/L) TDZ/BAP/Kn. The *in vitro* regenerated shoots produced a greater number of roots on half strength MS medium containing (1.0mg/L) IBA. Thus, the plant developed *in vitro* using leaf explants cultures were established in pots containing garden soil outside under shade in wound temperature and light conditions. These plants flowered after 8 weeks following transfer to pots. The protocol established can be used for rapid multiplication of the specific producing true to type plants.

Key words: *Luffa aegyptiaca* Leaf explants, multiple shoot buds, direct regeneration, Growth hormones



IN VITRO PLANT LET REGENERATION OF TOMATO (*SOLANUM LYCOPERISCAN* MILL. CV. PUSA RUBY) FROM SHOOT TIP EXPLANTS USING FIVE CYTOKININS

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Direct *in vitro* plant propagation was achieved in Pusa ruby cultivar of Tomato (*Solanum lycopersican* Mill) culturing shoot tip explants (0.5cm) on Murashige and Skoog medium. Among various concentrations of five cytokinins tested Adenine (Ad), N⁶-Benzyladenine (BA), Kinetin (Kn), Zeatin (Ze) and Thidiazuron (TDZ) individually. Highest shoots/explants (18.0± 034) were obtained on MS medium supplemented with (2.0mg/L) TDZ. Multiple shoot elongation occurred upon transfer to TDZ (2.5 mg/L each). The elongated shoots were transferred to Indole Butyric Acid (IBA) (0.5-1.0 mg/L) and Indole Acetic Acid (IAA) (0.5-1.0 mg/L) for root induction. Rooting was observed within two weeks of culture. MS medium supplemented with (1.0 mg/L) IBA proved better with seventy percent rooting after 25 days of implantation. Plantlets obtained from TDZ containing media were normal diploid (2n = 24), Most of the roots were long and healthy. Rooted plantlets were successfully hardened under culture conditions and subsequently established in the field conditions. The recorded survival rate of the plants was 86.3%. Plants looked healthy with no visually detectable phenotypic variations.

Keywords: Cytokinins, Multiple shoots, Tomato, Plant regeneration and Rooting

Tomato (*Lycopersicon esculentum* L.) is an economically important vegetable crop and widely consumed vegetable in many countries around the world, including India. At present, tomato is grown in an area of around 4.4 million ha. worldwide with an annual production of 115 million tons. United States of America, China, Turkey and Italy are the major producers of tomato in the world, with India ranking 5th in the world production. In India, it is cultivated in Orissa, Andhra Pradesh, West Bengal, Bihar and Karnataka. The estimated area and production of tomato in India during 2006-07 were about 593.6 thousand ha and 9878.3 thousand tons, respectively. In Karnataka, it is cultivated in an area of 45.8 thousand ha. with a production of 1223.7 thousand tons (Anon. 2008b).

The regeneration capacity of tomato was significantly influenced by explant type (Gubis *et al.* 2005, Hanur *et al.* 2007). The type of explants used not only determines the proportion of explants, which show organogenesis, but also the number of shoots produced per explant. Although almost all explants are amenable for regeneration, cotyledons (Gunay and Rao 1980, Dai *et al.* 1988, Garcia and Luque 1988, Hamza and

Chupeau 1993, Fari *et al.* 2000, Park *et al.* 2003) and hypocotyls (Gunay and Rao 1980, Zelcer *et al.* 1984, Garcia and Luque 1988, Newman *et al.* 1996) are the most widely used explants due to their high organogenic ability. Other explants such as leaf tissue (Dwivedi *et al.* 1990, Chandra *et al.* 1995, Chandel and Katiyar 2000), shoot tips (Garcia and Luque 1988, Mirghis *et al.* 1995), root and epicotyl have been used occasionally for regeneration. The purpose of this work was to study the effect of different five types of growth regulators on direct plantlet regeneration of tomato from shoot tip explants.

MATERIALS AND METHODS:

Seeds of Tomato (*Solanum lycopersican* Mill) cv Pusa ruby obtained from Regional Agricultural Research Station, Lam, Guntur, India, were imbibed in distilled water for 24 h, then surface sterilized with 0.1% HgCl₂ for 3-5 min, rinsed in several changes in sterile distilled water and germinated aseptically on Murashige and Skoog (1962) basal medium. About one cm shoot tips were excised from 3-week-old aseptic seedlings. Dissecting out shoot meristems (~ 0.5 cm long) from the above shoot tips was done using a low power

Antimicrobial potential and phytochemical screening of leaves and fruits of *Solanum thorum* (swartz). A medicinally important plant

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ABSTRACT

The present study designed for antimicrobial potential and phytochemical screening of leaves and Fruits of *Solanum thorum* (Swartz) belongs to the family Solanaceae it is an Important Medicinal Plant. The plant has been used in the folklore system of medicine for the treatment of Asthma, Diabetes and hypertension. To evaluate the antimicrobial potential activity, hydrogen peroxide radicals scavenging activity, reducing power, the total phenolic and flavonoids contents, and antioxidant and antifungal activities of methanol, ethanol and water extracts of leaves and fruits of *Solanum thorum*.(Swartz). Methanol, ethanol and water extracts were evaluated against four Gram positive and Gramnegative bacterial isolates (*Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Bacillus subtilis*) and two fungal strains (*Aspergillus fumigatus* and *Aspergillus flavus*). Methanol extract at different concentrations was tested for antimicrobial potential and phytochemicals were determined by using spectrophotometric method.

The total phenolic content was (40.859±0.017) mg gallic acid/g in the leaves of *L. camara*, while the total flavonoids were (53.112±0.199) mg/g dry weight. Methanol leaves and fruits extract of *Solanum thorum*.(Swartz) showed maximum antibacterial activity against *Staphylococcus aureus* and *Pseudomonas aeruginosa* and was also effective against other bacterial strains as compared to ethanol and aqueous extracts of leaves and fruits. The methanol leaf extract of *Solanum thorum*.(Swartz) exhibited significant inhibition (71%) and (66%) against *Aspergillus fumigatus* and *Aspergillus flavus* respectively.

The methanol extract of the *Solanum thorum*.(Swartz) leaves and fruits effective against selected bacterial and fungal strains. Its phytochemical contents have broad antimicrobial properties and the plant might be a novel source of antimicrobial drug.

Keywords: Methanol, ethanol, Antimicrobial, Phytochemicals *Solanum thorum*



DIRECT HIGH FREQUENCY PLANTLET REGENERATION FROM LEAF EXPLANTS OF *SOLANUM TORVUM* (SWARTZ). A MEDICINALLY IMPORTANT PLANT

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Tissue culture techniques of medicinal plants are important for the production of plant-based high quality medicine. *Solanum torvum* (Swartz) possesses immense medicinal importance of decoction of fruits is given for cough ailments and is considered useful in cases of liver and spleen enlargement. The plant is sedative and diuretic and the leaves are used as a haemostatic. The ripened fruits are used in the preparation of tonic and haemopoietic agents and also for the treatment for pain. It has antioxidant properties. It is intensively used worldwide in the traditional medicine as poison anti-dote and for the treatment of fever, wounds, tooth decay, reproductive problems and *in vitro* culture for commercial production was achieved by culturing the plant using different concentration and combination of plant growth regulators. Mainly, the concentration and combination of auxins and cytokinins in the nutrient MS medium is the key factor which determines successful plant regeneration. Direct high frequency plantlet regeneration has been obtained from 15-20days old seedling leaf explants of *Solanum torvum* (Swartz) using various phytohormones individually and in combination on Murashige and Skoog (MS) semi solid medium supplemented with BAP (1.0-5.0 mg/L), Kn (1.0-5.0 mg/L), IAA (0.5 mg/L)+ BAP (1.0-5.0 mg/L) and IAA (0.5 mg/L)+Kn (1.0-5.0 mg/L) for shoot proliferation. IAA (0.5 mg/L)+BAP (3.0 mg/L) proved to be best for induction of shoots for leaf explants. Individual shoots were aseptically excised and sub cultured in the same media for shoot elongation. The elongated shoots were transferred to Indole Butyric Acid (IBA) (1.0mg/L–5.0mg/L) for root induction. Rooting was observed within two weeks of culture. The rooted plantlets were successfully hardened under culture conditions and subsequently established in field conditions. The recorded survival rate of the plants was 86% and the plants were healthy with no visually detectable phenotypic variations.

Keywords: *Solanum torvum*, direct plant let regeneration, Leaf explants, High frequency shoot formation and *in vitro* Rooting

Abbreviations: BAP, 6-Benzyl Amino Purine;; Kin, Kinetin IAA, Indole Acetic Acid MS, Murashige and Skoog

The family *Solanaceae* is composed of approximately 90 genera and between 2,000 and 3,000 species. The family is widely distributed throughout tropical and temperate regions of the world, with center of diversity occurring in Central and South America and Australia. Within this family, *Solanum* is the biggest genus in the family, with the widest range of geographical distribution. A total of 1700 species of *Solanum* have been recorded all over the globe. 41 species represented in India, 19 are native, 8 naturalized, 10 cultivated and 4 cultivated experimentally, (Deb, 1979). *Solanum torvum*, commonly known as turkey berry, devil's-fig, or prickly *Solanum* (Pier 2003) is a plant of great economic importance. Its extract, which is rich in Solanine and Solasodine (steroidal alkaloids) has beneficial effect on bronchial asthma. It is cultivated in the tropics for its immature edible fruits (Langland and Burks 1998). Many species of

the *Solanaceae* have been regenerated by shoot organogenesis using young leaf explants eg. *Solanum surattense* (Gupta and Handra, 1982), *Solanum candidum*, *S.quitoense*, *Solanum sessiliflorum* (Hendrix *et al.* 1987), *Solanum melongena* (Mukherjee *et al.* 1991) and *Solanum commersonii* (Cardi *et al.* 1993). Arulmozhi and Ramanujam (1997) conducted *in vitro* culture studies on *Solanum trilobatum* L. with foliar and stem explants on MS medium containing IAA, BAP and KIN combinations. Madhavan *et al.* (1998) induced high frequency of shoot regeneration from mature seeds of *Solanum trilobatum* L. Callus was induced from root and shoot apical region and hypocotyls on MS medium supplemented with 2,4-D.

The plant tissue culture methods also provide a base for the improvement of crop e.g. it is to induce somaclonal variations, *in vitro* mutations, herbicide tolerance, di-haploid

‘SHANDY’ A TRADING CENTRE FOR TRIBALS OF WARANGAL DISTRICT OF TELANGANA: A CASE STUDY

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Abstract: Tribals have been living in thick and remote forest areas. Their main occupation is agriculture and also they collect forest produce, rearing of animals, hunting, making bamboo basket and labour works etc. They are living far away from the towns and also they don't have proper transportation facilities to their villages. So, they cannot go to regular (urban) markets for selling and purchasing of commodities. Therefore, they depend on weekly markets as a trading centre for tribals. Local weekly markets or haat or shandy or shanthas are functioning in a traditional style of retailing where on a particular day of a week petty traders display their commodities on a makeshift arrangement in places authorized by village Panchayat authorities against payment of some fixed fee. The present study focuses on buying habits of tribals, focuses on how individuals make decisions to spend available resources (money, time and effort) on consumption related items, determines the socio-economic status of the tribal buyers who visits at shandy and studies about the importance of shandy for tribals. It is concluded that the tribal men visit shandy along with wives, because females have better ideas on domestic requirements and better bargainer's. Normally tribals buy and sell their produce at bargaining price. In this situation buyers are paying more money to sellers. They move around the shandy to glimpse over the products they wish to buy enquire their prices at few shops for edible items as well as non-food items on priority basis.

