Academia and Society

International Journal of Education and Society

Print Journal: ISSN 2393-9419

Online Journal: e ISSN 2393-8919

Volume 10 Number 1&2 October 2023-February 2024

Publisher's Detail

Publisher:

Holy Cross Publishing House, Holy Cross College (Autonomous), Tiruchirapalli 620 002.

Publication details

Academia and Society Print: ISSN 2393-9419

Online: eISSN 2393-8919

Frequency: Bi-annual

 # started in the year 2014

Printed at: Holy Cross Publishing House, Holy Cross College (Autonomous), and Tiruchirapalli- 620 002.

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Content

Articles

ACOUSTICAL STUDY OF POLY METHYL METHACRYLATE IN TETRAHYDROFURAN

A. V. Paulin &A. Inigomary Rita
PG and Research Department of Physics, Holy Cross College, Tiruchirappalli, T.N.

Background: The propagation of ultrasonic waves and the measurement of their velocity in solutions serve as important tools for evaluating various acoustic and thermodynamic parameters. These parameters provide insights into the miscibility, compatibility, and molecular interactions within polymer solutions. Polymer-solvent miscibility can result from specific molecular interactions, such as hydrogen bonding, dipole-dipole interactions, and charge-transfer complexes, which contribute to the formation of a homogeneous polymer-solvent mixture(1).

Objective: Solutions of synthetic polymers have broader technological applications compared to solid polymers. Polymer solutions are of significant practical and theoretical interest due to the specific interactions between the solvent and polymer chains. Solvent effects strongly influence the properties of polymers, making it possible to gather extensive information about the dimensions and behaviour of polymer molecules in solution(2).The ultrasonic velocity, density and viscosity measurements have been made for different concentrations of Poly (methyl methacrylate) (PMMA) in Tetrahydrofuran at the temperatures 308K, 313K, 318 K and 323 K. From the experimentally measured parameters, the acoustical parameters such as adiabatic compressibility, specific acoustic Impedance, Relaxation time, free volume and Internal Pressure were determined to study the nature of interaction in polymer solutions.

Methods: The sound velocity through the solution is measured with the fixed frequency Mittal type ultrasonic interferometer at 2 MHz. The density of the solution is measured with 10 ml specific gravity bottle. The viscosity is found using Oswald's viscometer. All the measurements have been carried out at 308K, 313K, 318 K and 323 K using a thermostatically controlled water bath with an accuracy of ±0.1°C.
Results: Acoustic parameters are utilized to investigate different types of associations and various intermolecular interactions, as well as to assess the strength of these interactions.

Conclusion:Acoustical studies offer a detailed investigation of molecular associations in polymer solutions. Observing the trends and variations in acoustic parameters with changes in concentration and temperature reveals that cohesion between the components increases with higher concentrations but remains relatively weak. Additionally, as temperature rises, these cohesive forces tend to weaken.

Keywords: Ultrasonic velocity, adiabatic compressibility, Acoustic impedance, internal pressure, relaxation time, free volume

1. INTRODUCTION

The ultrasonic study of polymer solutions is a powerful method for exploring molecular interactions and understanding the behavior of polymers in different solvents. Ultrasonic waves, which travel through the solution, are influenced by various factors such as the solution's density, viscosity and compressibility. By measuring the velocity of these waves and related acoustic parameters, researchers can gain valuable insights into the molecular interactions, solubility and structure of polymer solutions (3).

2. MATERIALS AND METHODS

Ultrasonic technique is found to be a suitable method for the molecular interaction study because the waves just perturb the physico- chemical equilibrium of the medium. Due to its useful wavelength range, the ultrasonic technique could provide valuable information about the weak molecular interactions also (4). The use of ultrasonic waves does not result in the change in the structure of polymer materials and destruction of the sample being studied. PMMA, also known as acrylic or plexi glass is utilized because it is affordable, durable and easy to form. It is resistant to UV rays and has the capacity to maintain a light beam reflected within the surface. Acrylic glass is used in many items, including aquariums, car windows, and screens for digital devices.

ADIABATIC COMPRESSIBILITY

When an acoustic wave passes through the medium, adiabatic compressions and rarefactions take place. This results in a change in pressure (∂P) and a corresponding change in volume (∂V). These changes are related to the compressibility of the medium by a thermo dynamical relation.[5]

$$\beta = \frac{1}{V}\left(\frac{\partial V}{\partial P}\right)_s$$

Using the equation of Newton and Laplace, the adiabatic compressibility can be calculated employing velocity (U) and density (ρ)

$$\beta = \left(\frac{1}{U^2\rho}\right) \quad \text{---------- (1)}$$

ACOUSTIC IMPEDANCE

Acoustic impedance is a characteristic property of the medium. The acoustic impedance is analogous to the index of refraction of the medium. The specific acoustic impedance is related to density and velocity by the relation

$$Z = u\rho. \quad \text{---------- (2)}$$

RELAXATION TIME

The amount of energy passed to a given compartment grows exponentially with time to a final value and is characterized by a time constant which is known as the relaxation time τ and is given by the relation

$$V_f = \left(\frac{M_{eff}U}{k\eta}\right)^{3/2} \quad \text{---------- (4)}$$

FREE VOLUME

The free volume is defined as the average volume in which the centre of the molecules can move inside the hypothetical cell due to the repulsion of the surrounding molecules. C.V. Suryanarayana and Kuppusamy[6] derived a formula for free volume of a liquid system based on dimensional analysis. The ultrasonic velocity U in a liquid is a function of molecular weight M, viscosity η and free volume V_f.

$$V_f = \left(\frac{M_{eff}U}{k\eta}\right)^{3/2} \quad \text{---------- (4)}$$

INTERNAL PRESSURE

Internal pressure is the resultant of the forces of attraction and the forces of repulsion between the molecules in a liquid. Internal pressure is the parameter which depends on all types of interactions such as solvent-solvent, solute-solvent and solute-solute. Also it is closely related to the solubility parameters which determine the mode of interaction in the system. Internal pressure is experimentally measurable and it depends on molar volume.

$$\pi_i = bRT\left(\frac{k\eta}{U}\right)^{1/2}\left(\frac{\rho^{2/3}}{M_{eff}^{7/6}}\right) \quad \text{----------(5}$$

The internal pressure is measured through the equation,

$$\pi_i = bRT\left(\frac{k\eta}{U}\right)^{1/2}\left(\frac{\rho^{2/3}}{M_{eff}^{7/6}}\right) \quad \text{----------(5)}$$

3. EXPERIMENTAL

In the present research work, PMMA of monomer weight 100.1158 has been used. The solutions of various concentrations have been prepared by dissolving a known quantity of PMMA in 100 ml of tetrahydrofuran. The sound velocity through the solution is measured with the fixed frequency Mittal type ultrasonic interferometer at 2 MHz.The density of the solution is measured with 10ml specific gravity bottle. The viscosity is found using Ostwald's viscometer. All the measurements have been carried out at 308 K, 313K, 318 K and 323 K using a thermostatically controlled water bath with an accuracy of ±0.1°C.

4. RESULTS AND DISCUSSION

The decrease in adiabatic compressibility of a polymer solution with increasing concentration is mainly due to enhanced intermolecular interactions and structural organization of the polymer chains in solution. As concentration rises, polymer chains become more closely packed, reducing free volume and limiting the ability of the solution to compress under pressure.

In contrast, an increase in adiabatic compressibility with rising temperature occurs because thermal energy disrupts intermolecular interactions and reduces structural order in the solution. Higher temperatures lead to increased molecular motion, creating more free volume and thus enhancing the solution's compressibility.

The specific acoustic impedance in liquids can be used to assess the strength of inter- molecular attraction. As the strength of intermolecular attraction increases, the ultrasonic velocity also increases. Consequently, the acoustic impedance value also increases [(7)].

The variations of internal pressure and free volume are studied with respect to concentration and temperature. It is observed that the internal pressure increases with concentration of the solute while the

free volume decreases at all temperatures, showing the cohesion between the components. With increase of temperature, the internal pressure is found to decrease while the free volume is found to increase. This implies the weakening of the cohesive forces on increasing the temperature.

The values of relaxation time are found to increase with increase in concentration at all temperatures studied. At a fixed concentration, the value of τ is found to decrease with increase in temperature[8].

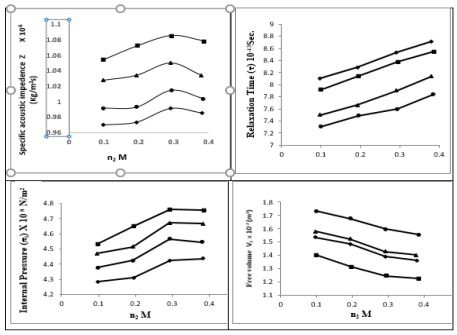
5. CONCLUSION

Acoustical studies offer an in-depth investigation into molecular associations within polymer solutions. Analysis of the trends and variations in acoustical parameters with changes in concentration and temperature reveals that cohesion between components increases with concentration, though it remains relatively weak. As temperature rises, these cohesive forces weaken further.

Table: Values of ρ, U, β and η for PMMA in THF at 308 K, 313K, 318K and 323K

Temperature K	n_2 (M)	ρ (Kgm^{-3})	U (ms^{-1})	β $x10^{-10}$ (m^2N^{-1})	η $x10^{-3}$ (Nsm^{-2})
308	0	867.56	1256	7.307	0.800
	0.098	864.55	1219	7.784	0.763
	0.197	873.21	1228	7.594	0.805
	0.294	881.81	1231	7.484	0.839
	0.386	876.00	1231	7.533	0.851
313	0	860.62	1205	8.002	0.758
	0.098	850.38	1209	8.045	0.699
	0.193	849.83	1217	7.945	0.724
	0.291	866.27	1212	7.859	0.754
	0.380	856.12	1208	8.004	0.762
318	0	841.53	1176	8.592	0.693
	0.099	842.27	1177	8.570	0.640
	0.194	838.46	1184	8.508	0.660
	0.293	853.48	1189	8.288	0.688
	0.384	847.92	1184	8.413	0.699
323	0	837.22	1159	8.892	0.775
	0.097	824.66	1176	8.768	0.693
	0.193	826.20	1178	8.722	0.712
	0.291	843.49	1175	8.587	0.745
	0.381	837.56	1176	8.633	0.758

A Psychosocial Investigation of Amir's Character Evolution in TheKite Runner



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EFFECT OF VERMICOMPOST WASH AND VERMIWASH AGAINST XANTHOMONAS ORYZAE PV. ORYZAE, THE CAUSATIVE ORGANISM OF BACTERIALLEAF BLIGHT DISEASE IN RICE

F. Emalda Mary[1], Dr. P. Pandilakshmi[1*], Dr.A.J. Bhorgin Lourdu Mary[1] and Dr. Sujatha Ilangovan[1]

[*]Correspondence Address

Dr. P. Pandilakshmi[1]

Assistant Professor

Department of Zoology

Holy Cross College

Tiruchirappalli

Tamilnadu, India

Email: pandilakshmip1980@gmail.com

Phone No. 9942052401

ABSTRACT

Xanthomonas oryzae is the causative agent of Bacterial leaf blight in rice which is one of the most devastating diseases and causes major loss in rice production. Presently, the use of vermicompost is an emerging method to promote growth and control pathogens in plants. In this perspective, we address vermicompost wash and vermiwash as promising tools for designing effective strategies for disease control and thus promoting sustainable paddy production. This study has found out that Vermicompst wash in combination with Vermiwash showed a higher inhibitory effect on *Xanthomonas oryzae* than the other experimental conditions.

Keywords: *Xanthomonas oryzae*, Bacterial leaf blight, Vermiwash

INTRODUCTION

Xanthomonas oryzae pv. oryzae (Xoo) is a phytopathogenic bacterium which causes bacterial leaf blight (BLB) in rice. It is one of the most devastating diseases of rice during monsoon season and widely distributed in all the major irrigated low land rice growing region of Asia (Laha *et al.*, 2009). At Global level, it is reported in different part of the United States, Asia, Africa and Northern Australia. In India, the disease has been observed in the most important rice growing states such as Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Karnataka, Kerala, Maharastra, Orissa, Punjab, Tamilnadu, Tripura and Uttar Pradesh. It has the potential to reduce the yield of rice upto 50% or more (Shankara *et al.*, 2017).

The bacterium attacks both seedlings and mature plants of rice. The symptoms of BLB usually appear one or two weeks after transplanting. It has two distinct phases which include blight phase and kresek phase. The causal organism is introduced to the plant through wounds or water pores in the leaves during the blight phase and produce yellow water soaked lesions and wavy margins on the leaves. Conversely,the kresek phase is a systemic phase during which acute wilting of the seedling occurs (Shankara *et al.*, 2017).

Some management strategies such as medicinal plants and some antagonistic bacterium have been used against *Xanthomonas oryzae*. Inspite of it, there is no complete solution to overcome the pathogenicity of the bacterium. Several researchers have proved the use of vermicompost and vermiwashes as growth promoters and antibacterial agents. Vermiwash contains soluble plant nutrients, enzymes, growth hormones, vitamins and beneficial microorganism which help in seed germination and plant growth; increase productivity and develop resistance in crops (Weesinghe *et al.*, 2005). Similarly, Vermicompost is a rich source ofnutrients, microflora and plant growth factors which improve growth, yield and disease resistance in crops (Manandhar and Yami, 2008).

Based on the above information, the present investigation was conducted to analyze the impact of Vermicompost wash and Vermiwash on Xanthomonas oryzae.

MATERIAL AND METHODS

COLLECTION OF DISEASED PLANTS

The diseased plants were collected from the paddy field and the infected leaves were cut into pieces and used for further study.

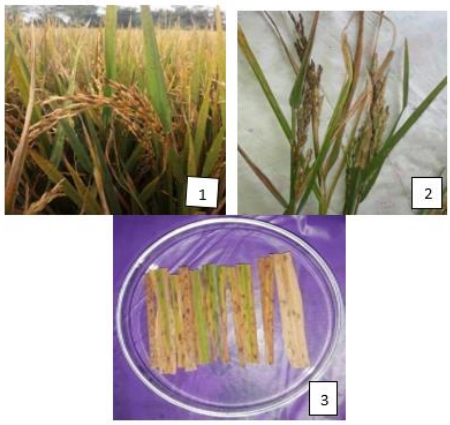

Plate 1: Photographic image of Rice field plants with BLB Symptoms (1), Rice plantshowing BLB Symptoms (2) and Infected leaf parts (3)

ISOLATION OF *XANTHOMONAS ORYZAE* FROM RICE PLANT

The infected leaves of rice were excised and sterilized with 1% sodium hypochloride for three minutes. Then, it was washed with sterile distilled water and cut into pieces. After drying with blotting paper, they were transferred to nutrient agar medium and incubated at 25 – 28℃ for 72 hours. After incubation, the colonies were sub cultured to get pure culture and preserved at 4℃ for further study (Wilson *et al.*, 1993).

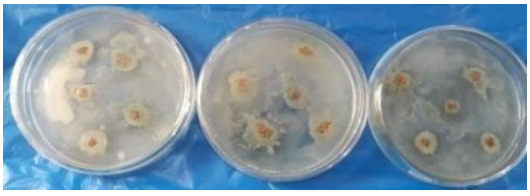

Plate 2: Isolation of *Xanthomonas oryzae* from rice plant on NA medium

Plate 3: Pure culture of *Xanthomonas*

IDENTIFICATION OF *XANTHOMONAS ORYZAE*

Presence of *Xanthomonas oryzae* in pure culture was confirmed at Trichy ResearchInstitute of biotechnology Pvt. Ltd., Thillai Nagar, Tiruchirappalli – 620 018.

Table 1: Results of confirmation tests of *Xanthomonas oryzae*

S.No	Name of the test	Result
1.	Gram staining test	G-ve (negative), rod shaped
2.	Motility	Motile
3.	Phyto Xano Camp Selection Agar Medium	Positive

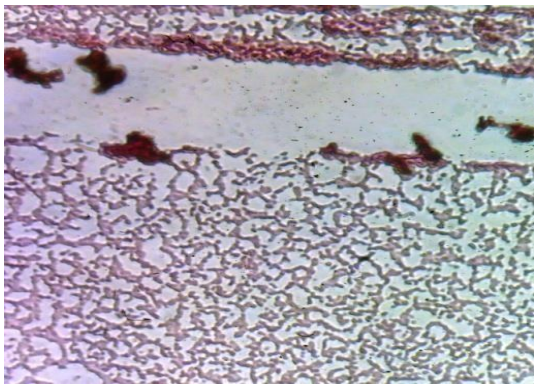

Plate 4: Photographic image of Gram staining of *Xanthomonas oryzae*

PREPARATION OF VERMICOMPOST WASH

About 1 - 2kg of earthworms was placed in a vessel with decomposed organic matter and vermicompost. When earthworms start feeding on waste, water was added into the vessel through inlet and the excess water flows out through the outlet in the form of thick syrupy fluid which was collected and used for the study (Gupta, 2004 and Abeskara, 2007).

PREPARATION OF VERMIWASH

10g of earthworms were immersed in 25ml of warm water and kept for 30 minutes at room temperature and the suspension was centrifuged at 3000 rpm for 10 minutes to remove the insoluble materials and the supernatant was used for the study (Zambare *et al*., 2008).

ANTIBACTERIAL SCREENING

The activity of Vermicompost wash and Vermiwash against *Xanthomonas oryzae* was assayed by agar well diffusion method on 24th, 48th and 72 hour of the experiment and the inhibition zones of each plate were measured with a scale.

STATISTICAL ANALYSIS

Mean, SD and Two ways analysis of variance was performed on the data obtained to find out the differences in the inhibition zones produced by Vermicompost wash and Vermiwash against *Xanthomonas oryzae*.

RESULTS

The effect of Vermicompost wash and Vermiwash against *Xanthomonas oryzae* was analyzed by measuring their zones of inhibition on 24th, 48th and 72 hours of the experiment.

Table 2a, Figure 1 and Plates 5, 6 and 7 represent the Zone of inhibition in control, Vermicompost wash, Vermiwash and Vermicompost wash in combination with Vermiwash against *Xanthomonas oryzae* on 24th, 48th and 72 hours of the experiment. No inhibition zone was noted in control. The Zones of inhibition of Vermicompost wash on *Xanthomonas oryzae* were 1.0 ± 0.0, 1.83 ± 0.76 and 2.16 ± 0.76 on 24th, 48th and 72 hours respectively. The corresponding values for Vermiwash were 1.83 ± 0.28, 2.16 ± 0.15 and 2.40 ± 0.17 which are higher than that of Vermicompost wash. However, the inhibitory activity of Vermicompost washin combination with Vermiwash against *Xanthomonas oryzae* was remarkably higher than that of other experimental conditions. The values were 2.00 ± 0.50, 2.66 ± 0.57 and 2.83 ± 0.28 on 24th, 48th and 72 hours of the experiment respectively.

The data were subjected to two way analysis of variance in order to confirm the impact of the experimental conditions and durations (Table 2b). The outcome indicated that there is significant differences between experimental conditions and durations ($p<0.05$). However, the interactive influence of experiment and duration is insignificant ($p>0.05$) on the zones of inhibition.

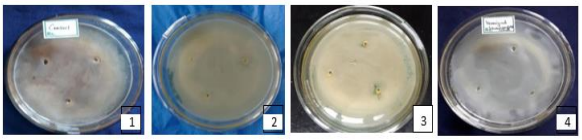

Plate 5: Zone of inhibition of Control (1), Vermicompost wash (2), Vermiwash (3) and Vermicompost wash in combination with Vermiwash (4) on *Xanthomonas oryzae* on 24th hour of the experiment

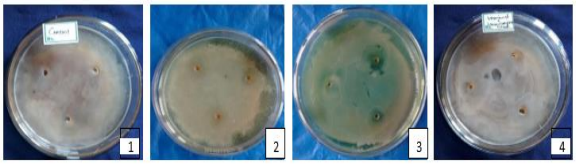

Plate 6: Zone of inhibition of control (1), Vermicompost wash (2), Vermiwash (3) and Vermicompost wash in combination with Vermiwash (4) on *Xanthomonas oryzae* on 48th hour of the experiment

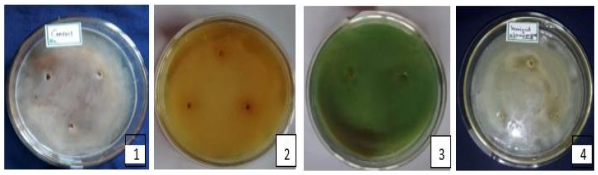

Plate 7: Zone of inhibition of Control (1), Vermicompost wash (2), Vermiwash (3) and Vermicompost wash in combination with Vermiwash (4) on *Xanthomonas oryzae* on 72 hour of the experiment

Table 2a: Zone of inhibition (mm in diameter) of Control, Vermicompost wash, Vermiwash and Vermicompost wash in combination with Vermiwash on *Xanthomonas oryzae* on 24th, 48th and 72 hours of the experiments

Experimental conditions	Duration (Hours)		
	24	48	72
Control	–	–	–
Vermicompost wash	1.0 ± 0.0	1.83 ± 0.76	2.16 ± 0.76
Vermiwash	1.83 ± 0.28	2.16 ± 0.15	2.40 ± 0.17
Vermicompost wash + Vermiwash	2.00 ± 0.50	2.66 ± 0.57	2.83 ± 0.28

Each value represents the Mean ± SD of a sample size of 4.