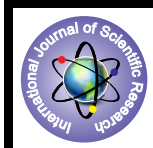
Key words: Shandy, trading, tribals, buyers, assembling, forest and buying habits

Introduction

Warangal was the capital of a Hindu Shaivite kingdom ruled by the Kakatiya dynasty from the 12th to the 14th centuries. The old name of this city is Orugallu. 'Oru' means 'One' and 'Kallu' means 'Stone'. The entire city was carved in a single rock; hence the name Orukallu means 'one rock'. The city was also called Ekasila Nagaram. The Kakatiyas left many monuments, including an impressive fortress, four massive stone gateways, the Swayambhu temple dedicated to Shiva, and the Ramappa temple situated near Ramappa Lake. The cultural and administrative distinction of the Kakatiyas was mentioned by the famous traveller Marco Polo. Famous or well-known rulers included Ganapathi Deva, Prathapa Rudra, and Rani (queen) Rudramma Devi. The Mughal emperor Aurangzeb conquered Golconda in 1687, so, it remained part of the Mughal Empire until the southern provinces of the empire split away to become the state of Hyderabad in 1724 which included

the Telangana region and some parts of Maharashtra and Karnataka. Hyderabad was annexed to India in 1948, and became an Indian state. In 1956 Hyderabad was partitioned as in the part of the States Reorganization Act, and Telangana, the Telugu-speaking region of Hyderabad state which includes Warangal, was joined to Andhra Pradesh. Warangal is 145 km northeast of the state capital of Hyderabad. It is the sixth largest city in Andhra Pradesh and second biggest city in Telangana state after bifurcation, the Telangana formed 29th state in India. The district is bounded by Karimnagar district to the north, Khammam district to the east and southeast, Nalgonda district to the southwest, and Medak district to the west. Warangal is well known for granite quarries (notably the black and brown varieties), grain markets for rice, chillies, cotton, and tobacco. The administration of the district is 5 revenue divisions, 51 mandals, 1049 villages, 1 Municipal Corporation, 2 municipalities 3

Tribal Weekly Markets: A Case Study of Adilabad District of Telangana



Commerce

KEYWORDS : Weekly markets, exploitation, tribals, shanthas, Girijan Cooperative Corporation

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ABSTRACT

Scheduled tribe communities lives around 18.08 percent of Adilabad district areas in various ecological and geo-climatic conditions ranging from plains to forest, hills and inaccessible areas. Out of many issues concerning tribals, one of the important issues i.e. marketing activities of tribals. The tribal, lives in subsistence economy, sells their marketable surplus in the weekly markets, locally known as 'Shanthas'. The present paper study the importance of weekly markets in tribal life and also study the buying and selling practices of tribals in weekly markets. It is concluded that the Adilabad district weekly markets are very big and large number of sellers and buyers will visit the Shanthas. Tribal people buy and sell their commodities in these markets. If Girijan Cooperative Corporation depots will available in weekly markets, they can also buy commodities from GCC depots. In weekly markets sellers are more commercialized it leads to the exploitation of the tribals. They are not only cheating on price, but also in the weights and measures used. In these markets sellers are offering urban made products which are low quality products. These markets are not regulated by government but it will be under control private traders.

Introduction:

Article 342, of the Indian constitution defines 'Tribal Folk' as "People living in a particular place, who enter into marriage relationship among themselves, who have no specific skills in any work, traditionally or ethnically ruled by adivasi leaders, who speak any special language, have own beliefs, customs and tradition". The criteria of geographical isolation, distinctive culture, primitive traits, shyness of contact with others and economic and social backwardness, are in general, considered relevant in the definition of tribes in India. Their poverty, social and economic backwardness are highly visible in the literature.

Concept of tribe, tribal society or tribal identity requires systematic investigation as they have implications both for theory and practice including the policy-related issues.1 Many assume that the tribal society is homogeneous or undifferentiated in terms of social and economic status.2 Tribal people of India are frequently referred to as vanajati, Vanavasi, pahari, Adimjati and Anusuchit Janjati. All these different names denote them as castes of forests, inhabitants of forests, hill dwellers. Original communities, first settlers, folk people, primitive people or schedule tribe respectively. Among all these terms, Adivasi is known most extensively and Anusuchit janjati or Scheduled tribe³ and the Constitutional Constituted as Scheduled Tribe.

The district derives its name from Adilabad, its headquarters town which was named after the ruler of Bijapur, Ali Adil Shah. The district was for long not a homogenous unit and its component parts were ruled at different periods by nasties namely, the Mauryas, Staavahanas, Vakatakas, Chaludyas of Badami, Rashtrakututs, Chalukyays of Kalyani, Mughals, Bhosle Rajes of Nagpur and Asaf Jahis, besides the Gond Rajas of Sirpur and Chanda. Originally this was not fully fledged district but a sub-district named Sirpur-Tandur which was created in A.D. 1872 with Edlabad (Adilabad), Rajura and Sirpur as its constituent's talukas. In 1905 the status of this sub-district was raised to that of an independent district with head quarters at Adilabad.

The district was situated between 77.46' and 80.01', of the eastern longitudes and 18.40' and 19.56', of northern latitudes. The district is situated on the northern boundary of Telangana, forming a border with the Yavatmal and Chandrapur districts of Maharashtra on the north, east and western borders and Nizamabad and Karimnagar districts of Telangana on the southern border. The District Compris-

es of 52 Mandals and 1743 villages of which 1557 villages are inhabited and 186 villages are un-inhabited. There are 7 Municipalities in the District. The District is conveniently formed into 5 Revenue Divisions as follows: Adilabad, Nirmal, Uttoor, Asifabad and Mancherial.

According to 2011 Census, Adilabad had population of 2,741,239 of which male and female were 1,369,597 and 1,371,642 respectively. Out of the total population of the district, 4.89 lakhs persons are Scheduled Castes and 4.96 lakhs persons are Scheduled Tribes forming 17.82% and 18.08% of the total population district respectively. The district literacy rate is 61.01 percent. The literacy rate among the SCs and STs are 58.46 per cent and 51.49 per cent⁴. Some of the tribals groups like Gonds, Lambadas, Kolams, Mannewars, inhabit Adilabad. Hence it can be ascertained that Adilabad is essentially a rural district with vast forest cover and tribal populations. Majority of tribals depend on agriculture and forest resource for their livelihood. In this present study Adilabad district is selected, because of second highest tribal population district in Telangana State.

Tribals in Adilabad: The tribal area of the district is endowed with rich minerals, forest and water resources. Coal, Limestone, Iron and Clay are the important minerals found in the tribal areas of the district. The soils of the scheduled area are Clay loams and clay under black soils, Sandy loams, under red soils. The texture of the soil differs from mandal to mandal. The mineral resources of Adilabad are being exploited in commercial way.

The scheduled areas of the District are covered with rich forest, wealth on which the tribal depend for, fuel, house building materials, and agricultural implements etc. for their livelihood. During lean period, they depend on roots, tubers, bark, flowers, fruits and leaves etc., which are abundantly available in forests. Thus, the dietary items of tribal families mainly consist of leafy vegetables, fruits, etc. which are having high nutrition value. Minor forest produce is available throughout the scheduled area. Collection of minor forest produce is one of the secondary sources of livelihood to the tribals, the necessity of which includes addaleaf, tamarind, gum, mohwa flowers, soap nuts, cleaning nuts, hill brooms, etc. The major forest produce like teak, bamboo etc. are also available in the forest area of the scheduled area. The composition of the tribal of Adilabad district as estimated in the ITDA Report is as follows:

EVALUATIVE STUDY OF RAJIV AAROgyASRI HEALTH INSURANCE SCHEME IN TELANGANA STATE

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ABSTRACT

Health is an important constituent of human resource development. Good health is real wealth of society. It not only increases human efficiency but also decreases private and public expenditure on sickness and diseases. The government of Andhra Pradesh introduced Aarogyasri as a cashless health insurance program for households living Below Poverty Line (BPL) in April 2007. A Scheme is a unique Community Health Insurance Scheme being implemented in State of Telangana. The Scheme provides financial protection to families living BPL upto Rs.2 lakhs in a year for the treatment of services ailments requiring hospitalization and surgery. The objective of the scheme is to improve access BPL families to quality medical care for treatment of identified diseases involving hospitalization. Surgeries and therapies through an identified network of health care providers are carried out.

The present paper focuses, the examine the structure of Rajiv Aarogyasri Health Insurance Scheme (RAHIS), to evaluate the accessibility of RAHIS whether home or outside of the district wise beneficiaries and study the demographic profile of beneficiaries of RAHIS and also study the understand the availment of benefits of RAHIS by respondents in government or private hospitals. The present study relied on secondary data and for analysis of data statistical techniques are used like coefficient of correlation, pie, bar and line charts.

The Aarogyasri Scheme covered all districts of Telangana State. Nearly about four-fifths of the household have Rajiv Aarogyasri Health Card in Telangana state. Among these highest in Medak district and lowest in Hyderabad district and 92 percent of STs and 80 percent of SC have this facility, residing in 10859 villages 584 Revenue Mandals of all districts of Telangana State in five phases. The scheme started with 163 procedures covered and has been gradually extended to 938 procedures. The majority of beneficiaries utilizing the scheme are illiterate and have a rural address. Since inception of the scheme till 17695 Medical camps were conducted and 4250864 patients were screened held by the network hospitals in rural areas. 2177848 Pre-authorisations were performed and 1977992 surgeries were done. The pre-authorised amount for the surgeries/therapies is Rs.5497.45 crores. The claim paid is Rs.5431.41 crores for the surgeries/therapies performed. It is concluded that the majority i.e., 72.4 percent of households access medical services from Private/Corporate hospitals and 27.6 percent from Government hospitals. The community wise medical services rendered by beneficiaries of RAHIS are highest i.e., percent from BCs community and followed by minorities (14.8%), OCs (14.4%), SCs (10%) and STs (6.7%) respectively. Hence, it is that suggested appropriate steps are initiated at the earliest for development of infrastructural facilities and recruit required staff in government hospitals to meet the needs of the medical services of poor families.

Key words: Below Poverty Line, Aarogyasri Health Insurance Scheme, Surgeries, Therapies.



The Role of Sellers in Tribal Areas of Telangan A Socio-Economic Survey

KEYWORDS

Sellers, tribal agency areas, weekly markets, communities

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ABSTRACT *The sellers are the most important components forming the central level of the mechanism of weekly markets; in fact, they are the controllers of the periodic marketing system. A large gathering of individual sellers always invites potential buyers in the market. The present paper studies socio-economic status of the sellers' and role of the seller in the tribal markets for procurement of MFP/AP and supply of daily needs. And also discusses about the nature of trading activities and availability of infrastructure facilities in weekly markets. The present study relied both secondary and primary data. The primary data collected from seller respondents through well designed schedule in selected tribal agency districts in Telangana. It concluded that the weekly markets held commonly in the areas where the tribal population is more. The selling is a self employment business to the sellers with small investment and without any requirement of infrastructure like building/shops and there is a chance to get more returns. Sellers can take their produce to one location rather than having to go from door to door. They can see how much of a particular product is on offer; compare the quality of their produce with that of other sellers, and set their prices accordingly.*

Introduction

The term 'tribe' denotes a group of people living in primitive or barbarous conditions. Article 366(25) of Indian constitution refers scheduled tribes as those communities who are scheduled in accordance Article 342 of the Constitution. This Article says that only those communities who have been declared as such by the President through an initial public notification or through a subsequent amending Act of parliament will be considered to be Scheduled Tribes. The essential characteristics, first laid down by the Lokur Committee, for a community to be identified as Scheduled Tribes are –

- Indications of primitive traits;
- Distinctive culture;
- Shyness of contact with the community at large;
- Geographical isolation; and
- Backwardness

Tribal economy is mainly an agricultural economy. The tribals depend upon utilization of the natural resources to get their sustenance.

Telangana with a population of 351.9 lakhs (according to the 2011 census) accounts for about 3.6% percent of the total population of India. Telangana has a sizeable Scheduled Caste and Scheduled Tribe population. The SC population is 54.3 lakhs and the ST population is 32.8 lakhs, which constitutes 15.4% and 9.3% percent of the total population. There has been a significant increase in the percentage of tribal population in total population from 2.81 percent to 9.34 percent for last three decades i.e. 1991 to 2011 census. But in case of general population drastically decreasing from 47 percent to 16.35 percent. As per 2011 census the literacy rate among the tribal's 49.51 percent is found to be far below the overall literacy of the state (65.11%). The female literacy rate among the tribal's is far lower 20.5 percent as compared with overall female literate rate (39.44%) of the state. In Telangana state 32 tribal sub groups in Telangana state out of them five tribal groups are Lambadas, Koyas, Gond, Yerukala and Pradhan

are dominated around 91 percent of tribal population. The Lambadi sub group constitutes the largest component of around 62 percent, of the entire tribal community in Telangana.

Role of the seller in tribal markets

The rural people are largely depends upon periodic markets for the sale transactions of AP/MFP that takes place in a retailing process at regular interval of a given time and place. These markets are responsible for establishing the grass root level networking of trade systems throughout the developing world.

The seller plays a vital role in tribal agency areas for procurement of commodities and supply of daily requirements to tribals. Basically tribal lives in forest and hill area, those places don't have proper transport, communication facilities. Even though some places are developed these facilities. But the permanent marketing facilities are not available in tribal villages for their trading. Even though few shops are available in tribal village they are not satisfy completely the tribal needs and also charge high rate. If the permanent shops will open in tribal area shops cannot run successful, because very less population (around 200-300) lives in each village. It is observed that the permanent market system is not suitable for agency people. Therefore, sellers are come to agency area every week end and arrange a temporary stall display their commodities in proper manner and offer the commodities for sale and also purchase produce in a pre-determined particular place and time of the day.