Table 2b: Two way analysis of variance showing the interactive influence of treatment and time duration on the Zone of inhibition (mm in diameter) of Control, Vermicompost wash, Vermiwash and Vermicompost wash in combination with Vermiwash on *Xanthomonas oryzae*. The data for a period of 24th, 48th & 72 hours were subjected to test

Source of variance	Degrees of freedom	Sum of squares	Mean sum of squares	F - Value	Significance
Experimental conditions	3	32.908	10.969	66.817	0.000 (p<0.05)
Duration	2	2.622	1.311	7.985	0.002 (p<0.05)
Experimental conditions* Duration	6	1.198	0.200	1.217	0.332 (p>0.05)
Error	24	3.940	0.164		
Total	36	129.970			

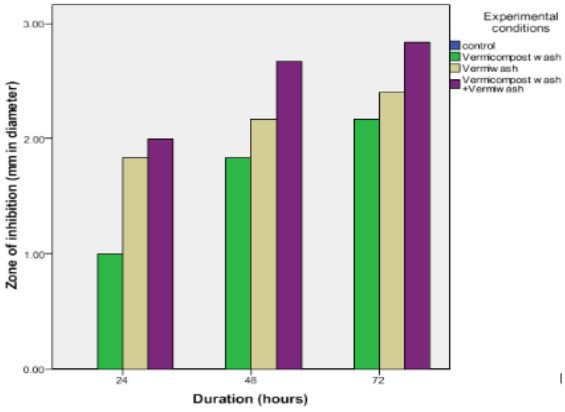

Figure 1: Zone of inhibition (mm in diameter) of Control, Vermicompost wash, Vermiwash and Vermicompost wash in combination with Vermiwash on *Xanthomonas oryzae* on 24th, 48th and 72 hours of the experiments

DISCUSSION

The research has been undertaken with the objective of tracing the effect of Vermicompost wash and Vermiwash against *Xanthomonas oryzae*, the causative agent of bacterial late blight in rice. The results of the study showed that both Vermicompost wash and Vermiwash have inhibitory effect on *Xanthomonas oryzae.*

Vermicompost wash has the ability to suppress the growth of *Xanthomonas oryzae*.Several researchers have found the effect of compost extracts on plant disease control. Weltzein (1991) studied the effect of compost wash against fungal pathogens. Gottschall *et al.* (1987); Weltzien and Ketterer (1986) observed the activity of compost tea against *Pythium* and *Rhizoctonia* in a variety of vegetables and fruits. Stindt

and Weltzien (1988) also studied the effect of compost extracts on control of *Botrytis cinerea* in strawberries and blight in potatoes. Similar study was performed by Thom and Moller (1988) by using the extract of compost against the Root rot and powdery mildew causing agants in beets and peas. Manandhar and Yami (2008) have recorded the activity of Vermicompost tea against *Fusarium moniliforme*, the causal agent of Foot Rot disease.

Several studies were also made to prove the activity of Vermiwash as antibacterial agents. Weesinghe *et al.* (2005) recorded the ability of vermiwash to develop disease resistance in plants. According to Shivsubramanian and Ganeshkumar (2004), vermiwash is a rich sourceof enzymes and plant hormones which can stimulate the growth, yield of crops and develop resistance against pathogens in crops. Thangavel (2005)also recorded the combined activity of Vermicasts extracts and Vermiwash on the growth and yield of paddy. Our results are also correlated with the above findings.The note worthy finding of our study is that Vermicompost wash in combination with Vermiwash showed a remarkable activity against *Xanthomonas oryzae.*

Production of Vermicompost wash and Vermiwash are simple, inexpensive and potentially effective method in the management of plant disease. It is suggested that both Vermicompost wash and Vermiwash could be used as antibacterial agents to control Bacterial leaf blight caused by *Xanthomonas oryzae* in rice to face the major challenges in disease management

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Synthesis, structural, optical, FTIR, surface morphology, and DLS analysis of silver nanoparticles

*K. Bansura Banu[1,]**
[1]Department of Physics, Holy Cross College (Affiliated to Bharathidasan University, Tiruchirappalli-620024), Tiruchirappalli-620002, Tamilnadu, India.

ABSTRACT

The synthesis of silver nanoparticles (AgNPs) was successfully performedadopting the co-precipitation method. Various characterization techniques were carried out to confirm the presence of the silver nanoparticles. The characterization techniques such as X-ray diffraction (XRD) analysis, UV-Vis Spectroscopy, Fourier Transform-Infrared Spectroscopy (FTIR),Dynamic Light Scattering (DLS), and Scanning Electron Microscope (SEM) were carried out. Powder XRD analysis was carried out on silver nanoparticles to confirm the crystallinity and the crystallite size of AgNPs was calculated. The UV-Vis NIR spectroscopy used to study the absorption behavior of the AgNPs was calculated. FTIR spectroscopy was performed to confirm the functional groups present in the AgNPs. The SEM analysis was carried out to analyze the surface morphology of the synthesized AgNPs. DLS analysis was done to confirm that the synthesized nanoparticles were in the range of nm

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Keywords*:* Silver Nanoparticles; X-Ray diffraction; FTIR; UV-Vis NIR; DLS; SEM;

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* Corresponding author. Tel.: +91-7010325792
E-mail address: bansurabanu@hcctrichy.ac.in (*Dr.K.Bansura Banu*)

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1. INTRODUCTION

Nanotechnology is one of the active areas of research that is expected to be the starting point of various multidisciplinary branches and nano-science is the contemporary and future point of many technological developments in the twenty-first century. The application of nano-scale materials and structures is gaining high attention due to their wide applicability, especially in the biomedical fields **[1-2]**. A major output of their activity is development of the new materials on the nanometer scale,including nanoparticles.These are usually defined as materials with a size of 1 to 100 nanometres (nm). The particles could be zero-dimensional in the case of quantum dots. Metal nanoparticles have been of great interest due to their distinctive features such as catalytic,optical,magnetic, and electrical properties **[3-4]**.

Silver nanoparticles (Ag-NPs) are useful in a variety of applications such as water treatment, antimicrobial agents in wound dressings, electronic devices, textile engineering, bioengineering, and biotechnology, and anticancer/antifungal agents due to their unique size-dependent magnetic, electrical, optical, physical, chemical, electrical resistance and resonance properties**[5-7]**. Apart from its toxic properties, they can be used in several products such as feminine hygiene products and contraceptive devices.Ag nanoparticles have many applications such as antibacterial and multiple drug resistance, which are the main reasons for the growing synthesis methodology during the previous decades. Different Methods like chemical, physical, photochemical, electrochemical, and biological routes were used for the synthesis of Ag-NPs by the researchers **[8-14]**.

The novelty is the new contribution with optimized facile, low cost, easy to scale-up, and template-free technique to produce silver nano-rods. In this study, we report the synthesis of Ag nanoparticles by the co-precipitationmethod. The AgNPs were prepared and characterized by different analyses such as X-ray diffraction (XRD), Fourier Transform-Infrared Spectroscopy (FTIR), UV-Vis spectroscopy, Dynamic light scattering (DLS), and Scanning electron microscope (SEM), and the results are discussed in detail

.

2.MATERIALS AND METHODS

1.7g of Silver Nitrate ($AgNO_3$) was dissolved in 100ml of distilled water. The Sodium hydroxide (NaOH) solution was prepared by stirring 4g of NaOH pellets in 20ml of distilled water. Then the pH of the $AgNO_3$ solution was adjusted to 9 by adding the Sodium hydroxide (NaOH) solution. The solution was stirred thoroughly by the use of a magnetic stirrer until the solution became dark brown with some precipitate. The formation of the dark brown color precipitate indicates the presence of silver nanoparticles. Then the solution was centrifuged to separate the precipitate and other impurities from the solution. After the centrifuge process, the obtained powder was calcinated at 300°C for 3 hours. The prepared silver nanoparticles are shown in **Fig.1**.

Fig.1. Prepared Silver nanoparticles

3. CHARACTERIZATION ANALYSIS

The characteristics of the prepared silver nanoparticle were analyzed by various characterization techniques like Powder X-ray diffraction, Fourier Transform-Infrared spectroscopy, UV-Vis spectroscopy, Scanning electron microscope, and Dynamic light scattering.

3.1.Powder XRD Analysis

Powder X-ray diffraction analysis is used to study the structural information and crystallinity of the material. The XRD PANalyticalXpert3 powder instrument was used in the present study. The X-ray diffraction patterns (**Fig.2**) of the powder sample of AgNPs have shown distinct diffraction peaks at 2theta of 33.36°, 38.33°,55.61° and 67.70° which can be indexed to the (111), (200), (220), and (311) Bragg's reflection of the face-centered cubic (FCC) structure of silver. From this, the crystalline nature of silver nanoparticles was confirmed. The crystallite size of AgNPs is calculated using the formula $(0.9\lambda)/ (\beta \cos \theta)$, where $\lambda = 1.54060$ Å (in the case of CuKa1), and β is the full width at half maximum intensity of the peak. Finally, the crystallite size of the AgNPs is found to be 33.90 nm

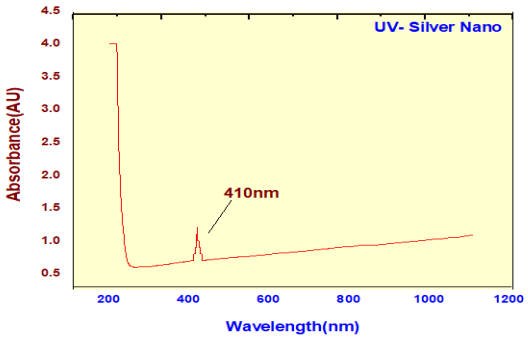

Fig.3. UV-Vis absorbance spectrum of AgNPs

FTIR analytical technique is used to identify the organic, polymeric, and in some cases inorganic materials. Here the Perkin Elmer Spectrum two model spectrometer was used to take the FTIR spectrum. The spectrometer has the range of 4000 to 400 cm^{-1} which measures the absorption of infrared radiation by the liquid or solid sample.**Fig. 4**shows the FTIR spectrum of the AgNPs which was obtained from the FTIR spectrometer. The molecular vibration bands were obtained between the ranges of 649 cm^{-1} to 3402 cm^{-1}. This range is to express the wavenumbers of the functional groups present in the silver nanoparticles. And in that, the strong peak in 3402.4 cm^{-1} represents the O-H stretching vibration. The peak emerged at 1654.5 $cm^{-1}$and 1380 cm^{-1} corresponding to the amides and carbonyl (stretch) group. The peak at 892 cm^{-1} is attributed to the ether group. This confirms the reduction of the silver nitrate to silver nanoparticles which is prepared by the co-precipitation method.

3.4. SEM analysis

The scanning electron microscope scans the particles using a focused electron beam over a surface to create an image. The electrons in the beam interact with the sample, producing various signals that can be used to obtain information about the surface morphology and composition. The SEM model used here is CAREL ZEISS EVO 18. From the SEM images **(Fig 5. a &b)** the shape and size of the silver nanoparticle can be visualized. The formation, as well as the morphological dimensions in the SEM study, demonstrated that the average size was 30-35 nm with inter-particle distance. And it seems to be spherical and flower-shaped.

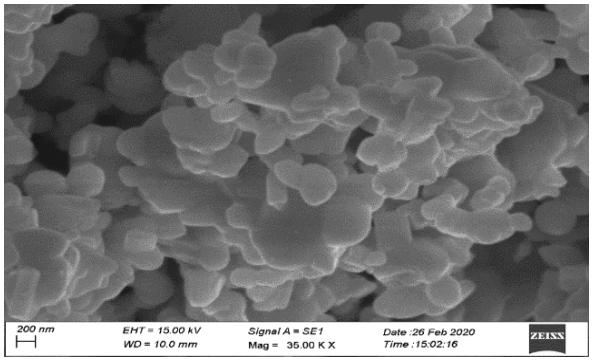

Fig.5.a. SEM image of AgNPs

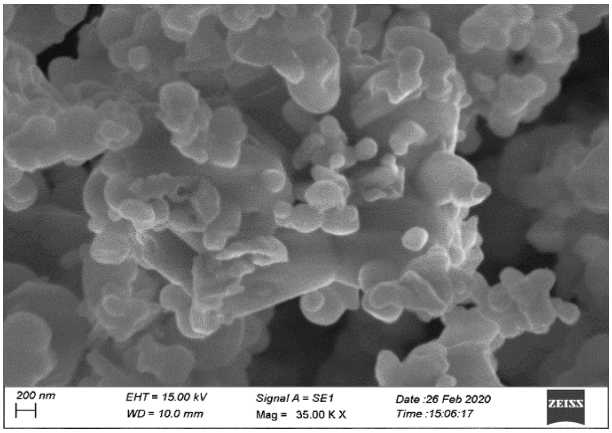

Fig.5.b. SEM image of AgNPs

3.5. DLS analysis

Dynamic light scattering analysis is used to measure the size distribution of the particles of the given sample. The DLS instrument used here is Micromeritics Nano Plus which can find the size of the particle suspended in liquid in the range of 0.1 nm to 12.3µm. **Fig.6**shows the intensity distribution spectrum according to the diameter of nanoparticles. From the DLS study, the size of the silver nanoparticle was determined to be 111.6 nm. Measurement was taken at room temperature and waterwas used as solvent

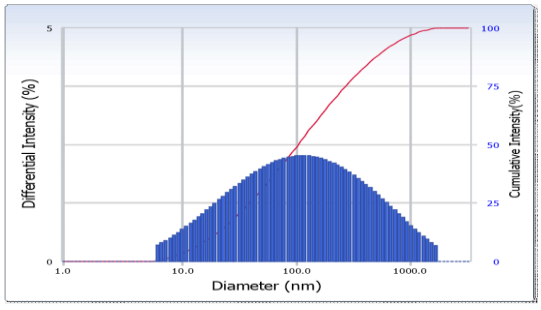

FIG.6. Dynamic Light Scattering Spectrum

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

DATA AVAILABILITY

The whole data sets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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Optimizing Milk Yield Through Effective Cow Management Practices

Ezhil Venil. L[1],Shalini Gnanam.T[2] Dharshini. M[3],*
[1]Student, PG and Research Department of Zoology,
Holy Cross College (Autonomous), Tiruchirapalli - 620002, Tamil Nadu, India.
[2]Assistant professor, PG and Research Department of Zoology,
Holy Cross College (Autonomous), Tiruchirapalli - 620002, Tamil Nadu, India.
[3]Student, PG and Research Department of Zoology,
Holy Cross College (Autonomous), Tiruchirapalli - 620002, Tamil Nadu, India.

***Address for Correspondence T.Shalini Gnanam**
PG and Research Department of Zoology,
Holy Cross College (Autonomous), Tiruchirapalli - 620002,
Tamil Nadu, India.
E. mail: shalinignanam@hcctrichy.ac.in

INTRODUCTION

This study emphasizes the importance of understanding current calf management practices to identify areas for improvement in dairy calf health and milk yield. To gather data, a survey was conducted using a questionnaire and interview method covering the profile of the respondent, type of animal, housing system, feeding practices, health care, breeding system, and milk yield of the cow. The results showed a lack of systematic understanding of calf management among many dairy managers, with inconsistencies in practices such as dry cow vaccination programs. The study included 150 dairy managers with low levels of education and low milk yields who were primarily engaged in dairy farming for income. This study highlights the need for a comprehensive understanding of calf management practices to improve dairy farming outcomes. A summary of the latest calf management practices would assist researchers in creating a comprehensive database that supports research related to this area of livestock management.

Keywords: Cow Management, Diary farming, Milk Yield, Feeding practices, Health care, Breeding system, Vaccination programs, Mortality rate.

Cow milk has been used for its nutritive and medicinal values globally, with Ayurveda, the Indian system of medicine, describing its innumerable benefits. The dairy sector is a crucial component of India's rural economy and is an important instrument to fight poverty and improve the nutritional intake of rural families. Cow milk is constituted of Water – 87%, Carbohydrate (Lactose) – 4.8%, Fat – 4%, Protein (Casein, Whey, Glycoprotein) – 3.4%, Minerals (Ca, K, I) – 0.8%, and Vitamins (A, B2, B12). Casein makes up approximately 80% of the total protein found in milk, while whey protein accounts for the remaining 20%. Thus, casein becomes a major source for supply of all essential amino acids (except Sulphur-containing amino acids - methionine and cysteine) (Superna de et al., 2015). Milk production is the primary performance indicator of a Dairy Farm. Proper cow care is crucial on dairy farms, as management practices affect animal well-being and productivity, as well as farm profitability. The present work aims to study seven separate management areas in Pullambadi and Vengadachalapuram to provide a more comprehensive view of management practices. To accomplish this, a survey has to be taken that covers the respondent's profile, animal type, housing system, feeding practices, health care, breeding system, and milk yield of the cow. A comprehensive description of current calf management practices would enable researchers to identify problem areas in dairy calf management, identify calf management practices that will improve calf health and milk yield, and establish a comprehensive database for research in this management function.

MATERIALS AND METHODS

This study aimed to survey calf management practices in Pullambadi and Vengadachalapuram areas of Tiruchirappalli district using an interview- based questionnaire. The survey covered seven categories, including the profile of the respondents, type of animal, housing systems for cows, feeding practices, health care, breeding system, and milk yield. The questionnaire was administered to 150 dairy managers to obtain a broad picture of their approaches to calf management. The data collected were analyzed using tables and graphs to describe the major characteristics of calf management practices on the small scales of Pullambadi and Vengadachalapuram. The tables and graphs were used to analyze the data and draw conclusions regarding the major characteristics of calf management practices in the surveyed areas.

Result

Respondents demographics

Completed questionnaire was obtained from 150 respondents, with approximately equal gender representation. The response rate in this study was 100 %, The median age bracket was 35 – 62 years of age, slightly older than the mean Indian age. They are (18 %) were Illiterate, (42%) can read and write only, (4%) were can read only, (10%) were primary level, (10%) were secondary, only (14%) only Higher got higher education. (Table 1).

6.2 Type of Animals

There were Bullocks, Sindhu, Jercy and Other types of cows. Most common is Sindhu and followed by Jercy. Jercy (11.3%), Sindhu (65.3%), others (22.3%) and Bullocks (1.0%) (Table 1). 11.6% of Jercy cows yielding 16 – 20 liters per day, 10.2 % Sindhu cows yielding 16 – 20 liters day and 8.5 % other cows yielding 16 -20 liters per day.

6.3 Housing System

There are 4 types of orientation followed, in the following percentages, North (20.7%), East (16.7%), West (18.7%), South (44%) (Table 3). In Location of shed Near dwelling or away from dwelling, was found to be in the percentage 72% and 28% respectively.

Type of roof highest percentage was found to be Asbestos 56%, followed by Thatched (26%), Asbestos sheet (56%) (Table 5, Figure). Type of floor is responsible for temperature control there are two types of floor is common Mud (61.3%), Concrete (20%), (Table 4).

Space for animals were improve the ventilation of animals. Majority of people have given good ventilation. It is indicated as follows, Loose (91.3%), Rigid (1.3%) and Average space (7.3%)(Table 8)

Sharing of shed can varying according to their economical level All species together found to be (67%) and Same species together found to be (30 %), Separate was only (3%) (Table 7).

Their opinion about appropriate number of dry cows in shed with 100 cubicle were 105(0%), 100 (2.6%), 95 (60 %), and 90 (37.3%).

Summer stress Management and Cold Management is necessary for the cows, Summer stress management cows are settle down under Late lactation - Inside other (0. 6%), Inside straw (99.3%), Far – off dry – Inside other (100%), Inside straw (0%), Close – up dry – Inside other (1.3%), Inside straw (98.6 %), Calving - Inside other (8%), Inside straw (92%). Cold Management Late lactation - Inside other (0%), Inside straw (100%), Far – off dry – Inside other (92%), Inside straw (8%), Close – up dry – Inside other (0%), Inside straw (100 %), Calving - Inside other (8%), Inside straw (92%).

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6.4 Feeding Practices:

Vengadachalapuram. The tables and graphs were used to analyze the data and draw conclusions regarding the major characteristics of calf management practices in the surveyed areas.

Abstract

Khaled Hosseini's debut novel, *The Kite Runner* (2003), is a poignant and

powerful exploration of human relationships, set against the backdrop of a tumultuous Afghan

history.This article ventures on a panoramic character evaluation of the protagonist Amir in Khaled Hosseini's *The Kite Runner*,applying Eric Erikson's Psychosocial theory to illuminate the formation of a round character. This study inspects Amir's developmental stages, leveraging the Bildungsroman technique to cast light upon his metamorphosis. Through a nuanced application of Erikson's theory, this research traverses Amir's

experiences, shaped by Afghanistan's socio-political context and its influence onhis character development. This investigation delves into the themes of guilt, redemption, and identity, underlining Amir's relationships and experiences shaped by his psyche. Furthermore, this study investigates the influence of historical events, cultural norms, and social expectations on Amir's development, comprehending the reciprocation between individual growth and societal influences. By examining Amir's character through the view point of psychosocial theory, this article offers insights into the convolution of human development, identity formation, and the indelible effects of childhood experiences.

Keywords: Psychosocial development, Identity formation, Guilt and redemption,Afghan culture and politics, Coming-of-age, Bildungsroman.

Introduction

Afghanistan's literary convention is one of the most affluent in central Asia, particularly Herat, the third- largest city of Afghanistan, an oasis city which is glorified as a centre of Persian scholarly and literary pursuit. The ancient works of Afghanistan Literature were orally dispatched, whereas the contemporary Literature is profound in the inheritance of the oral constitution and the predominantly written texts. In the twentieth century, Kabul, the capital of the country became the centre for literary figures and publishing.

Khaled Hosseini, born on March 4, 1965, in Kabul, Afghanistan, is an Afghan-American novelist, philanthropist, activist, and diplomat. Hosseini's novels are known for their authentic portrayals of Afghanistan, often featuring women as main characters who face male domination in the Islamic state. Hosseini's

familiarity with Tajik and Pashtun cultures, as well as his childhood experiences ofkite flying, inspired his debut novel, *The Kite Runner*. Published by Riverhead Books in 2003, it became a New York Times bestseller and earned him international acclaim.

Hosseini was recognized as a defender of Afghan refugee affairs. The socialdisruption activated his nomination as a goodwill ambassador in the year 2006 for the UN High Commission for Refugees. Hosseini established The Khaled HosseiniFoundation after visiting Afghanistan with UNHCR, which dispenses assistance to the needy people in Afghanistan. His debut novel, *The Kite Runner* (2003), tells a powerful story of friendship and redemption against the backdrop of a changing Afghanistan. It became an international bestseller and was adapted into asuccessful film.

His second novel, *A Thousand Splendid Suns* (2007), explores the lives oftwo Afghan women whose paths cross amid the turmoil of war and societal

oppression. The novel highlight's themes of resilience and the struggle for personalfreedom. Hosseini's third novel, *And the Mountains Echoed* (2013), is a multi-generational family saga that spans several decades and continents, illustrating how choices resonate through time and affect numerous lives. In addition to his novels, Hosseini has written short stories and essays, often reflecting on the plight of refugees and the impact of conflict. His literary works are celebrated for theiremotional depth, compelling narratives, and rich depiction of Afghan life andculture.

Erik Erikson's Psychosocial theory

Erik Erikson's psychosocial theory is a foundational model in developmental psychology, suggesting that personality evolves through eight distinct stages, each defined by a particular conflict that must be resolved. Unlike Freud, who focused on the role of sexuality in development, Erikson emphasized the impact of social

and cultural influences, proposing that each stage involves a psychosocial crisisthat shapes individual growth and identity.