In weekly market starts business at morning and it remain open till evening. The seller comes from various places of towns, nearby villages and also from other neighboring states like Andhra Pradesh and Maharashtra. Especially from Maharashtra sellers visits in Adilabad district and Andhra Pradesh sellers visits in Khammam and Mahabubnagar district in Telangana state. At morning hours sellers made temporary sheds with plastic covers and sticks or either use umbrella and arrange their items properly display

FUNCTIONING OF WEEKLY MARKETS IN TRIBAL AREAS OF TELANGANA

Dr. RAMAVATH RAVI*

Abstract: The tribal lives in subsistence economy, sells their marketable surplus and buys essential commodities in the weekly market, locally known as 'shanthas'. The regulated marketing system is not suitable in tribal areas. Hence, they are depending on weekly market for their trading and also recreational centres. Where lot of tribal people make it a point to definitely attend the weekly market on week days to eat, drink and make a jolly trip on the weekends. Usually tribals have various kinds of disputes such as land, matrimonial problems and others that are settled at weekly markets. The present paper focuses to understand the importance of weekly marketing activities in tribals' areas and also to know the socio-economic conditions of buyers and sellers who participate in weekly markets. For selecting the sample stratified random sampling technique is used to select the respondents. In the present study two tribal dominated districts are selected namely Khammam and Adilabad. 152 samples are selected from each district, out of it 120 are buyers and 32 are sellers, while giving equal importance to all the parameters. Four weekly markets are selected from each district and from each weekly market 30 buyers and 8 sellers are selected. It is concluded that the weekly markets generate employment opportunities to rural tribals in a large number and hereby resulting improved earnings and better economic status among the tribals in the surrounding villages. Hence, it is suggested that the government should provide minimum amenities at the weekly market.

Key words: Shanthas, Exploitation, Employment, Communities, Tribals

Assistant Professor of Commerce, Govt. Degree College, Mahabubabad district, Telangana *

INTRODUCTION

Scheduled Tribes (2011 Census Report) 104,281,034 represent 8.6% of the total country's population. There are about 654 ST communities throughout India and 75 of the STs are most backward and termed as "Primitive Tribal Groups"¹. The essential characteristics of these communities are primitive traits, geographical isolation, distinctive culture, shyness of contact with communities of other areas and backwardness. Tribals are living in remote and exclusive areas of thick forest, hill slopes, and lack of facilities. They heavily depend on forest resource for their livelihood in terms of food, material and money. The tribal lives in subsistence economy, sells their marketable surplus in the weekly market, locally known as 'shanthas'. But unfortunately, the tribal are unaware of the marketing intelligence due to lack of adequate information and exposure, falls an easy prey to the powerful segment of traders in the 'shanthas'. The working of marketing system in the tribal areas, thus, it appear to be unregulated which continues to be a dominating reason for keeping tribal economy depressed. Despite the volume of production has been increasing in few areas. But, mere increased production has no meaning unless the tribals get remunerative price for the produce in the market. Weekly market, the only marketing channel in the tribal areas and which doesn't promise for suitable price for tribal produce.

¹Ch.Parandamulu (2012)"The Socio-Economic Conditions of Tribal Women in India & Need for their Empowerment", The Indian Journal of Social Science Research, Vol.1, No.2, March, 2012, pp 146-149.

SELF EMPLOYMENT OF TRIBAL WOMEN THROUGH STREET VENDING IN NALGONDA DISTRICT OF TELANGANA: A BRIEF STUDY

Dr. Ramavath Ravi

Assistant professor of Commerce, Govt. Degree College, Mahabubabad, Warangal (Dist), Telangana

ABSTRACT:

Tribal societies generally view gender as complimentary and egalitarian, where each role is defined but complimentary to the other. Men focus on cultivation and women on planting and gathering the foods, thus both roles are necessary and complimentary in the holistic relationship of the family. Traditionally tribals are depending on agriculture and forest resources. But after Globalization & liberalization have often destroyed indigenous subsistence economies and displaced tribals from their land. Therefore, tribals are migrating to towns/cities for searching employment. Today, vending is an important source of employment for a large number of poor as it requires low skills and small financial inputs. This paper studies the self-employment of tribal women through street vending. The street vendors are not financially self-sufficient to meet their financial needs for the business; this is more prominent in the case of women street vendors. The data has been collected through proper designed schedule, interview 120 women street vendors in the study area. It is concluded that the majority of the women street vendors get finance from their own source. Bank and other financial institutions hesitated to provide finance to the women street vendors on the ground that they are unable to provide security against credit. The government should take initiative to include women street vendors through its various schemes for financial and non-financial needs. There is no doubt that women street vendors are integral part of our society.

Key words: Women street vendors, financial, tribals, employment

INTRODUCTION

A high proportion of socially and economically underprivileged sections of society are concentrated in the informal economic activities. Especially low level income group families largely depend on these sectors. Faster and inclusive growth needs special attention to informal economy. Looking at the history of our country; street vending has been a part of our culture and tradition. Traditionally, during the times of the Vijayanagar Empire, street vending mostly in the form of selling of gold and silver ware. The folk tales said that children also speak of vending on streets in one form or the other. More recently, street vending includes selling of eatables, to vegetables, to even carpets. Street vendors form an important part of the socio-cultural and economic life since time immemorial. Traditionally, these vendors have been a part of our lives, which still it, continues. And nowhere in history have they been considered as obstructions to public space till colonial rule entered the country. Street Vendor means it is broadly defined as a person who offers products for sale to the public without having a permanent built-up structure

from which to sell goods. The street vendors may be stationary in the sense that they occupy space on the pavements of other public/private spaces or, they may be mobile in the sense they move from place to place by carrying their wares or push carts or in basket on their heads. Now a day the vendors carrying vegetable and fruits till night in front of our house making it very convenient. There are others who keep the healthy refreshing tender coconut under the shade of a tree which are very energizing after having walked or driven in the sun. And there are still others who carry roasted or steamed groundnuts which is a nice snack to munch on. Many a time we are blessed by a cobbler on the street when our footwear snaps and we have a long way to go. These are small things we all enjoy and have taken for granted that little do we think about the services they provide and the harsh conditions under which they function.

Scheduled Tribes (STs), the socially and educationally disadvantaged groups are one of the most exploited and deprived sections of the population in India. The tribal women, constitute like any other social group, about

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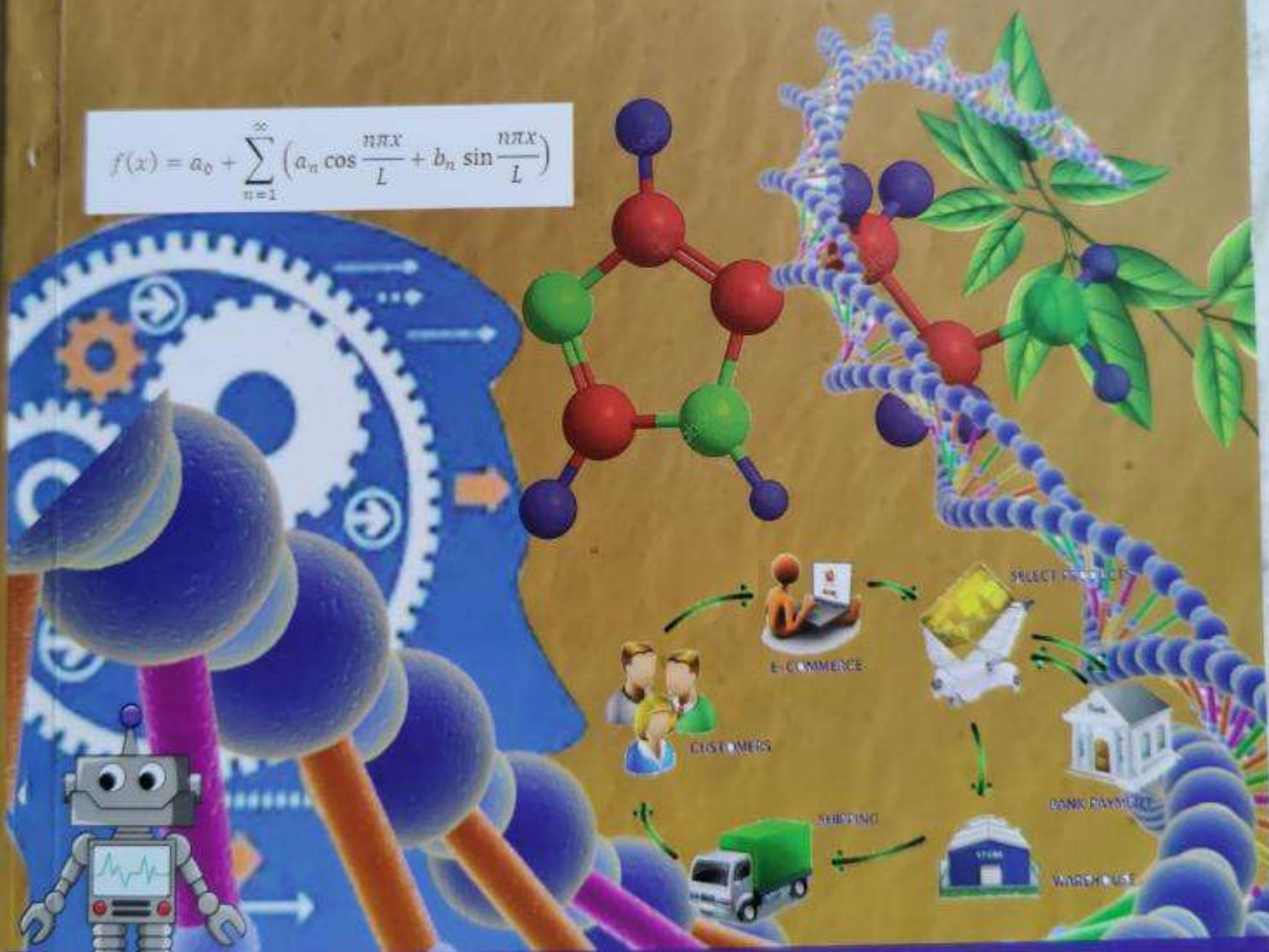


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ECONOMICS OF TRIBAL AGRICULTURE



Dr. B. BONDYALU

ABOUT THE AUTHOR



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The scheduled tribes in India, numbering more than 700 are distinct as a social group with their unique features of socio economic, cultural and religious living. ST population of 10.43 crores in India as per 2011 census accounting for 8.6 percenta of the total population is widely spread across the states and union territories with a few exceptions. The state of Telengana has the largest concentration of ST population, 9.3 percenta among the states of south India.

This book divided to six chapters. vividly presents the transformation of tribal agriculture to modernity by selecting one plain and one agency villages inhabited by two different tribes. All the aspects of tribal agriculture like podu cultivation crop pattern, input applications and marketing of agricultural produce are analysed in detail. The extent of awareness and transition to modernity are elaborated at length as more than 80 percent of the tribals depend on agriculture. A separate chapter comparing the two sample villages focuses on the variations in catching of the trends of modernity in agriculture. Spatial factors weigh more in the change of mindset and production process as the plain village is ahead in modern practices when compared to the agency village. This book is of immense help to the researches, academicians, policymakers and to those who have a stake in tribal development.