The initial stage, Trust vs. Mistrust, spans from birth to one year and

revolves around the infant's basic needs being met by caregivers. Consistent and reliable care fosters trust, while inconsistent care can lead to mistrust. The secondstage, Autonomy vs. Shame and Doubt (ages 1-3), involves the child developing asense of personal control over physical skills and independence. Success in this stage leads to autonomy, while failure results in feelings of shame and doubt.

The third stage, Initiative vs. Guilt (ages 3-6), is when children start to assertpower and control over their environment through play and social interactions.

Successfully navigating this stage results in a sense of initiative, while failure cancause feelings of guilt. The fourth stage, Industry vs. Inferiority (ages 6-12), takes

place during the school years, where children face new social and academic demands. Achieving success leads to a sense of competence, whereas failure canresult in feelings of inferiority.

During adolescence (ages 12-18), the fifth stage, Identity vs. Role Confusion, is critical for developing a personal identity and sense of self. Success in this stage fosters fidelity, the ability to adhere to societal standards and expectations, while failure can lead to role confusion and a weakened sense of self.The remaining stages—Intimacy vs. Isolation (young adulthood), Generativity vs. Stagnation (middle adulthood), and Integrity vs. Despair (late adulthood)—build upon earlier stages, focusing on relationships, productivity, and life reflection. Erikson's theory underscores that personality development is a continuous processshaped by social and cultural factors throughout life.

PSYCHOSOCIAL EVOLUTION OF AMIR IN *THE KITE RUNNER*

During the primitive stage of Trust versus Mistrust, Amir's early life is characterized by his father's unemotional nature, which fosters a deep-seated

mistrust in Amir. Baba's failure to provide affection or emotional support leaves Amir feeling insecure and questioning his self-worth. According to Erikson, the first year of life is a period of rapid growth and development, and Amir's

experiences during this formative time had shaped his future relationships.

Amir reflects, "I remember the way he used to look at me, like I was some kind of precious, exotic treasure" (Hosseini 15). This brings out Baba's detachment and its impact on Amir's trust issues. Amir's longing for his father's attention and approval is evident, but Baba's emotional distance instils a sense of insecurity in him. This sense of mistrust influences Amir's relationships throughout the novel, particularly his relationship with Hassan.

The second stage is the stage of Autonomy versus Shame and Doubt, in which Amir's pursuit of independence is obstructed by his father's expectations, resulting in feelings of shame and self-doubt. Baba's persistent criticism and lackof approval make Amir feel inadequate, which hampers his sense of autonomy.

Erikson argues that, the child must learn to assert his will and test the limits of hisenvironment, but Amir's efforts to assert himself are met with disapproval.

Amir reflects, "I was a coward, and I knew it" (Hosseini 67). This statement accentuates Amir's shame and self-doubt, rooted in his struggles to stand up to his father or pursue his own desires. His thwarted attempts at autonomy lead to a sense of powerlessness. Consequently, Amir's sense of shame and doubt impacts his relationships and decision-making throughout the story. His inability to assert himself erodes his confidence and plays a role in his eventual betrayal of Hassan.

In the next stage of Initiative versus Guilt, Amir's efforts to prove himselfand win his father's approval led to significant guilt, as his actions driven by initiative result in severe consequences. Despite Erikson's assertion that children must learn to take initiative and assert his own desires, Amir's misguided actions cause harm rather than achieving his goals. Amir says "I had one last chance to make things right" (Hosseini 91). Thisquote shows Amir's awareness of his errors and his attempt to rectify them.

However, his efforts come too late, leaving him burdened with deep guilt. As aresult, Amir is plagued by guilt throughout the novel. His struggle to forgive himself leads to self-loathing and shapes his quest for redemption. The fourth stagedeals with Industry versus Inferiority Amir's difficulties in school and his feelings of inferiority compared to Hassan contribute to his sense of inadequacy. His desireto prove himself and gain his father's approval drives him to compete with Hassan,but he continues to feel inferior.

"I was a mediocre student, and I knew it" (Hosseini 123). This line illustrates Amir's feelings of inadequacy and inferiority. His academic strugglesand perceived shortcomings compared to Hassan deepen his self-doubt. Consequently, Amir develops a pervasive sense of inferiority that impacts his relationships and self-esteem throughout the novel. His difficulty in recognizing his own abilities and limitations leads to a lack of confidence.

Stage five deals with Identity versus Role Confusion, which describes Amir's time in America, along with his interactions with Soraya and Rahim Khan,plays a key role in his search for identity. He wrestles with balancing his Afghan heritage with his new American environment, which leads to confusion about his roles. Erikson asserts that, the adolescent must explore different identities and roles, and Amir's experiences in America act as a trigger for this exploration.

"I was an Afghan, but I was also an American" (Hosseini 215). This quote emphasizes Amir's difficulty in integrating his dual identities. His relationships with Soraya and Rahim Khan assist him in navigating this identity confusion.

As a result, Amir starts to form a clearer sense of identity, understanding his own strengths and weaknesses. This exploration of identity becomes a crucial part of hispath toward redemption.

In the sixth stage of Intimacy versus Isolation, Amir's quest for intimacywith Soraya and his efforts to find redemption through Hassan's son, Sohrab,emphasize the significance of deep, meaningful relationships. His longing for connection drives him to build close bonds, though his past errors risk pushing him into isolation. Amir's connections with Soraya and Sohrab were essential to his personal growth.

Amir reflects, "I had found a new family, a new home" (Hosseini 371) through which, Amir's search for intimacy and a sense of belonging becomes evident. His relationships with Soraya and Sohrab offer him both a sense of purpose and a place where he feels he belongs. As a result, Amir develops a deepersense of intimacy and recognizes the value of significant relationships in his life.

His path toward forming these connections sets the stage for his journey towards forgiveness and redemption.

During the seventh stage of Generativity vs. Stagnation, Amir's attempts toatone for his past and find a sense of purpose illustrate the concept of generativity.His desire to make a positive difference motivates him to assist Sohrab and seek redemption. Erikson suggests that, the middle-aged adult must contribute to the society, and Amir's actions to make amends reflect this generative drive.

"I had found a new purpose" (Hosseini 421). This statement magnifies Amir's commitment to making a positive impact and giving back. His efforts to support Sohrab and pursue redemption are clear examples of generativity. Hence, Amir develops a sense of generativity, understanding the significance of contributing to the greater good. This pursuit of generativity forms the basis for hiseventual journey toward achieving integrity.

At the last stage of Integrity vs. Despair, Amir's contemplation of his life and pursuit of redemption reflects his struggle to achieve integrity. He deals with his past errors and seeks forgiveness, which leads him toward a sense of integrity. Erikson observes that, the older adult must reflect on their life and find closure and Amir's path to redemption exemplifies this quest for integrity.

In the novel, Amir notes, "I had found some measure of peace" (Hosseini441). This enhances Amir's pursuit of forgiveness and his effort to achieve integrity. His journey toward redemption and reconciliation demonstrates hisprogress toward integrity. Ultimately, Amir develops a sense of integrity by acknowledging the need for reflection and closure. This journey towards integrityoffers him a sense of resolution and fulfilment.

Erikson's eight stages of life would aid an individual to discover their own identity and individuality. The psychological aspect of the theory proves that the society has a greater role to play in the process of psychological development of a character. The society shaped Amir's psychological structure by forming and deforming several aspects in Amir through various social and situational incidents.Hence Amir was both affected and healed by the society. Erik Erikson's theory wasapplicable in almost all the stages of Amir's life and therefore Amir's psychosocial development becomes clearly visible under the light of psychosocial theory.

Conclusion

In conclusion, this analysis reinforces the relevance of Erik Erikson's psychosocial theory in exploring the intricacies of human development as portrayed in Khaled Hosseini's *The Kite Runner*. Through Amir's journey, Hosseini vividly illustrates Erikson's eight developmental stages, highlighting the challenges and achievements inherent in personal growth. Amir's progression through the stages—from Trust vs. Mistrust to Integrity vs. Despair—serves as a model for understanding the impact of social interactions and relationships on identity formation. The novel emphasizes the importance of resolving each developmental crisis, demonstrating how unresolved conflicts can lead to feelings of guilt, shame, and inadequacy. *The Kite Runner* ultimately conveys that redemption and forgiveness are attainable despite past transgressions. Amir's questfor integrity reflects the potential for human growth, self-awareness, and transformation. Moreover, the study highlights the continued relevance ofErikson's theory in psychological research, suggesting avenues for future exploration of psychosocial concepts within literary analysis. The insights gainedfrom this analysis can enhance the application of psychological frameworks to literary studies, enriching our understanding of the human experience.

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WASH – IN DILAPIDATED DETENTION FACILITIES - A CRITICAL REVIEW

S. Helankkethini *1 and Dr. P. Swarna Kumari *2

1. Under Graduate Student at P.G and Research Department of Rehabilitation Science, Holy Cross College (AUTONOMOUS) Tiruchirappalli, Affiliated to Bharathidasan University.
Contact: 9677695704
Email: hkkethini@gmail.com
2. Associate Professor and Dean of Research, P.G and Research Department of Rehabilitation Science, Holy Cross College (AUTONOMOUS) Tiruchirappalli, Affiliated to Bharathidasan University.
Contact: 9659762566
Email: swarnakumari@hcctrichy.ac.in

ABSTRACT:

Water- the elixir of life, must by no means be deprived to a person regardless of their demographic, cultural, social and in this case, judicial origins. Ever since 1915, The International Committee of the Red Cross (ICRC) has been strategically functioning and devising Humanitarian Law for the protection and cumulative well-being of a detainee/inmate serving a sentence in a correctional facility. Although the outlook of the drafted and implanted activities sounds convincing and successful, there are several loopholes when the key focus is magnified under the lens of WASH- Access to Water, Sanitation and Hygiene. One of the major contributing factors that diminish the prescribed standards of construction and sanitization ranging from state to central prisons in all most every developing country is the lack of material structures backed up by an economic drop in financial aid or assistance. This being the practical and present-day dilemma of correctional facilities, the advancement of WASH to a higher regime in the foreseeable future is at a handicapped state as deprivation and denial of basic sanitation has become an inevitable normalcy that inmates are built resilient to in the due course of their incarceration period. When the basic hygiene needs (water, sanitation, tampons/pads, extra clothing, bathing essentials) are deprived and compensated, an inmates' health is at stake. During COVID 19, detainees behind bars were subjects of poor sanitation and were the least considered in the hierarchy of pandemic importance. This lack of sanitation providence in prisons, nullifies several judicial laws and guidelines formulated for the protection of the rights of an inmate. A global shift towards the impact of dilapidated detention facilities that exercise poor sanitation and hygiene methodology should be ranked as an indispensable concern that require immediate attention for the formulation of adaptive measures that are implementable in nature which are drafted with certified approach tested to scale the effectiveness of practice and can be universally modified with efficient outcomes in the long run. As the goal of WASH, is inclusive and sustainable in nature, encompassing the well-being of every human towards the access of sanitization and hygiene, the underlying attention should be prioritized and projected towards the vulnerable, ostracized and down trodden group; which in reality unfortunately happens to be a massive number under statistical terms. This uprising global

concern, can be tackled by proper allocation of funds and by channelizing the available resources in a constructive and effective way. Until this need is highlighted and dragged out of bars for public observance and notice, prisons and correctional facilities will continue to thrive as unsafe embodiments unfit for human survival with minimum investments made towards the availability and accessibility of water, sanitation and hygiene. Against this backdrop, this paper presents an in-depth analysis on the current status of WASH facilities in prison environments particularly during the global pandemic- COVID 19 and also attempts to throw light on a few strategies to alleviate this problem and to arrive at summative yet feasible ways to improve detention facilities for the benefit of prison inmates.