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Women and Polity in Telangana

Dr. V. VIJAYA LAXMI

In India, for many centuries, women did not rule as sovereigns, though there has been no written law which made them ineligible for political succession. This might be due to the general dependency of woman on men. Moreover, war fares and internal security were considered as male oriented activities and women did not fit to assume these roles. Kautilya too, in his Arthashastra declares that in the event of a king dying without leaving behind a male issue, the minister should invest with authority, to ordain a princess or widow of the late ruler, to ensure continuity of rule in the same dynasty¹. However, he made it clear that the princess was evidently not to succeed in her own right just as the widow was to wield the authority, till a son was begotten and was duly crowned. Nitivakyamitra says in case of king's death his son, full brother, half brother, uncle, male of the same family, daughter's son, or even a stranger elected by people could take up the charge as a king but, there is no reference of widow of deceased or his daughter to assume the charges. Despite the fact that law giving authorities are not unanimous about women's political participation, substantial references can be found in the records pertaining to ancient and medieval period regarding women governors². Such instances are more common in early medieval south India during the period of Rashtrakutas and Western Chalukyas³. The epigraphs indicate participation of women in politics ever since the period of Satavahanas. This became a regular feature by the time of Kakatiyas. This development can be explained in terms of the political changes of medieval period due to the prevalence of feudal elements in the polity. Several petty clans were ruling almost independently owing nominal allegiance to the emperors. The continuity of existence of each state depended upon the power of control exercised by the ruler. Thus there were continuous wars between the feudatory chiefs. Further their feudal allegiances are not permanent and were frequently shifting from one imperial power to the other, according to the changing situation of political supremacy. Under these circumstances, the feudatory chiefs were, for most of the time away from their kingdoms either by participating in the wars for extension of their area of control or helping their emperors in the campaigns. For administration of their domain, they depended mostly on their ministers and officials. Under such circumstances, perhaps, their wives began interfering in the administrative affairs of their kingdoms. Sometimes, they had to assume the role of sovereigns in the absence of a male successor or as a guardian of the minor son in the event of sudden death of the king and to ensure continuity of political control. In addition, constant wars might have damaged the peaceful life of the country, plundering the cities or razing the forests. This was alleviated

Violence against Women- Issues, Challenges and Prevention

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ABSTRACT

Violence against women and girls is an epidemic of global proportions and is now recognised as a public health problem. It is both a violation of human rights and fundamental freedoms of women. Violence against women perpetuates gender inequality that hampers development and peace in the society. Gender inequality and gender discrimination are root causes of violence against women, influenced by the historical and structural power imbalances between women and men. Irrespective of geographic borders, economic and social class, religion and ethnicity, violence impacts women of all ages in all communities. Violence against women occurs throughout the life cycle from pre birth, infancy, childhood, adolescence, adulthood to senescence. Most of the data are believed to be unreliable as many cases go unreported.

This paper makes an attempt to discuss the reasons behind violence against women and tries to find solutions to prevent the same as it is the real need of the hour to end gender discrimination and perpetuate gender equality.

Key words: Gender inequality, Gender Discrimination.

Introduction

The home is often equated with a sanctuary, a place where individuals seek love, safety, security and shelter. For some women, the home is a place that imperils lives and breeds some of the most drastic forms of violence perpetrated against girls and women. Violence is usually perpetrated by males who are, or who have been in positions of trust and intimacy and power e.g. husbands, fathers, fathers-in-law, stepfathers, brothers, uncles, sons, or other relatives. The Protection of Women from Domestic Violence Act (PWDVA), 2005 defines domestic violence as any act, omission or commission or conduct of the respondent, which includes threat or actual abuse. A typology of violence presented in the world report on violence and health divides violence into three broad categories: viz. a) one who commits the violent act b) self directed violence, c) interpersonal and collective violence

The International Centre for Research on Women (ICRW) in multiple centers in India reported that 85% of men admit they had indulged in violent behaviour against their wives at least once in last 12 months. 57% of men admitted to have sexual abuse with their wives. 32% of men admitted to committing violence on their pregnant wives. The men indulged in violence to establish their

International Terrorism and Women Trafficking- Challenges and Policy Options
power over the weaker sex. Subtle and insidious forms of violence include repeated humiliation, insults, forced isolation, limitations on social mobility, the constant threat of violence and injury, and denial of economic resources.

From domestic violence such as female infanticides, dowry deaths to sexual harassments female trafficking and harmful practices such as female genital utilisation, forced prostitution, far too many women face violence or threats of violence in one form or other. This restricts women in all areas of social life and their access to sources, services and activities making them poor with lack of protection and denies women of her fundamental freedoms such as right to live, equality, liberty, security, equal protection under law, right to maintain good physical and mental health, right to just and favourable conditions of work and finally the right not to be subjected to torture or other cruel, inhuman are degrading treatment or punishments¹. Cases of violence against women are steadily increasing in the country. In our country, there is one dowry death for every 78 hours, one act of sexual harassment every 59 min, one rape every 34 min, one act of torture every 12 min and almost one in every three married women experienced domestic violence. From domestic violence to sexual harassment, human trafficking to harmful practices such as female genital mutilation, far too many women in far too many places face violence or threats of violence on a daily basis. Today, estimates show that nearly 1 in 3 women has experienced some form of physical or sexual violence an astounding and unacceptable statistic and one of the most challenging barriers to women's full participation².

Violence against women and girls is related to their lack of power and control, as well as to the social norms and taboos that prescribe men and women's roles in society and condone abuse. Inequalities between men and women cut across public and private spheres of life, and across social, economic, cultural, and political rights; and are manifested in restrictions and limitations on women's freedoms, choices and opportunities. These inequalities can increase women's and girls' risks of abuse, violent relationships and exploitation, for example, due to economic dependency and limited survival and income-earning options, or discrimination under the law as it relates to marriage, divorce, and child custody rights. Violence against women and girls is not only a consequence of gender inequality, but reinforces women's low status in society and the multiple disparities between women and men. (UN General Assembly, 2006).

Freedom from violence is a fundamental human right as critical to individual health and well-being as it is to our collective growth and prosperity a nation. According to a recent estimate, intimate partner violence imposes an economic drag of one to nearly to four percent of GDP across a variety of countries. Failing to prevent and respond to violence against women means that we are failing to provide our communities, our economies and ourselves with the opportunity to thrive. Legislation by itself would not suffice because violence against women is a deep rooted social problem. They significantly contribute to the increasing social exclusion of domestic violence victims and lower their chances for financial and other independence.

Relevance of Social Science and Promoting Research

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Social sciences promote logical thinking which is essential in decision making and finds solutions for national problems. It studies how society functions; what are factors responsible for social changes and relationship between individual and society. It develops critical thinking and analytical understanding which in turn help us to improve our societies. We also study the steps taken by people to effectively run the society. we also acquire knowledge to question, find out solutions to problems our society is facing. We gain the understanding about success and failures of situations in the past. To understand people and society, to understand the changes in society and how society came into existence we need the knowledge of Social Sciences. Social Sciences provides insights into all types of social situations. It teaches about evolution of technology and helps us to understand the impact of technology on the society. Social sciences carries a normative responsibility to widen our knowledge on human values namely freedom, trust, mutual respect and respect for others. It studies human behaviour that is responsible for various activities of the society.

The various disciplines of Social Sciences help us to think, debate, understand adapt a concept. We develop skills, creativity, teamwork, self organisation and communication by applying the knowledge of Social sciences. The advancement of technology many legal, ethical, social issues sprang up and to combat them we need Social Sciences. Social scientists are working hard to make sure that health, leisure and social care services work to best effect in any society. The social scientists cover a wide array of complex issues that make rules to safe guard rights of the citizens. They make rules to out throw crime from the society. They make educational policies and develop new insights to make the education structured and effective, organize institutions, to provide equal opportunities for all. Social accounting, equitable distribution of income and wealth, employment, enhancement of physical and mental health so and so forth.

Social Sciences works in an interdisciplinary manner on issues involving socio-economic policies, regional development, environmental awareness, globalisation and policies on science and technology. It promotes skills which enhance people capabilities all this promote civic competence and help us to grow as informed and responsible citizens. Social sciences make us more responsible as human beings by teaching us ethics, moral values and thus develop a sense of being a responsible citizens with rights to actively work for changing the society.

The History of Social sciences begins in the age of enlightenment, which saw the evolution of philosophy. It was influenced by various revolutions. the social sciences developed to study social improvement of group of interacting entities¹ social sciences, columbian encyclopedia, (1897). Comte referred social science a social physics that developed five routes

1. Led to the rise of social research
2. Led to studying social facts
3. Led to development of methodologies
4. Led to economic knowledge
5. Led to correlation of knowledge and promotion of social values.

Great social scientists like Comte, Durkheim, Marx and Weber evolved the social sciences. Often it is difficult to know where one social science end and other's begin.

Social science research is widely regarded as providing substantial benefits to individuals and to local, regional, national and international communities. In the world of growing commoditization and marketisation, social sciences has no takers. Social Science research is facing serious criticism for not having met expectations in analysing problems of the society that have emerged, particularly to raise India on par with the global standards



EXPANDING THE QUALITY OF EDUCATION THROUGH THE ONLINE MODE IN RURAL GOVERNMENT DEGREE COLLEGES IN THE MAHABUBABAD DISTRICT: ISSUES AND CHALLENGES

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Abstract:

The paper focuses on improving the quality of Higher Education through online mode by identifying the practical issues faced by students and teachers working in Mahabubabad District's rural Government Degree colleges. Students and teachers' perceptions of online learning and teaching, their concentration, the LMS platforms they use, and the government's support for rural colleges to improve quality are all investigated. Both students and teachers are in the process of learning and are willing to progress to the online mode of education. We chose rural Mahabubabad colleges for our case study because they are going to experience a digital divide. The lack of technical skills resulting from a lack of interaction with teachers has become a problem in online learning. The paper also discusses the strategies to be used when going online and makes a few recommendations for improving the quality of online education after the paradigm shift from offline to online.

The study aims to determine how Mahabubabad rural degree colleges managed to provide knowledge during the omicron pandemic, when degree colleges were forced to adapt their educational processes to exclusively online teaching and learning in a short period of time. We began to look at students' perceptions forward into online learning, their ability to absorb information, and their use of E-learning platforms in this regard. A semi-structured questionnaire was used to conduct an online survey. From the 17th to the 30th of January 2022, data was collected including over 100 students and teachers at four degree colleges in the Mahabubabad District.

Health Issues Affecting Wellbeing of Women in India

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Abstract

Women's health is a global issue. Women's health matters as they occupy multiple roles in the society. Though women's life span is an average of 63, relatively in comparison to men, but those live aren't healthier due to many reasons like poverty, discrimination, violence, medications, social and environmental factors etc. This paper tries to focus in major health issues like Cancer, type II Diabetes, Musculoskeletal diseases, Osteoporosis, Cardio-vascular diseases, etc. Experts note that mental illness affects people of all ages but women suffer from anxiety, depressions, hormonal changes which affect the women in one way or other. There is technological advancement that includes ultrasound, MRI, etc but they are very expensive and women cannot afford them to check their health. Over 30% women are victims of physical or sexual abuse which in turn is affecting their health. The Government is not addressing the health needs of women, research that is being carried out on women health is meager and it has to be emphasised. For women in many countries, discrimination and denial of basic rights begin at infancy and they negatively show their impact on their health. Worldwide education, occupational opportunities and access to health care are critical components for a healthier future. Many of the leading threats to women health can be prevented by constant health checkups, eating healthy food, maintaining healthy weight, avoiding smoking and alcohol consumption and managing stress which women don't give much importance. This paper talks about top health issues affecting women health, the steps that Government should take to promote Women health, technological advancements, various hormonal changes that affect women during Menstruation, Pregnancy, Menopause, etc. Finally the precautions the women must take up to safe guard one's own health for a better future.

Keywords: Auto immune diseases, Menopause, Irritable bowel syndrome, STDS, Alzheimer's.

Introduction

Women's health matters and that focusing on women's health and the study of sex and gender differences in disease have contributed to increased knowledge as

Entrepreneurial Competencies among Women Graduate Students of Public Funded Higher Educational Institutions - A Study

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ABSTRACT

Entrepreneurship is considered to be an important input for rapid economic development. In developing economies, it could play an effective role in coping with various socio-economic problems. Many developing regions do not suffer from resource constraints; rather the required skill is missing to convert the physical resources into useful enterprises. Any organization in today's world of growing costs, increasing competition and ever changing technology should establish a value edge in all activities including Human Resource Management. Managerial competence is the sustained value edge which the company successfully demonstrated through its efficient business process. The purpose of the present paper is to examine the level of competence among women graduate students and their interest towards entrepreneurial career. With the help of structured questionnaire, data has been collected from 160 women graduate students of Government degree colleges in Warangal district of Telangana State. The result revealed that women graduate students have high level of competence but their preference and interest is not towards entrepreneurial career mainly because of economic problem.

Key words: Entrepreneur, Competence, Entrepreneurial Competence.

Introduction

Women in recent times are considerably occupying a prominent place in business promotion also. The fact that almost half the population of this large country comprises of females while businesses owned and operated by them constitute less than 5 percent, is a reflection on social, cultural as well as economic distortions in the decades of development.

As education has spread and compulsions for earning have grown, more and more women have started to go out of homes and opt either for wage employment or self employment/entrepreneurial career. In case of women, however, handicaps to entry into business ownership have been for too many given the traditional conservative, orthodox

EVALUATIVE STUDY OF RAJIV AAROgyASRI HEALTH INSURANCE SCHEME IN TELANGANA STATE

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ABSTRACT

Health is an important constituent of human resource development. Good health is real wealth of society. It not only increases human efficiency but also decreases private and public expenditure on sickness and diseases. The government of Andhra Pradesh introduced Aarogyasri as a cashless health insurance program for households living Below Poverty Line(BPL) in April 2007. A Scheme is a unique Community Health Insurance Scheme being implemented in State of Telangana. The Scheme provides financial protection to families living BPL upto Rs.2 lakhs in a year for the treatment of services ailments requiring hospitalization and surgery. The objective of the scheme is to improve access BPL families to quality medical care for treatment of identified diseases involving hospitalization. Surgeries and therapies through an identified network of health care providers are carried out.

The present paper focuses, the examine the structure of Rajiv Aarogyasri Health Insurance Scheme (RAHIS), to evaluate the accessibility of RAHIS whether home or outside of the district wise beneficiaries and study the demographic profile of beneficiaries of RAHIS and also study the understand the availment of benefits of RAHIS by respondents in government or private hospitals. The present study relied on secondary data and for analysis of data statistical techniques are used like coefficient of correlation, pie, bar and line charts.

The Aarogyasri Scheme covered all districts of Telangana State. Nearly about four-fifths of the household have Rajiv Aarogyasri Health Card in Telangana state. Among these highest in Medak district and lowest in Hyderabad district and 92 percent of STs and 80 percent of SC have this facility, residing in 10859 villages 584 Revenue Mandals of all districts of Telangana State in five phases. The scheme started with 163 procedures covered and has been gradually extended to 938 procedures. The majority of beneficiaries utilizing the scheme are illiterate and have a rural address. Since inception of the scheme till 17695 Medical camps were conducted and 4250864 patients were screened held by the network hospitals in rural areas. 2177848 Pre-authorisations were performed and 1977992 surgeries were done. The pre-authorised amount for the surgeries/therapies is Rs.5497.45 crores. The claim paid is Rs.5431.41 crores for the surgeries/therapies performed. It is concluded that the majority i.e., 72.4 percent of households access medical services from Private/Corporate hospitals and 27.6 percent from Government hospitals. The community wise medical services rendered by beneficiaries of RAHIS are highest i.e., percent from BCs community and followed by minorities (14.8%), OCs (14.4%), SCs (10%) and STs (6.7%) respectively. Hence, it is that suggested appropriate steps are initiated at the earliest for development of infrastructural facilities and recruit required staff in government hospitals to meet the needs of the medical services of poor families.

Key words: Below Poverty Line, Aarogyasri Health Insurance Scheme, Surgeries, Therapies.

PROVERBS OF LAMBADAS (Gwar Matiri Saaki)

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Proverb is a word derisive from Latin proverbium. Proverbs are some sentences that come with a long period of human life. Those sayings are normally look as simple and concert sentences, popularly known and repeated, that expresses a truth based on common sense or the practical experience of humanity. They are often metaphorical.

Proverbs are often borrowed from similar languages and cultures, and sometimes come down to the present through more than one language. In lambada this is one of the oldest practices known as “GWAR MATIRI SAAKI”. From these proverbs we can understand lambada language is the old language.

These proverbs of lambada’s show their accuracy and fluency towards the language. Life of lambadas not only depends on their routine speeches but also proverbs. Lambada proverbs can have huge impact of their own experiences, while roaming towards one end to the other end of the earth on their duties and business. As per their experience they gained knowledge and put that in to as proverbs. Proverbs explains real life incidents of lambadas and they formed those words as universal truth¹.

In community of the lambadas proverb can represent perfect and reality of life as a part. As a human being man can get sorrows and joys in the same manner. So he who gets the knowledge about personal experience can be a creation of words as proverb. In one note we can say the proverb can be framed through a single person experience but creation of proverb can be one single persons but it can have universal appeal.

A saying cannot be a sentence because it has to be accepted by the people and used in general speeches. Proverb represents entire meaning of human life in one word. According Sundaram “in generally a proverb consist a sentence or two but it has uniformity of words at the end of sentence, as a proverb can be divided as two parts consisting same number of words in each part like.

Birth Ceremonies of Lambada Community in Telangana

Dr. B. Hathiram

Among the tribals inhabiting the plains of Telangana, the *Lambadas*, with their near-yellow skin complexion, are the largest group. They are originally from North India. After the loss in Battle of Tarain between the Rajput king Pruthviraj *Chauhan* and Muhammad Ghori, the *Lambadas* migrated to other regions. In India's system of positive discrimination, they are listed as Scheduled Castes in the states of Karnataka, Himachal Pradesh and Delhi, as Backward Classes in Maharashtra, Punjab and Madhya Pradesh, and as Scheduled Tribes in Orissa and Bihar. The erstwhile state of Andhra Pradesh has classified them as Scheduled Tribes from 1956 in the coastal areas, and from July 1977 in Telangana¹. After the formation of separate states of Andhra Pradesh and Telangana on 2nd June 2014, their population in Telangana is 20.46 lakhs or 5.81% of the overall population of the state².

The *Lambadas* are also known as *Banjaras* and *Sugalis*. The term *Banjara* owes its etymology to the Sanskrit word '*Vanachara*' - wanderers in jungles - based on their nomadic life. They are found all over the country and are variously known as *Banjaras*, *Banjaris*, *Boiparis*, *Lamans*, *Lambanis*, *Sugalis*, *Sikalis* and *Lambadas*. The language they speak is *Gor Boli*³.

In Ancient Birth ceremony process of a Child:

Birth is the first stage in Man's life journey. There is a variety of rituals associated with the birth of a child in every society across the world, and the *Lambada* society is no exception. No wealth can assuage the grief of a couple that has no offspring. According to the Aryan saying, a male offspring helps his parents escape eternal hell. The mythologies are replete with descriptions of various rituals performed to appease the Hindu pantheon to beget an offspring. The folk literature depicts the hardships women suffer to bear children. "A woman's life is fruitful only if she bears a child" is an adage that is universally applied. The *Lambadas* feed their pregnant women with nutritious food that includes meat. It is their belief that the pregnant women desirous of eating meat bear sons. They do not perform any special ceremonies (called *Seemantam*) for the pregnant women unlike many others in the society, nor do they have the tradition of the pregnant woman's parents bringing her home and taking care of her health during the first pregnancy. After the child birth, the mother is administered herbal medicines for recovery of health. When the *Lambadas* are on the move in a caravan and if the woman delivers there, the

HISTORY OF KORAVI

(From 8th Century A.D. to 14th Century A.D.)

Dr.B. Hathiram Lecturer in
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In medieval Telangana History 'Koravi' has a prime importance. The early rulers of the Kakatiya dynasty from Yerrayya to Ganapathideva waged many wars for this locality. In medieval period rulers practiced feudatory system to operate administrative issues. Even at the time of war the powerful ruler organized military power through their feudatories. Early Kakatiyas served as ministers, feudatories under kalyani Chalukyas after the decline of Rastrakutas.

Mudhigonda chalukyas, as feudatories of Eastern Chalukyas, as contemporaries, ruling with Mudhigonda as their capital hence had been tried to get the Koravi as part of there kingdom. Meanwhile, the Kakatiya rulers were kept by Rastrakutas as their agents of Koravi locality, because of rivalry between Kakatiya and Mudhigonda Chalukyas. These facts were revealed in grant papers of Moghal charuvula, and Krivvaka, Mangallu inscription, Koravi Inscription, Chennuru Inscription, Guduru Inscription, Palampeta Inscription and Nathharameswaram Inscription and others¹.

Koravi is located in Mahabubabad District at present and old Warangal District, famous for Sri Bhadrakali associated with Sri Veerabhadraswamy Temple which was constructed by king Bheema-I and reconstructed by Beta Raju – I of Kakatiya ruler. Before every invasion Rudrammadevi used to visit Veerabhadraswamy temple for blessings. She was strongly believed that victory will be in favour of her if she visit the temple. There is Koravi Inscription laid by Niravadhya of Mudhigonda Chalukyas ruler. This inscription describes about the taxes crimes and punishments of that time. According to this inscription, the Grama Nayakas were given the responsibility of punishing the criminals².

Two Day International E-Conference on
“Trends Issues and Development of Physical Education and Sports”
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30 – 31 July, 2020 at Department of Physical Education and sports Science,
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**A CRITICAL STUDY ON THE EFFECT OF INTERVAL TRAINING
AND DETRAINING ON CARDIO RESPIRATORY ENDURANCE
AND BREATH HOLDING TIME AMONG KHO KHO AND
BASKETBALL PLAYERS**

¹Shashikanth Gopu ²Dr. P. Ravi Kumar

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Abstract:

The purpose of the study was to find out the effect of interval training and detraining on cardio respiratory endurance and breathe holding time among male Kho kho and Basketball players. To achieve the purpose of the study, N=90 male Kho kho and Basketball players from Government Junior college(Boys), Mahabubabad and Government Degree college, Mahabubabad, Telangana were selected randomly as samples from total population and aged between 18-25 years. Further the players were divided into three equal groups as n=30 (Basketball group – BBG), n=30 (Kho kho group – KKG), n=30 (Control group – CG). The experimental design for this study were as follows, a pre and posttest was administrated before and after the 12 weeks of interval training on cardio respiratory endurance and breathe holding time. The CG (Control group) was not given any type of training and they are settled for their daily routine workouts. To know the effect of detraining, the coopers 12 min run/walk and breath holding time tests were administrated on 10th, 20th, 30th, 40th and 50th days for the data collection after the training period. With appropriate statistical tests the results was analyzed with the help of the software package of social science (SPSS 20.0). It was found that there was a significant difference found in experimental groups and no significant difference in control group. There was a significant decrease in performance after 20 days in detraining period.

Key Words: Interval training, Detraining, Cardio respiratory endurance and Breath holding time.

1. INTRODUCTION:

Sport Physiology further applies these concepts from exercise physiology specifically to training the athlete and enhancing athlete performance within a specific sport. Exercise and sport physiology is about improving performance, by knowing how the body functions during exercise, and using scientific principles to allow your body to train better, perform better and recover quicker. Studies in exercise physiology help athletes achieve greatness.

1.1. STATEMENT OF THE PROBLEM:

The Purpose of the Study was to investigate the effect of interval training and detraining on cardio respiratory endurance and breathe holding time among Kho kho and Basketball players.

1.2. SIGNIFICANCE OF THE STUDY:

The study is significant in the following ways:

- To find out whether there was any significant difference with the effect of training and detraining in experimental groups.

1.3. DELIMITATIONS:

The study was confined to the following aspects.

- Only male kho kho and basketball players were chosen as the subjects with in the age group of 18-25 years and cardio respiratory endurance and breath holding time were delimited to testing variables.
- The training period was delimited to 12 weeks, 5 days per week and detraining was set up to only 50

“A Critical Study on The Effect of Training and Detraining on Selected Motor Fitness and Physiological Variables Among Basketball and Kho Kho Players”

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Abstract

Motor Fitness refers to how an athlete can perform at his or her sport, and involves a mixture of speed, agility, coordination, balance, circulo muscular Endurance, muscular strength Endurance, and reaction time. Detraining is defined as the partial or complete loss of training-induced adaptations in response to cessation of training or a substantial decrease in training load. The purpose of the study was to find out the effect of Plyometric training, Interval training and Detraining on selected Motor Fitness and Physiological variables among male Basketball and Kho Kho players. To achieve the purpose of the study, N=90 male Basketball and Kho Kho players from 322 | P a g e ` Government Junior college(Boys), Mahabubabad and Government Degree college, Mahabubabad, Telangana were selected randomly as samples from total population and aged between 18-25 years. Further the players were divided into three equal groups as n=30 (Kho Kho group – KKG), n=30 (Basketball group – BBG), n=30 (Control group – CG). The experimental design for this study were as follows, a pre and post test was administrated before and after the 12 weeks of Plyometric training period on selected Motor Fitness and Physiological variables for the three groups i.e., KKG, BBG and CG respectively. The CG (Control group) was not given any type of training and they are settled for their daily routine workouts only. To know the effect of Detraining, the selected tests were administrated on 10th, 20th, 30th, 40th and 50th days for the data collection after the training period. Similarly a pre and post test was administrated before and after the 12 weeks of Interval training period on selected Motor Fitness and Physiological variables for the three groups i.e., KKG, BBG and CG respectively. The CG (Control group) was not given any type of training and they are settled for their daily routine workouts only. To know the effect of Detraining, the selected tests were administrated on 10th, 20th, 30th, 40th and 50th days for the data collection after the training period. With appropriate statistical tests the results was analyzed with the help of the software package of social science (SPSS 20.0). It was found that with the effect of Plyometric training and Interval training there is a significant difference on selected Motor Fitness and Physiological variables among BBG(Basketball) and KKG(Kho Kho) groups and there was a significant decrease among the groups on selected Motor Fitness and Physiological variables with the effect of Detraining.