INTRODUCTION:

The National Institute of Mental Health and Neurosciences (NIMHANS) in 2013, surveyed and revealed that around four lakh prisoners were lodged in Indian Prisons. More than 200,000 people are serving life sentences in the U.S. prisons today, and most of them are locked in state correctional facilities. At present, the prison population stands at 1.4 million, with 203,865 people serving life sentences — or one in seven people, according to another study. With a rapid increase in the housing of inmates, detention facilities are placed in a vulnerable position to overlook the basic protocols that are prescribed to be followed by functional institutions. This plight is drawn from the lack of financial aid, inadequate raw materials/ facilities, improper allocation and channelization of available funds and untargeted utilization of man power. This being the rough draft of every prison at a global level, it is magnified in developing countries as they strive towards stable financial security. India being a developing country directly falls under the highlight of this cause, as the untold truth of Indian prisons is truly devasting in a deplorable state. Article 14 of the Constitution of India says: "The state shall not deny to any person equality before law or the equal protection of laws within the territory of India". And according to the Provisions under the Prison Act 1894, the accommodations and sanitary conditions for inmates is ranked as prior importance. Under the heads of the above quoted major laws functioning on behalf of inmates and their basic rights, Prisons should meet the basic, indispensable needs of an inmate regardless of their race, gender, cast and felony involved. Narrowing it down to the lens of WASH; Water, Sanitation and Hygiene should be accommodated in accessible forms for the usage of inmates behind bars. The key question to this cause is, to what extent can WASH be a practical implementation when there is a national dilemma of economic crisis. The purpose of this research paper is to revolve around the present-day prison scenario and to extract practical solutions in simple means which directly applies WASH as an effective measure.

UNIVERSAL ACCESS TO WASH:

Water, Sanitation and Hygiene: A guidance note for leaving no one behind (UNICEF)

According to this initiative launched by UNICEF, no human being should be denied of the basic right for the access to water, sanitation and hygiene. Leaving no one behind (LNOB), became a popularized term after UNICEF declared it as one of the key strategies in achieving a universal access to WASH. The guidance comprises of three parts:

Part I explains the LNOB imperative, providing key definitions.

Part II emphasizes the fact that it is people that are at the centre of LNOB, using examples.

Part III provides entry points and examples of actions for LNOB for UNICEF WASH programming.

The successful reach of this noble initiative can only be attained when there is an integrated reach of accomplishment. The radius of the parameters of this strategy covers the vulnerable, deplorable and ostracized group in the society. Prisons in all most every developing country, has a minimized chart that abides under the regulation of WASH. And thus, for the universal access to WASH, prisons/ detention facilities must also be considered under all costs.

PRESENT DAY PRISON IN CONTRAST WITH WASH:

In the past few decades, the outburst of crime rates has proportionally increased the number of inmates housed in detention facilities per year. This has directly impacted the housing facilities and has resulted in overcrowding of inmates under one roof with bare minimum amenities for basic survival. This being said as the general prison environment; the basic needs of inmates are left unbothered and unnoticed. This came to light and was magnified during COVID 19 as detention facilities/ jails were given not much importance when formulating interventions and protocols. And to summarize the plight, in places of enforced confinement, access to basic necessities and fundamental hygiene protocols are in a depleted state. To ensure the utmost importance for ensuring that the inmates remain in good health; WASH in prisons must be the new normal. In developing countries, prison buildings are usually in a dilapidated state and is materially unfit place for the confinement of large groups on a temporary or permanent basis. The

capacity of detention facilities tends to decline and deteriorate due to the lack of maintenance and conventional measures towards preservation, while at the same time the number of inmates in urban centres is on the rapid increase. Economic drawbacks add on to the negative side of cause and hinders the growth of the project to a refurbished state. On the contrary, several low cost and effective technologies and devices are available to heighten the reach of WASH. Most of such strategies are said to be a one-time investment and requires maintenance for sustainability. As the Government/ State holds the superior power over detention facilities, the authorities must be open to adapt such technologies and active measures must be taken from the legal side to bring such schemes to action.

THE IMPORTANCE OF WASH IN DETENTION FACILITIES:

According to several studies set on prison environment, detainees are crammed into a cell or dorm in large groups, in some severe cases, they are forced to stay in places built for other purposes such as prison warehouse and store rooms. When the count of inmates increases past the prison's capacity, the need to adapt essential measures towards expansion is often left unaccounted. As a following result, the water supply system and sanitary facilities are not sufficient to cater the needs of the prison population. When there is a faulter or breakdown in the supply of essentials (Water, Meals, Hygiene) inmates risk severe health problems. And when the health conditions of inmates are appalling, the prison staff and people residing near by are bound to confront the consequences. In reference with COVID 19, prisons can be ranked as a major hotspot for the widespread of contagious diseases. Although there are several protocols advocating the importance of social distancing, sanitation and hygiene; a fine line of negligence is drawn when it comes to prisons and detention facilities. Practically and psychologically speaking, if a persons' basic needs are left unmet, the entire concept of rehabilitation is questionable. Prisons-serving as not only punishment entities but also as rehabilitation facilities, must incorporate the aspects that fall under the spectrum of basic amenities in non-negotiable terms. If the awareness of the importance of WASH is heightened in a larger scale and is accepted as a sustainable measure, the implantation of WASH can be elevated to another dimension.

THE FUNDING GLITICH IN WASH:

The financial resources in prison administrations have always been restricted. The allocation of funds is either not fully utilized or not supplied. Chronic economic crisis and devaluation of currency further fuels and aggravates the situation. Also, the increase in the number of inmates has a direct effect. In many cases, the money allotted by the state turns out to be insufficient to address the basic needs of inmates. Under such circumstances, hygiene, food, medical care and sanitation are often compromised. Due to economic constraints, prison maintenance is often limited to security aspects while the infrastructure is left to crumble and deteriorate. Despite the sad plight, there is a possibility to maintain or renovate decaying detention facilities with limited funds under strategic means to make significant improvements.

STEPS TO IMPLEMENT WASH IN DETENTION FACILITIES:

The first step towards addressing a problem, is ascertaining the problem. 70% of the problem is solved when a problem is identified and analysed. Thus, the initial move to approach WASH in detention facilities, is to carefully conduct an inventory of the existing situation, to identify and analyse the main problem, to define the measures that need to be executed and to prioritize the most urgent work. To break this format down in simple steps:

STEP 1: Conducting a complete inventory of the prison incorporating all aspects (Building, sanitation, Hygiene, Stocks, Funds, Materials, Population, Staff, Transport, Water Facilities, Bathroom providence, Kitchen requirements, Existing and overlooked protocols and other factors)

STEP 2: Analysing the findings from the collected data (Grouping and categorising under heads like Building and Maintenance, Transport and Road, Water and Waste water management, Sanitation and hygiene, Health and medical care, Population and Housing, Funds and stocks, Regulations and protocols)

STEP 3: Ascertaining the main problem that requires immediate attention (this can vary from prison to prison, to find out the most urgent need; the tri force of a persons' indispensable needs which comprises of food, clothing and shelter can be used or other available standardized tools/charts can be used)

STEP 4: Defining the problem statement and listing all possible means of approach (If a prison has a major problem in water facilities, the problem statement can be defined as: ***An Urgent Need to Eradicate the Shortage of Water and to Find Sustainable Measures To Recycle Waste Water Within Limited Financial Resources)*** and to list all possible means of approach; a thorough analysis must be done, the problem must be thrown for discussion and must be consulted with professionals in the field. (Considering the above-

mentioned hypothetical example of water scarcity in prison, the problem can be notified to experts in the field of waste water management)

STEP 5: Formulating a protype/ sample model (this can aid in overviewing the project and in rectifying errors and possible loopholes)

STEP 6: Calculating available funds (Based on the availability of funds the range of the project can be altered. To gain maximum benefit; the availability of funds should not minimize the quality of the project)

STEP 7: Allocating and dividing the work under efficient heads (A steering committee can be formed to operate the project and to take it to the next step of progress)

STEP 8: Documenting and reporting the entire program (A complete documentation starting from inception to completion can aid as a blueprint for upcoming future projects)

STEP 9: Tracking the accessibility and benefits of the project (Following up with the usage and outcomes of the project plays a crucial role as it displays the effect of the project)

STEP 10: Sustaining and persevering the project through maintenance (Frequent supervision and surveillance can prevent any damage and repairs)

(By using the above mentioned 10 steps, WASH can be made available ,accessible and affordable in any deplorable prison)

APPROACHING THE KEY CONCEPTS OF WASH:

The key concepts of WASH circulate around the access to water, hygiene and sanitation. To address each concept, the following is broken down under the highlights of WASH. Each aspect is individually encountered and practical solutions are suggested.

1. ACCESS TO WATER:

According to the minimum standards laid down by the ICRC, the amount of water necessary for survival is 3-5 litres per person per day, and 10-15 litres per person per day to cover all minimum needs and remain in good health, as long as the other services and facilities are also in good working order (ICRC and WHO). Supplying sufficient amount of water at a place where people are held in large groups is highly uncompromisable and mandatory. The quality and quantity of water should not be declined even when the recipients are on a rapid increase. Consequently, modern alternatives should be adapted to meet the indispensable need of supplying water to detention facilities. Strictly speaking, the State/ Government should cope with the rise in inmates and must be fully alarmed to address such basic needs. A slight lag in these crucial amenities, severe riots, illness, contagious consequences can instantly emerge. And thus, to prevent all such foreseeable disasters, a proper outline incorporating every sector that requires water for the functional use in day-to-day activities carried out in detention facilities must be carefully listed. The following are the basic areas that fall under the above mentioned:

- Drinking water
- Preparation of food/meals
- Maintenance of personal hygiene
- Cleaning/ sanitation of the premises
- Sewage and waste water management
- Uncalled disaster/ situations

To determine if these needs are met and to identify the problem statement, the following parameters can be taken into account:

- The quantity of water that enters the prison
- The quantity of water that is available to the detainees
- The quantity of water that is actually utilized by the detainees
- The quantity of water saved

The amount of water that enters the prison can be noted by regular readings of the water meter. The water meter is generally mounted at the exterior part of the premises. Constant surveillance and maintenance of the water meter is mandatory. The volume of water supplied can vary according to the time of the day, season and for other natural causes. To derive the availability of water on a permanent basis, such variations must also be noted. And once when the exact readings are noted, the problem statement can be examined and solutions can be implemented accordingly.

POSSIBLE PROBLEMS IN ACCESSING WATER:

Accessing water can be a problem when:

- the water distribution points are outside the cells and dormitories, far from reach;
- the water supply is intermittent, or the rate of flow is comparatively low;
- there is no storage tank for sudden scarcity
- the quality and quantity in the supply of water is compromised
- there is a sudden leakage or hinderance in distribution

And to prevent such cases, the following can be adapted:

- Building water storage tanks
- Installing Bore wells
- Rain water harvesting system
- Waste water management
- Recycling and reusing used water

• Drip irrigation system
• Installing showers
• Wells

To make water accessible in prisons:

• The number of taps/faucets should be increased to reduce over crowding
• The accessible point for water must be increased
• The quality of water must be frequently examined
• The quantity of water provided should not be compromised
• Water should be available at all time and in all places

WAYS TO INVOLVE INMATES IN WATER RELATED PROGRAMS:

The detention facility must take active steps to involve inmates in saving water. Water related problems can be minimized to some extend when there is a conscious involvement from the recipient's side. The following can be implemented:

• An orientation on the importance of saving water can given
• Inmates can take turns to monitor activities relating to water
• The everyday tasks given to inmates can incorporate saving water
• Inmates can be encouraged to come out with ways to manage waste water
• World water day (March 22) can be celebrated in prison to highlight the importance of water
• Basic water and sanitation protocols introduced by ICRC, WHO and UNICEF can be introduced to inmates

2. ACCESS TO SANITATION:

The fundamentals of sanitation revolve around cleaning and disinfecting. Post COVID 19, the global situation demands for a well sanitized environment for the survival of the human race. This calls for an immediate sanitation spere in prisons. Access to an environment that is clean and free from germs and infection is more of a necessity. Although, prisons hold in-house cleaning staff, the efforts of a well-formed team turn out to be futile under the lack of providence in the required essentials. Thus, to prevent such adversities and to not negotiate with the situated protocols, active measures must be taken by the State/Government. When the talk about sanitation rises, the talk about accommodation follows. According The United Nations Standard Minimum Rules for the Treatment of Prisoners 2 stipulate in Rule 10, under the heading "Accommodation": "All accommodation provided for the use of prisoners and in particular all sleeping accommodation shall meet all requirements of health, due regard being paid to climatic conditions and particularly to cubic content of air, minimum floor space, lighting, heating and ventilation". The number of latrines available should be of one for 25 detainees (WHO), the strict minimum acceptable one latrine for 50 detainees (ICRC). And thus, it is of high importance that sanitation and accommodation is not compromised in detention facilities. The following arenas require constant sanitation in detention facilities:

• Dorm/cell/room
• Washrooms/bathroom/faucets
• Hallways and verandas
• Kitchen and warehouse
• Lawn and garden
• Other rooms and departments

To determine if these needs are met and to identify the problem statement, the following parameters can be taken into account:

• No of rooms/ departments/dorms/cell in a facility
• No of inmates/ staff/ users
• No of in-house cleaning workers
• Litres of water and number of raw materials (liquid detergent, mops) required
• No of cleaning sprees per day
• Duration of maintenance

The exact count in the number of rooms in a detention facility can help to determine the number of in-house sanitary workers needed. The number of users can help to trace the population that is housed in the facility. The amount of water that enters the prison can be noted by regular readings of the water meter. And the number of times the facility is cleaned per day, can aid in the steps towards maintenance.

POSSIBLE PROBLEMS IN SANTITAION PROTOCOLS:

Implementing sanitation protocols in detention facilities can be hindered when;

• There is shortage in the supply of essentials (water and materials)
• There is a shortage in staffing
• There is no follow up maintenance
• There is a lack in cooperation by the users
• The sanitary protocols are not properly oriented

And to prevent such cases the following can be implemented:

• A frequent check on the flow of supply of essentials
• Proper and excess staffing
• Measures to preserve maintenance
• Involving the active participation of inmates
• Increasing the pay for in-house cleaning staff

WAYS TO INVOLVE INMATES IN SANITATION OF THE FACILITY:

The detention facility must take active steps to involve inmates in promoting sanitation in the facility. Sanitation related problems can be minimized to some extend when there is a conscious involvement from the recipient's side. And to attain that state, the following can be implemented:

- An orientation on the importance of sanitation can given
- Inmates can take turns to monitor activities relating to cleanliness
- The everyday tasks given to inmates can incorporate basic cleanliness
- Inmates can be encouraged to come out with ways to promote sanitation in the facility
- World Clean-up Day (September 18) can be celebrated in prison to highlight the importance of cleanliness
- Basic water and sanitation protocols introduced by ICRC, WHO and UNICEF can be introduced to inmates.

Accommodation should be considered when it comes to sanitation. When the facility is past the ability to house inmates, proper measures should be taken towards expansion. The increase in the number of inmates should not be a factorial cause to settle down with quality declined services. The basic rights of a person should not be compensated with another cause. Active measures must be taken by the State/Government to implement such meaningful strategies for the perseverance of sanitation in detention facilities. Although technically speaking, chronic economic crisis is disturbing factor when it comes to implementation, several low-cost technologies are available and can be adapted to tackle the monetary drawback.

3. ACCESS TO HYGIENE:

While being under charged confinement, inmates bear the responsibility of their personal hygiene. The International Committee of Red Cross (ICRC) has set up various norms to advocate the importance of personal hygiene behind bars. Although several laws and norms are passed, the odds that these laws are overlooked tends to settle down on the favourable side. According to the Collins English Dictionary, Hygiene is the practice of keeping yourself and your surroundings clean, especially in order to prevent illness or the spread of diseases. Under the guidelines of the definition, personal hygiene is a continuous and conscious practice which plays an indispensable role in a person's physical and mental well-being. Being deprived of the access to exercise personal hygiene is completely inhumane in nature.

The following are the set of some stringent norms imposed by the International Committee of Red Cross (ICRC) to ensure that detainees are allowed equitable access to basic amenities associated with maintenance of hygiene:

- Construction of one toilet to cater to 25 detainees. Similar provisions must be available for single or multiple holding cells to ensure immediate and sufficient access.
- Availability of one shower per 50 detainees with allowance for a bath at least 3 times per week.
- Each toilet block must be equipped with one tap for availing the facility of washing hands.
- Availability of water 24 hours a day
- Providence must be made in adherence with WHO standards for adequate water purification and portable systems
- Different entry points for men, women and juveniles to water must be installed.,
- Providence should be made to access water at multiple sources in order to avoid conflict.
- Female inmates should be able to avail secured entry to toilets throughout 24 hours
- The toilet facilities should be situated in a secured location, wherein female inmates don't encounter any risk while trying to gain access.
- Extra facilities should be availed to women who are pregnant, lactating, under a menstrual cycle or taking care of relatively young children.
- Sufficient facilities should be made available for women to avail bathing. They should have access to amenities like soap and fresh towels etc.
- Women should be provided with suitable sanitary products to deal with menstruation (Including the disposal of materials) with dignity and privacy
- Proper set of clothing should be provided on regular basis.

If all the above-mentioned protocols are met, access to hygiene in detention facilities can be a practised routine.

POSSIBLE LOOPHOLES IN HYGIENE PROTOCOLS:

- When there is a disturbance in the supply of materials (Towels, pads, soaps)
- When the quality is compromised due to a rise in the quantity
- When there is a sudden lack or scarcity
- Improper usage of allotted supplies
- Hoarding and stealing of supplies (Inmates tend to attempt such tactics)

- Negligence of hygiene protocols
- Lack of cooperation from inmates
- Shortage in funds

AND TO PREVENT SUCH CASES THE FOLLOWING CAN BE IMPLEMENTED:

- A frequent check on the flow of supply of essentials
- Proper entry/ book keeping of resources purchased
- Measures to preserve maintenance
- Involving the active participation of inmates
- Orienting inmates on the importance of personal hygiene
- Provisions like saloons/ shaving/ trimming facilities
- Installing in campus shops that sell low-cost essential products such as shampoo, soaps, pads, shaving kit, tooth brush etc
- Frequent checks for head lies and skin allergies

WAYS TO INVOLVE INMATES:

In a maximum correctional facility in the United States, an inmate serving a life long sentence runs a barber shop in the detention facility. To some extend such measures can be globally followed. The following are some ways in which a detention facility can involve inmates to promote personal hygiene:

- An orientation on the importance of personal hygiene can be given.
- Inmates can be given an opportunity to take active roles like barbers, hair dressers
  (Depending on the person, type of prison and security)
- Inmates can be called for frequent health check-ups.
- The protocols set by WHO, UNICEF, ICRC can be disclosed directly to inmates, so they can know their basic rights behind bars.

CONCLUSION:

I know not whether Laws be right,
Or whether Laws be wrong;
All that we know who lie in gaol
Is that the wall is strong;
And that each day is like a year,
A year whose days are long.
- Oscar Wilde

To debate on the felony committed by a person and to confine him/her behind bars with minimum provisions of basic amenities is equivalent to advocating a cause with no predominant reason. To reform and rehabilitate a person crucial aspect such as physical, mental and social well-being must be incorporated. A lag in one aspect can proportionally affect the other. A well-structured balance must be established between these inter connected forces. With the availability of resources and within the reach of the allocated funds, strategic measures must be planned and implemented for the benefit of inmates. WASH – with the global aim to ***Leave No One Behind*** (***LNOB)*** must be instilled in detention facilities which are often ostracized and neglected from the society. To quote from the words of Oscar Wilde, the prison wall is strong; and each day for an inmate is like a year that is long. WASH can only gain massive attainment and success if the reach of WASH goes beyond strong prison walls. .

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DAUGHTERS OF INDIA AND THEIR UNSPOKEN VOICES

[1]A.P.Vanavil [2] P.Amsavarthini [3]Dr.G.Sasikala Hephzibah
[1&2] III B.R.Sc, PG & Research Department of Rehabilitation Science
[3]Assistant Professor, P.G & Research Department of Rehabilitation Science
Holy Cross College (Autonomous), Tiruchirappalli – 620 002, TAMIL NADU, INDIA

ABSTRACT

The Struggle and Condition of Marginalized Girlhood, which focuses on the obstacles and circumstances that marginalized girls confront. This study delves into the intricate network of challenges that young girl's face, which includes social, economic, and cultural components. The study's

interdisciplinary approach attempts to uncover the varied nature of these impediments, as well as their impact on marginalized girls' well-being and development.

The inquiry uses qualitative methodologies, case studies, and ethnographic observations to portray the fragile experiences of underprivileged girls in a variety of settings. By investigating the interplay of factors like as poverty, prejudice, limited access to education, and cultural norms, the study hopes to provide light on the complex issues that underprivileged girls face.

Finally, this study provides a glimpse into the study's depth and complexity, encouraging readers to engage with the various barriers that impede underprivileged girls' advancement and well-being while fighting for a more equal and just society.

Key words: Daughters of INDIA, girl children, gender role, biased treatment, marginalized, socially excluded, cultural norms, women empowerment

INTRODUCTION

The nation of India is diverse. These are the building blocks of life. Our country, India, claims that women have been revered as gods from prehistoric times to the present. For this reason, the earth, and rivers themselves are referred to as women. But the prestigious goddesses are getting restricted, overburdened and most importantly couldn't break the invisible chain that has been knot on the name of love. Do these remarks imply that women are valued equally? is still up for debate. Global statistics indicate that there is a violation of women's fundamental rights. In terms of education, work, social security, the economy, health, and decision-making as well as involvement in society, women experience prejudice. Women are subjected to numerous hardships and atrocities in the home and in society as a whole as a result of these disparities and inequities between men and women. These distinctions become more pronounced as adults and start in childhood. Here, we examine the impact these variations have on marginalised women and children. This research is going to highlight about the Marginalized and socially excluded community girl children.

Women's education in general was an octogenarian as various minor amendments and the struggle of various leaders sacrificed their lives as a result of which women got the right to education. Even today, marginalized girls face more difficulties in getting an education than the rest of the general poor.

Boom Maattukkaraas – Adiyan:

Kerala and Tamil Nadu are home to Adyan people known as Bhoombhoom Mattukkara people. They are still performing the clan business till today, their custom is to tame cows and perform tricks. Thus, the majority of women travel from town to town with their kids, especially the girls, in tow, earning a living by selling items like amulets, moss, bangles, dhristhi ropes, and needles.