Key words: Motor Fitness, Physiology, Plyometric training, Interval training and Detraining.

INTRODUCTION

Motor Fitness refers to how an athlete can perform at his or her sport, and involves a mixture of speed, agility, coordination, balance, circulo muscular Endurance, muscular strength Endurance, and reaction time. Detraining is defined as the partial or complete loss of training-induced adaptations in response to cessation of training or a substantial decrease in training load.

STATEMENT OF THE PROBLEM

The Purpose of the Study was to investigate the effect of Interval and Plyometric training methods and Detraining on selected Motor Fitness and Physiological variables among Basketball and Kho Kho players.

OBJECTIVE OF THE STUDY

To find out the effect of Interval training, Plyometric training and Detraining on the selected Motor Fitness and Physiological variables such as speed, agility, resting heart rate and peak flow rate.

SIGNIFICANCE OF THE STUDY

The study is significant in the following ways:

- i. The study will indicate the effects of Interval training, Plyometric training and Detraining on speed, agility, peak flow rate and resting heart rate among male Basketball and Kho Kho Players.
- ii. It will further provide which of the two training methods enhances the efficiency and sustain to a longer duration.

Solvothermal Synthesis, Structural and Optical Properties of Phase-Pure Cu_3BiS_3 Nano-Powders Exhibiting Near-IR Photodetection

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The Cu_3BiS_3 with a direct band gap of 1.4 eV, crystallizing in orthorhombic phase, devoid of any rare earth metals like indium was synthesized using a facile solvothermal route at 170 °C for 8 hrs. The structure and composition of the obtained nano-powders were confirmed by X-ray powder diffraction (XRD), field-emission scanning electron microscopy (FESEM), transmission electronic microscopy (TEM) and X-ray photoelectron spectroscopy (XPS). The optical properties of the Cu_3BiS_3 nanorods were investigated by Raman and UV-Visible spectroscopy. Out of 36 Raman active modes, 16 modes were pronounced remaining silent. The current–voltage measurements were performed over the Cu_3BiS_3 film, on sandwich and in-plane geometries both in dark and light conditions. Measurements showed that in sandwich geometry, the I – V curves followed the SCLC mechanism at a higher bias, and thermionic emission in the in-plane geometry at a lower bias. In-plane IR photoresponse was higher compared to sandwich geometry.

KEYWORDS: Cu_3BiS_3 Nanopowders, Solvothermal Route, Thermal Evaporation, IR Photodetection.

1. INTRODUCTION

The Cu_3BiS_3 with the mineral name, wittichenite, one among the family of Bi-Cu-S-sulfbismuthides, a ternary alloy system, shows a good thermal stability (300 °C) and a high optical absorbance in the visible spectrum which has a potential application, as a p -type semiconductor¹ and in the solar cell as a absorber material² and in the lithium-ion batteries.³ The cell fabricated with the layers Mo/CIGS/CdS/ZnO has attained a maximum of 19.2% efficiency⁴ till date. The toxicity and scarcity of indium limits the generating capacity of this cell, so the alternative absorber materials which are expected to have the suitable optical band gap of 0.9 to 1.9 eV are of great concern. In Cu_3BiS_3 , bismuth used, is readily available as well can be used as a replacement where the toxicity of this material is a concern. Therefore Cu_3BiS_3 with a band gap of 1.4 eV, an another alternative absorber material will facilitate its utilization in the solar cell devices.² Synthesis of Cu_3BiS_3 involves different methods like reactive sputter deposition,^{5,6} evacuated glass capsule technique⁷ using elemental powders, hydrothermal decomposition process,⁸ biomolecule assisted solvothermal synthesis,⁹

nanorods by ethanol-thermal route,¹⁰ dendrites using cyclic microwave,¹¹ electrochemical methods¹² and others.

The routes involving the vacuum sealing and the annealing of binary sulphides were carried out at higher temperature 600 °C and above, hence in our synthesis we have chosen the solvothermal route, as it provides the control over the chemical composition of the products formed, a low temperature 170 °C and a reaction path of 8 hrs. It was observed that the concentration of the precursor materials, have an impact over the morphology of the Cu_3BiS_3 nano-powders. The as synthesized nano-powders along with sulphur were co-evaporated to form the Cu_3BiS_3 thin films.

2. EXPERIMENTAL DETAILS

2.1. Synthesis

The synthesis procedure involved 0.004 M Copper(II) acetylacetonate- $(\text{C}_5\text{H}_7\text{O}_2)_2\text{Cu}$ (99.99%), 0.01 M bismuth chloride- BiCl_3 (99.99%) and 0.1 M thioacetamide- $\text{C}_2\text{H}_5\text{NS}$ (99.99%), procured from Sigma Aldrich. The absolute ethanol HPLC grade was used as a solvent. The 0.004 M copper and 0.01 M bismuth solutions were made separately and were stirred vigorously until all the salts dissolved completely. Then 0.1 M thioacetamide solution was added drop wise to the above solutions, with the constant vigorous stirring. The two solutions were mixed and sonicated for 30 min and the resultant was transferred

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A CASE STUDY OF GOVERNMENT DEGREE COLLEGES IN MAHABUBABAD DISTRICT TO DETERMINE THE CAUSES OF ADOLESCENT SUICIDES AND STRESS AMONG STUDENTS

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Abstract

India is having highest suicide rate in the world the reason is lack of economic social or emotional resource to combat it. Suicide is a desperate attempt to escape suffering, it is blinded by the feelings of hopelessness and isolation and it is a serious adolescent problem. The paper tries to analyze the reasons for Teenage suicides and suggests ways and means to overcome it. Teenagers are emotionally turbulent and they face stress and turmoil to succeed in their life and this is a result leading to suicides. Academic pressure, workplace stress, social pressures, modernization, breakdown of family support, urbanization and breakdown of the traditional family support system relationship concerns, Generation gap issues coupled with the class of values within the family are few of the causes. Despite the high number of the adolescent victims, suicide prevention has not been discussed as a major social problem in our country.

Emile Durkheim (1966) describes suicide as one of the crudest expressions of the social phenomena and women are more likely to make and attempt over men. Suicidal behavior is a result of the socio-cultural developmental psychological circumstances. In recent days online education has put the students under extreme stress and depression especially in the rural areas where there is a digital divide. The paper highlights how stress management and counseling can prevent suicides. A questionnaire with 10 questions was given to over 120 students studying in the degree college of Mahabubabad district as a part of our case study and the

Anti-Bacterial Activity of Parotoid Gland Secretion and It's Extract of the Toad *Bufo melanostictus*

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Abstract

The present study was to investigate and assess the antibacterial activity of granular gland secretion and its extract of Indian toad *Bufo melanostictus* (Schneider). Amphibians like toads secrete antimicrobial secretions from outside their body into their environment, through skin pores and parotoid glands. The parotoid gland secretions and its extracts were collected from *Bufo melanostictus*. The parotoid glands were pressed gently to release the secretions with the help of sterile forceps. The collected parotoid gland secretions and its extract was filtered-sterilized, freeze dried and subjected to antibacterial assay through well diffusion technique. In this method, on Asthana Hawkers agar medium, the plates were seeded with selected bacterial strains i.e., *Escherichia coli*, *Klebsilla pneumonia*, *Staphylococcus aerius* and *Protious vulgaris* and Zone of Inhibition (ZOI) was measured. The zone of inhibition in gland secretion was maximum for *K. pneumonia* (38mm) and minimum against *E.coli* (24mm). An inhibition zone in parotoid gland extract was observed maximum for *P. vulgaris* (34mm) and minimum against *K. pneumonia* (28mm). An inhibition was observed with 40µl/ml of parotoid gland secretion and its extract have showed nearest inhibition zones i.e. viz., 38mm, 32mm; 29mm, 24mm; 34mm, 33mm; 30mm and 28mm pathogenic bacteria respectively. Therefore we conclude that the toad parotoid gland secretion and its extract have the potential to be developed as a potent source for the development antibacterial agents used in the treatment of infectious diseases.

Keywords: Antibacterial activity, *B. melanostictus*, parotoid gland, Zone of Inhibition, *Klebsilla pneumonia*, *Escherichia coli*, *Staphylococcus aerius* and *Proteus vulgaris*.

1. Introduction:

Amphibians are most diversified vertebrates with environmental dependant body temperature and having glandular glands and moist skin. The skin of amphibians (frogs and toads) characterized by the presence of a pair of parotoid glands located between eyes and tympanum [1]. These gland secretions generally associated with chemical defense and against predators and microbial infection i.e. fungal and bacterial strains to protect themselves [2-6]. These gland secretions contain rich components like biogenic amines, peptides which have the ability to inhibit the growth of pathogenic microorganisms.

Bacteria are an important cause of human, animal and plant diseases. The treatment of bacterial diseases is quite not possible due to lack of potent bactericidal agents [7-10]. The toad parotoid gland secretions contain peptides which exhibit antimicrobial activity against gram positive (+ve), gram negative (-ve) bacteria and as well as against yeast and protozoans too [12-15]. Many host defense peptides show high potency against bacteria and other potent biological activity [16-17]. The secretions of toad granular gland might also be of benefit to human health with its antibacterial, antiprotozoal, antidiabetic and other therapeutic properties [18-20].

2. Material & Methods:

The toads (7.0cm to 10 cm in length, weighed about 50 to 75 gm) were collected from the vicinity of hostel buildings of Kakatiya University. The parotoid glands were gently pressed to release the secretion with the help of sterile forceps. The secretions were collected into ice-jacketed containers. After collecting secretions, the gland was dissected out, blotted to free from blood clots and other adherent tissues and weighed to the

THE ANTIFUNGAL ACTIVITY OF SKIN SECRETION AND ITS EXTRACT OF INDIAN TOADBUFO MELANOSTICTUS

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ABSTRACT

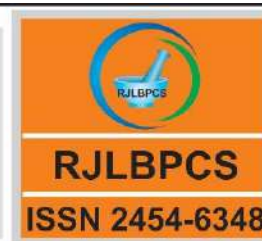
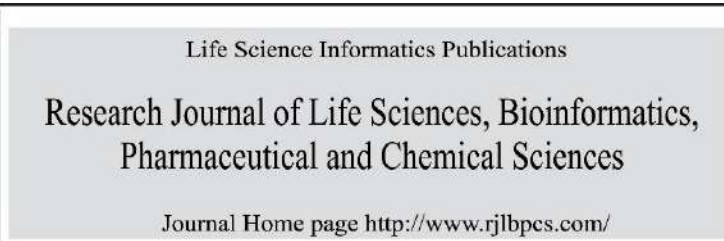
The present study was aimed to determine the antifungal activity of skin secretion and its extract of Indian toad *Bufo melanostictus* (Schneider). Amphibian skin possesses a wide variety of biologically active substances that can be used in therapeutics. For the present investigation, the toads and frogs were induced to release a skin secretion using electrical stimulation by using platinum electrodes rubbed over the moistened dorsal skin surface for 10sec. The collected skin secretions were filtered-sterilized, freeze dried and subjected to antifungal assay. Antifungal activity of the toad skin secretion was tested on *A. sthana*-Hawkers agar medium plates seeded with the species of *Aspergillus Niger*, *Penicillium notatum* through well diffusion technique by using minimum inhibition concentration (MIC) method. An inhibition was observed with 40µl/ml of toad skin secretion. According to our observations, the skin secretion and its extract of toad have shown antifungal activity against two strains of *A. niger* and *P. notatum*. Both the skin secretion and its extract have shown nearest inhibition zones i.e. viz., 23mm, 27mm and 25mm, 23mm respectively, therefore the toad skin secretion and its extract possess has the potential to be developed as a source of antifungal agents.

KEYWORDS: *Bufo Melanostictus*, Skin Secretion, *Asthana-Hawakers* Agar Medium, Antifungal Agents, *Aspergillus Niger* & *Penicillium Notatum*

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INTRODUCTION

Fungi are eukaryotes, which are an important cause of infections to plant, animal and human diseases. Fungal infections have been reported to increase gradually in individuals with reduced immune system. Treatment is limited against fungal infections due to effective antifungal agents are not available compared to antibacterial agents (Katerere *et al.*, 2013, Barlian *et al.*, 2011). In some cases fungi are indirectly responsible for allergic (or) toxic disorders because of the production of mycotoxins (Marco Dalla Rizza 2011). Pathogens such as chytrid fungus and irido viruses also affect different species of amphibians (Woodhams 2005). Amphibians can live in both terrestrial and aquatic ecosystems, in such a manner that its skin plays an active role in physical and physiological activities (Clarke 1997). Toad skin contains a wide range of bioactive compounds like alkaloids, biogenic amines, proteins and peptides. These bioactive compounds can develop the defense mechanism against the predators, bacteria, fungi and other microorganisms (Simmaco *et al.*, 1998). Frog skin secretion can be utilized for the benefit of human beings, with its anti-bacterial, anti-fungal, anti-protozoal, anti-diabetic and some other therapeutic properties (Gomes *et al.*, 2007). Conlon and Sonnevend (2011) have reported that the skin secretion of many Anurans (toads & frogs) contain peptides with antifungal activity. These chemical substances are secreted from the granular glands of frog which are located in the dorsal region of skin Abishek Grag (2007), Rollins



Original Research Article

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EFFECT OF CHLORPYRIFOS ON ESTERASE ISOZYME BANDING PATTERNS IN MUSCLE AND BRAIN OF FRESH WATER CAT FISH *HETEROPNEUSTES FOSSILIS*

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ABSTRACT: The present study was under taken to assess the toxicological effect of Chlorpyrifos (an Organophosphate) on esterase isozyme banding patterns in muscle and brain tissues of freshwater cat fish *Heteropneustes fossilis* (Bloch) at different time intervals i.e. 24,48,72 and 96hrs and was compared with control. The esterase isozymes were quantitatively analyzed by using 7.5% native polyacrylamide gel electrophoresis (PAGE) stained with α -naphthyl acetate as substrate. Three different esterase bands were detected and named as Est-1; Est-2 and Est-3 with different relative mobilities such as 0.35; 0.43; 0.30 in muscle tissue and 0.60; 0.40; 0.30 in brain. All the three esterase bands were found in muscle and brain tissues. Among the three esterases Est-1 in brain tissue at 24hrs and Est-2 in muscle at 24 hrs is found to be more abundant with highest intensity. The intensity of Est-3 was faintly stained in both the tissues.

KEYWORDS: Esterase, isozymes, PAGE, *H. fossilis*, Chlorpyrifos.

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1.INTRODUCTION

Fresh water ecology is polluted due to continuous use of agrochemicals especially pesticides. The pesticides like Organophosphates, Organochlorides and carbamates are regularly used in agricultural pest management for food production through their excessive and indiscriminate use in public health operations [1]. They ultimately find their way into aquatic habitats such as rivers, lakes and ponds. The environmental quality is determined by assessing the toxicity of different chemicals in agriculture which cause serious hazards to fish and other aquatic organisms [2], [3]. Pesticide toxicity to fish has been investigated in several studies [4] hence toxic studies are required for the

TERMITE ALATES (ODONTOTERMES OBESUS) USED AS FOOD FOR KOYA TRIBES IN PAKHAL WILDLIFE SANCTUARY, WARANGAL, TELANGANA

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ABSTRACT

Termites, especially Odontotermes sp. were playing an important role in ecology, entomophagy and other contexts such as Zootherapy around the world including Indian ethnic people. By food, value termites have a rich source of proteins, lipids, carbohydrates, enzymes, and minerals. The termites Odontotermes obesus had high levels of biochemical constituents such as proteins 66mg/ 100mg; carbohydrates 35mg/100mg; lipids 6.80mg/100mg and other enzymes. The results that Odontotermes obesus have more proteins followed by carbohydrates, lipids, and enzymes. In addition to their ecological importance, termites are a source of food and medicinal resources to ethnic people of Koya tribes from Pakhal Wildlife sanctuary, Telangana state. Therefore, there is an urgent need to focus on entomological research to the documentation of the utility of insects.

KEYWORDS: *Odontotermes Obesus, Biochemical Constituents, Carbohydrates, Proteins, Entomophagy, Zootherapy, Koya Tribes, Pakhal Wild Life Sanctuary*

INTRODUCTION

India is a tropical country, the diversity of insects is greater. So, a potential land for insect resource to be utilized their vast potential. Alfred et al., [1998] reports indicated 59,353 species of insects belonging to 619 families from India. Insects have played an important role in ecological, food and another context such as supplying raw material for dyes, poisons, traditional medicines, decoration objects, entertainment and even admiration also [Hogue CL,1987; Hoffmann HJ, 2006; Nonaka K, 1996].

The practice of insects as a part of the human diet is called Entomophagy [Figueirêdo, 2015]. Termites are the traditional food in many cultures of the world [Gagan Kumar Mahapatro, 2015]. In spite Entomophagy has the superior nutritional content of edible insects compared to other animals yet to become a day to day activity of most people in the US and Europe [html]. Termites, especially Odontotermes species are considered as delicious food in most parts of Asia and Africa [Gagan Kumar Mahapatro, 2015]. According to Entomological survey of America, by the weight termites are a better source of protein than beef, chicken, and pork. Insects are low in cholesterol and low fat [html].

Termites (eg. *O.formosanus*) have proteins, carbohydrates, lipids, essential amino acids and other nutrients as food.



STUDIES ON BIOCHEMICAL VARIATIONS OF SKIN SECRETION AND ITS EXTRACT OF *BUFO MELANOSTICTUS* EXPOSED TO CHLORPYRIPHOS AN ORGANOPHOSPHATE

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ABSTRACT

The present study was under taken to analyze the biochemical variations in skin secretion and its extract of *Bufo melanostictus* exposed to chlorpyrifos an organophosphate (OP compound). The skin of *B. melanostictus* was exposed to the toxicant and the variations were observed on proteins, carbohydrates and ninhydrine positive substances at different time intervals i.e. 4, 8 and 12 hrs and variations in skin secretion and its extract. The results revealed that the components of proteins, carbohydrates and ninhydrine positive substances were found to be decreased significantly at 4, 8 and 12 hrs in skin secretion and its extract. The maximum decrease was observed at 4 hrs and 12 hrs compared to 8 hrs and control.

KEY WORDS

Skin secretion, Skin extraction, Total proteins, Ninhydrine positive substances (Free Amino Acids), Chlorpyrifos, Organophosphate.

INTRODUCTION

Amphibians show sensitivity towards changes that occur in the environment and they are used as bio-indicators of aquatic and terrestrial ecosystems [1, 2]. They lead an obligatory aquatic life and have permeable skin, which made these animals susceptible to water borne environmental chemical contaminants [3], that directly influence these organisms [2, 4]. Thus, many pesticides used in agriculture ultimately reach the food chain of the aquatic as well as terrestrial ecosystems. Amphibians actually constitute the largest group of vertebrate biomasses in some ecosystems, making them as important source of food for the higher vertebrates like fish, birds, reptiles, mammals as well as important herbivores (tadpole) and carnivores in these ecosystems [5]. But usage of pesticides is receiving an increased attention in potential causes of Amphibian decline. These chemicals unintentionally influence the life of other non-target organisms found in the

surroundings. Toads have two types of skin glands i.e. mucous and the glandular (or) alveolar glands [6, 7]. Skin glands produce mucous, peptide, biogenic amines, steroids and large no of biologically active compounds [8]. Venom is a secretion synthesized in a specific part of the body and it is a modified saliva containing different polypeptides used for defense from prey instead of defense organs [9-11]. Utilization of wide range of pesticides, insecticides, herbicides in agriculture is polluting the soil as well as aquatic ecosystem. Some of the pesticides, herbicides and nematocides show an endocrine disrupting effect [12], however in natural communities; their effect is direct or indirect on the toad species thus also becoming a cause for amphibian population decline [13-16].

In view of the above, present investigation has been undertaken to study the toxic effect of organophosphate compound Chlorpyrifos on some

Electrophoretic studies on esterase banding patterns in parotoid gland secretion and its extract of Indian toad *Bufo melanostictus*

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ABSTRACT: The present study has been carried out to investigate the electrophoretic studies on esterase banding patterns of parotoid gland secretion and its extract of common Indian toad (*B. melanostictus*). The qualitative analysis of esterase isozyme banding patterns were examined on 7.5% native polyacrylamide gel electrophoresis (PAGE) stained with α -naphthyl acetate as substrate. In parotoid gland secretion 3 esterase bands named as Est-1 (27.50); Est-2 (25.00); Est-3 (21.62), where as in parotoid gland extraction 6 esterase bands named as Est-1 (27.50); Est-2 (25.00); Est-3 (21.62); est-4 (35.58), Est-5 (48.50) and Est-6 (50.00) were observed with different relative mobility. The results revealed that the activity of individual esterase band was not completely inhibited by pCMB and Physostigmine (Eserine). However a complete inhibition was observed (in both parotoid gland secretion and its extract) in the presence of paraoxon (an organophosphate). Thus our present investigation reveals that all the enzymes were classified as carboxyl esterases.

KEYWORDS: *B.melanostictus*, parotoid gland secretion, α -naphthyl acetate, paraoxon, pCMB, Physostigmine, carboxyl esterase.

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I. INTRODUCTION:

Amphibians are important components of both terrestrial and aquatic ecosystems by means of their sensitivity towards environmental changes (Dullmen and Trueb, 1986; Pull et al., 2000; Marco AD et al., 2001). Amphibian skin is characterized by the presence cutaneous glands spread over the body. Basically toads have two types of alveolar glands in the epidermal layer of their skin i.e. i) mucus glands and ii) granular glands (Toledo and Jared 1995; Jared et al., 2009). Mucus glands secrete mucus substance functioning as a lubricant in the water to keep skin moist and protect the skin from the mechanical damages and prevent microbial settlement on the skin. These glands secrete glycoprotein rich material, which plays an important role in defense mechanism. The granular glands are associated with chemical defense. These gland secretions contain biogenic amines, steroids, peptides, protein, bufotoxins, oligopeptides, alkaloids in terms of pharmacological effects (Toledo et al., 1995; Eraspmer 1994; Lyttle 1996; Maciel 2003; Daly 2007; Gomes et al., 2007a). In toads these granular glands are form the parotoid glands located besides eyes and tymphanum. The venomous secretions of these parotoid glands of the toad *Bufo* species are known to contain several bioactive compounds (Habermehl 1995) and were used by Chinese and Japanese physicians for centuries as folk medicine (Lyttle et al., 1996; Abhishek garg 2007, Smith et al., 2005).

Preliminary survey on the venomous secretions and the extracts of gland reveal that the gland secretions contain good amount of hydrolytic enzymes, esterases. Esterases represent a diverse group of hydrolases catalyzing the formation and break down of ester bonds which are sensitive to organophosphate compounds, and play a vital role in biotransformation and detoxification of the pesticides, and are useful in bioremediation of organophosphate sensors. In present study we investigate on the electrophoretic studies on esterase banding patterns of parotoid gland secretion and its extract of common Indian toad *B. melanostictus*.

Materials and Methods:

The toads (5cm to 8cm in length, weighed about 50-75grams) were collected from the vicinity of Kakatiya University hostel buildings, Warangal, Telangana State. The parotoid glands were gently pressed to release the secretions (Linde & Myer-1971). The secretions were collected in ice-jacketed containers. After collecting the secretions, the gland was dissected out and blotted free of blood clots and other adherent tissues and weighed to the nearest milligram. The gland as well as the secretions were homogenized in (10%) 0.01M Tris-HCL Buffer (pH 7.4) containing 0.9% NaCl.

The homogenates were centrifuged and the supernatants were diluted 1:1 with 20% sucrose containing 0.01% bromophenol blue as tracking dye. An aliquot of 0.1ml of these solutions were loaded directly on to the separating gel. Esterase patterns were separated on thin layer (1.5mm thickness) polyacrylamide gels (7.5%,



**ANTIBACTERIAL ACTIVITY OF SKIN SECRETION AND ITS EXTRACTION FROM
THE TOAD *Bufo melanostictus***

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ABSTRACT

Skin secretion of Amphibians generally contain multiple antimicrobial peptides with distinct spectra of activity and it has been speculated that the animal is protected from invasion by a wide array of different microorganisms. The objective of the present study was to assess the antimicrobial properties of skin secretion and its extract from Indian toad *Bufo melanostictus* (Schneider). The collected skin secretion was filter-sterilized, freeze-dried and subjected to antibacterial assay. Antibacterial activity of toad skin secretion was tested on Asthana Hawkens agar medium plates seeded with the species of *Escherichia coli*, *Staphylococcus aureus*, *Proteus vulgaris* and *Klebseilla pneumoniae* through well diffusion technique by using Zone of inhibition (ZOI) method. An inhibition was observed with 40µl/ml of frog skin secretion. Results showed that the skin secretion of toad has antibacterial activity against four strains. All the skin secretion and extraction have showed nearest inhibition zones i.e., viz., 30mm, 27mm, 28mm,33mm,19mm, 24mm, 19mm and 25mm.Hence,we conclude that the skin secretion and extract can be employed in the development of potent antibacterial agents used to treat infectious diseases.

KEY WORDS: Skin secretion, Asthana Hawkens agar medium, Zone of inhibition, *Escherichia coli*, *Staphylococcus aureus*, *Proteus vulgaris*, *Klebseilla pneumoniae*.

INTRODUCTION

In the last few years, data revealed that occurrence of very few antimicrobial peptides characterized from a wide range of organisms. Antibiotics have been termed as the single most significant discovery in medicine. Consequently, there have been efforts in for the production of novel antimicrobial agents.^[1] Amphibian skin is a morphologically, biochemically and physiologically complex organ, which helps not only in respiration, osmoregulation, excretion, temperature control, reproduction but also in anti predator activity and antimicrobial defense mechanism.^[2] The skin of toad acts as a barrier for entry of bacteria, fungi and other invades. We partially known the origin and function of poisonous and noxious substances of Amphibians such as biogenic amines and their derivatives found in skin of frogs and toads.^[3,4]

Toads and Salamanders have been considered noxious creatures for containing noxious and poisonous substances in their skin secretions.^[3,5] These secretions contain peptides which have the ability to inhibit the growth of pathogenic microorganisms.^[6] These secretions contain peptides which exhibit anti-microbial activity against gram positive, gram negative bacteria and some yeast and protozoans also.^[7,8,9,10] Many host defense peptides show high potency against bacteria^[11]

and other potent biological activities too.^[12] The secretions of frog and toad may benefit human health with its antibacterial, antifungal, antiprotozoal, antidiabetic and other therapeutic properties.^[13,14,2] In view of the above, we have undertaken the present investigation to screen the antibacterial activity of the skin secretion and its extract to find out the *B. melanostictus*.

MATERIAL AND METHODS

Collection of toad and toad skin extract (TSE)

preparation

Adult live toad (40-50 gm) *B. melanostictus* were collected from the vicinity of Kakatiya University hostels buildings and maintained in well ventilated glass box, some insects were given as feeding. Animals were pithed and their skin was separated from the body except parotid gland. The skin was kept in methanol at room temperature for 30 days. The supernatant was centrifuged and was pooled. It was evaporated to dryness by rotary evaporator and the extract was kept at RT (28°C) in a desiccator. Then toad skin extract was dissolved at definite concentration in normal saline (0.9%) until use.^[15]



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EFFECT OF METHYL PARATHION (AN ORGANOPHOSPHATE) ON BIOCHEMICAL CONTENTS OF FRESH WATER CAT FISH *HETEROPNEUSTES FOSSILIS* (BLOCH)

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Keywords:

H. fossilis,
Proteins, Carbohydrates,
Ninhydrine positive substances,
Methyl parathion, Organophosphate

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ABSTRACT: The present work was planned to study the effect of methyl parathion an organophosphate compound (OP) on biochemical contents of fresh water cat fish *Heteropneustis fossilis*. The exposure of fish to the sub-lethal concentrations of the toxicant methyl parathion was investigated and the variations were observed in biochemical contents in different tissues of the fish *i.e.* gill, liver, intestine, muscle and brain. The quantitative variations were observed in proteins, carbohydrates and ninhydrine positive substances at different time intervals *i.e.* 24, 48, 72 and 96 h. The results revealed that the components of proteins, carbohydrates and ninhydrine positive substances were found to be decreased significantly at different time intervals of methyl parathion exposure to different tissues of fish compared to control. The maximum decrease in proteins followed by ninhydrine positive substances (free amino acids) and carbohydrates was observed at 72 h and 96 h compared to 24 h and 48 h in different tissues of the fish *H. fossilis*. Thus, our present investigation reports that the changes observed were depending on period of exposure of fish to the concentration of methyl parathion.

INTRODUCTION: Pesticides are used worldwide in aquaculture and agriculture to control the insects, pests and other vectors¹, which ultimately find their way into aquatic habitats like rivers, lakes and ponds. The environmental quality is determined by the assessing to toxicity of different chemicals to fish and other aquatic organisms. They ultimately enter the organisms through food webs and also through contact in water^{2,3}. Most of the chemicals used as pesticides are acutely toxic to many non-target organisms such as invertebrates, birds, mammals and fishes especially those inhibiting the marine environment^{4,5,6}.

Some of the pesticides have been reported to persists the environment and tend to bio-accumulation in organisms⁷. It has been reported that pesticides can be actively toxic to fish^{8,9,10,11,12,13,14}. Pesticide toxicity to fish has been investigated in several studies^{15,16}. Usage of pesticides in the ecosystem leads to development of various types of morphological, physiological, biochemical and behavioral changes in individual¹⁷.

Hence it is necessary to study the immediate effect of pesticides on fish which forms a part of human diet. Among these pesticides, organophosphate compounds (OP's) are commonly used insecticides, which maintain less toxicity, persistence and also rapid biodegradability in the environment¹⁸. Methyl Parathion (0, 0 -di methyl-0-4 nitro phenyl phosphoro thioate)-Bayer (Germany) is a synthetic Organophosphorous pesticide, known to be toxic to fish¹⁹ and insects²⁰ and applied abundantly in agriculture²¹.

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Effect of Chlorpyrifos (An Organophosphate) on Biochemical Constituents of Fresh Water Cat Fish *Heteropneustes fossilis*

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Abstract: Chlorpyrifos is an organophosphate pesticide widely used insecticide in agriculture sector to control the varieties of pests and ectoparasites. The present study was under taken to analyze the effect of chlorpyrifos on biochemical constituents of fresh water cat fish *H. fossilis*. The fish were exposed to sub lethal concentrations of the toxicant chlorpyrifos and the variations were observed in different tissues like gill, liver, intestine, brain and muscle. The biochemical variations were observed in proteins, carbohydrates and ninhydrine positive substances at different time intervals i.e. 24, 48, 72 and 96hrs of exposures. The results revealed that the components of proteins, carbohydrates and ninhydrine positive substances were found to be declined significantly at 72 and 96 hrs compared to 24 hrs and 48 hrs time interval in different tissues of fish *H. fossilis* on exposure to Chlorpyrifos compared to control. The biochemical levels were found to be declined in all the tissues maybe due to the effect of insecticide Chlorpyrifos.

Keywords: Chlorpyrifos, *H. fossilis*, proteins, carbohydrates, ninhydrine positive substances, sub lethal concentrations, gill, liver, intestine, muscle, brain.

INTRODUCTION:

Indiscriminate usage of pesticides in agriculture to prevent crop damage from insects, pests and other disease vectors. They ultimately find their way in to aquatic habitats such as rivers, lakes and ponds and alter the physico-chemical properties of water and consequently affecting the organisms [1-4]. Pesticides in water cause damaged to biotic life especially to fish [5]. Fishes are very sensitive to a wide variety of toxicants in water. Different species of fish show uptake and accumulation of many contaminants (or) toxicants such as different pesticides. Among these pesticides have been found to be highly toxic not only to fishes and also to other aquatic organisms. Pesticides produce many physiological and biochemical variations in fresh water fauna by influencing the activities [6]. These variations are tissue specific and species specific but it can be

used as a meaningful indicator for pesticide pollution [7]. It also been reported that the acute and chronic toxicities of pesticides cause biochemical alterations in organisms [8-9,6]. Priyanka and Tiwari *et al.*, [10] has been reported that the sublethal concentration of Endosulphan provoked prominent oxidative stress in the gill, muscle and brain of Zebra fish. Acute exposure of fish to pesticides result in some biochemical changes causing interference. The high concentration of pesticide may cause severe adverse effects on cellular and molecular level ultimately it leads to behavioral, physiological, pathological and biochemical disorders that may prove total conditions to aquatic life [11-14]. The alterations in biochemical constituents in different tissues of fish due to toxic effects of different heavy metals and pesticides have been reported by many workers extensive work have been



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Research Article

Comparative Study Of Electrophoretic Patterns Of Esterases In Various Tissues Of Fresh Water Cat Fish *Heteropneustes Fossilis* (Bloch

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ABSTRACT

The present study was carried out to investigate the comparative study of electrophoretic patterns of esterases extracted from various tissues i.e. gill, liver, intestine, muscle and brain of fresh water cat fish *Heteropneustes fossilis* (Bloch). The qualitative analysis of esterase isozymes were examined on 7.5% native polyacrylamide gel electrophoresis (PAGE) stained with α -naphthyl acetate as substrate. Altogether 4 esterase bands were named as Est-1 (0.6 ± 0.05), Est-2 (0.4 ± 0.05), Est-3 (0.3 ± 0.05), Est-4 (0.15 ± 0.05) were observed with different relative mobility. Est-2, Est-3, Est-4 were found in gill, muscle, brain and liver where as all the four were found in intestine. Among the four esterases Est-3 is found to be more abundant in all the tissues tested with the highest intensity found in liver followed by intestine, gill, brain and muscle. Thus our present investigation reveals that all the four tissues of *H. fossilis* is rich in esterases.

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Comparative Study of Electrophoretic Patterns of Proteins in the Parotoid Gland Secretion and its Extract of *Bufo melanostictus* (Schneider) through SDS-PAGE and Urea SDS-PAGE

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Abstract

The present study was undertaken to analyze the qualitative analysis of the comparative study of electrophoretic patterns of proteins in the parotoid gland secretion and its extract in terrestrial toad *Bufo melanostictus* (Schneider). The protein patterns indicated that the secretion has less number of protein bands compared to the gland extract. The patterns of protein bands were observed in the parotoid gland extraction of *B. melanostictus* through Sodium Dodecyl Sulphate and Poly Acrylamide Gel Electrophoresis (SDS-PAGE) indicated a distinct of four protein bands and some additional bands with poor resolution and was compared with Urea SDS-PAGE. The protein bands indicated a distinct of six protein bands with some other additional bands in Urea SDS gels. In the parotoid gland secretion two protein bands in SDS-PAGE, whereas four protein bands were observed in the parotoid gland secretion of *B. melanostictus* through Urea-SDS PAGE. The protein subunit patterns were identified by using standard marker protein and R_m values were calculated accordingly. The electrophoretogram both the SDS-PAGE & Urea SDS-PAGE patterns of parotoid gland secretion and its extract showed homology in protein bands with minor variations.

Keywords: *Bufo Melanostictus*; Parotoid Gland; Protein Patterns; Urea SDS PAGE; Electrophoresis.

Introduction

Amphibians are treated as bio-indicators of aquatic and terrestrial ecosystem owing to their sensitivity to changes in the environment [1, 2, and 3]. Amphibians like toads are characterized by the presence of cutaneous glands spread over the skin. Basically two different types of glands developed in the amphibian skin i.e., I) Mucus secreting glands generally associated to maintain the humidity and cutaneous respiration and to protect the skin from mechanical damages and prevent microbial settlement on the skin; these glands secrete glycoprotein rich material which plays an important role in defense mechanism. II) Granular glands generally associated with chemical defense against predators and microbial infection [4-6]. The product secreted by such glands contain a wide variety of rich components like biogenic amines, bufo toxins, oligo peptides, proteins, guanidine derivatives, steroids and alkaloids in terms of pharmacological effects [4, 7-9]. The epidermal glands in amphibians are more evolved and are alveolar glandular cells and open on to the surface of the skin through ducts. In toads these glandular cells form the parotoid glands located between eyes and

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tympanum [8, 10]. The venomous secretions of the parotoid glands of the *Bufo* species are known to contain several bioactive compounds [11] and were used by Chinese, Indian traditional medicinal practice and Japanese physicians for centuries as folk medicines like "kyushin" and "Chan Su" [8,11]. The granular secretions are known to be secreting a variety of compounds which are species specific [12, 13].

The toad *Bufo melanostictus* (Schneider) is a very common amphibian in India So far, there are few reports on the protein patterns of *B. melanostictus* through Urea-SDS-PAGE. The present investigation has been undertaken for the comparative study of electrophoretic patterns of proteins in the parotoid gland secretion and its extract of *Bufo melanostictus* (Schneider) through Urea and SDS-PAGE in order to understand their possible defense role against