Narikuravas

Children also lack the resources to study because they are always on the move in pursuit of a living.

Urban – Sanitary workers

The city's cleaners, whose parents are just now beginning to educate their daughters due to health issues related to their profession and social rejection, are those who reside on the outskirts of the city.

OBJECTIVES

To Study about the education level, economical level and the social acceptance among the peer and the social access of girl children in the marginalized community

NEED OF THE STUDY

Everybody uses common statistics to discuss the advancement and development of women and girls. Governments periodically establish different programmes and incentives because they recognise the importance of women's progress in education. However, it is especially critical to consider the girl kid who is the most marginalised. The condition of those who, as nomads, are shunned by the profession of caste, is still beyond our imagination. They lack the resources to take advantage of programmes, therefore even when they are offered, they are shunned. We must examine these issues since, despite the introduction of numerous rules, the same problems—such as fingerprints—continue to be handled in the same manner. Basically whenever it’s a research on girl children everybody will concentrate on the floating population. But these Boom Boom maattukkara Adiyans, Narikuravars and the urban poor community girl children are not contracted effectively. Lack of concentration on them made us to do this research.

REVIEW OF LITERATURE

The results of resource analysis pointed towards the less power of women to access and control resources that they come across in their day to day life. This is also a reflection of the male domination of the tribal society. The situation was such that they were not able to directly impose control over the money they obtained through income. This might be due to the female oppression that was still prominent in Wayanad district.

- *Gender Analysis of 'Adiya' tribal agricultural labourers of Wayanad district (2017) Dhanusha Balakrishnan and Dr.A.Anilkumar*

This study brings out the gender discrimination prevailing in Narikoravar community. And it also shows how it affects their education. This study on Narikoravars will bring out this problem to lime light, so that necessary steps shall be taken by government and voluntary organisations. Though there are already executed government schemes in India to address the girl child education like Sarva Shiksha Abhiyan, BhetiBachao Beti Padhao, The Rashtriya Madhyamik Shiksha Abhiyan various others steps should also taken by them to address the gender gap in Education.

- *Challenges faced by Narikurvars (Gypsies) community's girl children in education in India (2022) S.P. Vignesh, Dr.S.D.Dineshkumar*

The above analysis envisages that education is one of the most important social indicators, which are directly linked with economic development. To increase the State Wise School Drop-Out Rates in Classes I-V-SC Students in India, the state wise should concentrate on retention rather than enrolment especially schedule caste communities to reduce social disparities. In addition to universal facilities, universal enrolment and universal retention, the availability of a universally high quality of teaching and learning should also be provided. As a whole, the highest dropout rate is recorded in the Scheduled Caste community, As per the opinions elicited from the local teachers literacy levels of parents and poor economic conditions of the families are found to be the major reasons for dropouts. Excessive involvement of children in domestic work, household chores, etc., and negligence of parents towards early marriages of girls children are the other causes for the higher dropout rates.

- *Status of Primary Education of Scheduled Caste Children (2013) Dr.S.Saravanakumar*

METHODOLOGY

This study used purposive sampling, which targets a particular underrepresented group, in conjunction with a descriptive self-preparatory questionnaire as the primary data collection instrument. Investigating the distinct viewpoints, experiences, and difficulties that members of this specific marginalised population encounter was the goal of the study. The research caught the complex and frequently underrepresented voices within the targeted industry since the purposive sample approach made it possible to deliberately pick participants from this particular group. The study aimed to illuminate the unique needs, problems, and aspirations of a marginalised community by concentrating on them. Through the use of a descriptive self-preparatory questionnaire, the participants' narratives were thoroughly examined, leading to a thorough comprehension of their lived experiences. An extensive examination of the participants' narratives was made possible by the use of a descriptive self-preparatory questionnaire, which promoted a thorough comprehension of their lived experiences. The utilisation of this research strategy demonstrates a strong dedication to social justice and inclusivity by elevating the voices of underrepresented groups that could otherwise go unnoticed in academic studies.

21 participants between the ages of 12 and 17 made up the research sample for this study, which concentrated on those who worked in urban sanitation. The purposeful choice of this population was to highlight the viewpoints and experiences of a group that is frequently disenfranchised in metropolitan environments. Six participants in the sample were particularly selected from the community of urban sanitation workers, offering valuable perspectives on the particular challenges and peculiarities of their line of work. Ten participants were from the Adiyan group as well, and they provided insightful information on their experiences within the given age range. Additionally, five individuals were chosen from the Narikuravar community, adding a variety of viewpoints to the study. This sophisticated strategy for sample composition guarantees a thorough analysis of the intended age group while also taking into account the different socio, economic and cultural backgrounds of Adiyan, Narikuravar, and urban sanitation workers under the study scope.

TABLE 1: EDUCATION

Categories	Basic Qualification	Access of Education		Scholarship		Higher education		Degree holders
		Yes	No	Yes	No	Yes	No	
Urban (Sanitation workers)	Degree	100 %	-	100 %	-	100%	-	3
Adiyan	8th	80%	20%	-	100 %	-	100%	-
Narikuravas	12th	20%	80%	40%	60%	-	100%	-

This table provides information on different categories of individuals based on their level of education, access to education, scholarship availability, higher education opportunities, and whether they hold a degree or not.

Analysis:

Access to Education: Adiyan and Narikuravas communities have lower access to education compared to Urban (Sanitation workers). This could be due to

various socio-economic factors, including accessibility to schools, economic constraints, or cultural barriers.

Scholarship Availability: Adiyan and Narikuravas communities have varying degrees of access to scholarships, with Narikuravas having a higher percentage. This indicates potential efforts or initiatives to support education within these communities.

Higher Education Opportunities: While all categories seem to have some access to higher education, specifics are not provided for Urban (Sanitation workers). For Adiyan and Narikuravas, 100% of individuals have access to higher education, indicating some level of support or availability of pathways for further studies.

Degree Holders: Urban (Sanitation workers) and Narikuravas have 100% degree holders, implying a higher level of education attainment within these communities compared to Adiyan, where no degree holders are mentioned.

Implications:

Efforts should be directed towards improving access to education for Adiyan and Narikuravas communities to ensure equitable opportunities for all individuals.

Initiatives to increase scholarship availability can further support education within these communities and alleviate financial burdens.

More detailed information on higher education opportunities and support systems for all communities would provide a clearer understanding of the pathways available for further education and skill development.

TABLE 2: ECONOMY

Categories	Salary/ Month Parents	Job assurance		Maintain – Daily expenses		Work place of parents				Kind of work	
		Yes	No	Yes	No	Govt		Private	Self	Kulathozhil	Other works
						Contract	Permanent				
Urban (Sanitation workers)	8,000 – 10,000	-	100 %	-	100 %	50%	50%	-	-	90 %	10%
Adiyan	1000	-	100 %	100%	-	-	-	-	100 %	100 %	-
Narikuravas	15,000	-	100 %	60%	40 %	-	-	80 %	20%	-	100%

This table provides additional information about the categories mentioned earlier, focusing on the salary of parents, job assurance, and ability to maintain daily expenses, workplace of parents, and the kind of work they are engaged in.

Analysis:

Income Levels: The income levels of parents vary significantly among the three categories, with Narikuravas having the highest average monthly income, followed by Urban (Sanitation workers) and then Adiyan. This reflects differing economic conditions and opportunities among these communities.

Job Assurance: Job assurance is not explicitly specified for any of the categories. However, the high percentage of parents being engaged in government jobs for Urban (Sanitation workers) and Narikuravas may suggest a relatively higher level of job security compared to those in private or contractual employment.

Maintaining Daily Expenses: All categories report being able to maintain daily expenses, indicating some level of financial stability within these communities, despite variations in income levels.

Workplace of Parents: Urban (Sanitation workers) predominantly work in government jobs, while Narikuravas have a mix of government and private sector employment. Adiyan's parents' workplace is not specified.

Kind of Work: Urban (Sanitation workers) are primarily engaged in Kulathozhil (sanitation work), while Narikuravas have a similar pattern but with a notable portion involved in other works as well. Adiyan, on the other hand, is entirely engaged in other works, suggesting a diversity of occupations within this category.

Implications:

Economic conditions vary significantly among these communities, influencing factors such as access to resources, educational opportunities, and overall well-being.

The predominance of government jobs among Urban (Sanitation workers) and Narikuravas may indicate a need for initiatives aimed at enhancing employment opportunities, especially in the public sector, for marginalized communities like Adiyan.

Understanding the types of work each community is engaged in can inform targeted interventions aimed at skill development, job training, and economic empowerment initiatives tailored to their specific needs and circumstances.

TABLE 3: SOCIAL

Categories	Peer group treatment		Equal rights		Gender position			Edu – Menstrual hygiene		Girl – Marriage age
	Good	Bad	Yes	No	Primary	Secondary	Least	Yes	No	
Urban (Sanitation workers)	-	100 %	-	100 %	30%	70%	-	50 %	50 %	16 - 18
Adiyan	10%	90%	-	100 %	-	60%	40%	30 %	70 %	21
Narikuravas	40%	60%	40 %	60 %	-	40%	60%	-	100 %	15 - 18

This table presents information on various social and cultural factors affecting different categories,

including peer group treatment, equal rights, gender position, education regarding menstrual hygiene, and the typical marriage age for girls.

Analysis:

Peer Group Treatment: Adiyan and Narikuravas report varying degrees of peer group treatment, with a majority indicating poor treatment. This suggests potential issues related to social dynamics and community relationships that may impact individual well-being and self-esteem.

Equal Rights: While a majority in all categories report having equal rights, there are still significant proportions indicating otherwise, especially among Narikuravas. This indicates ongoing challenges in achieving full equality and addressing discrimination within these communities.

Gender Position: Not explicitly defined for Urban (Sanitation workers). Adiyan and Narikuravas show mixed responses, indicating differing perceptions or experiences regarding gender roles and expectations within these communities.

Education Regarding Menstrual Hygiene: Urban (Sanitation workers) and Adiyan report higher levels of education regarding menstrual hygiene compared to Narikuravas. This could indicate differences in access to information and resources related to reproductive health and hygiene.

Age of the Girl Marriage : Adiyan typically has a later marriage age for girls compared to Narikuravas, while Urban (Sanitation workers) fall in between. This reflects cultural norms and practices within each community regarding the timing of marriage for girls.

Implications:

There is a need for initiatives promoting positive peer group treatment and fostering a culture of respect and inclusivity within these communities, especially among Adiyan and Narikuravas where a significant portion reported experiencing bad treatment.

Efforts to promote gender equality and empower women and girls should be tailored to address specific challenges and perceptions within each community, taking into account variations in attitudes and beliefs regarding gender roles.

Enhancing education and awareness regarding menstrual hygiene, particularly among Narikuravas, can contribute to improved health outcomes and overall well-being for women and girls.

Understanding variations in marriage age norms can inform targeted interventions aimed at delaying marriage and promoting education and empowerment opportunities for girls, especially within communities where early marriage is prevalent.

RESULT:

From the data it was found that, in comparison, female children from urban sanitation worker families had access to both economic and educational opportunities. Higher education is a barrier for other tribal tribes who are semi-nomadic or nomadic. However, the issue that each of them face is societal inaccessibility. Even with their education, their economic sustainability and equal rights are severely lacking.

CONCLUSION

In addition to making sure that there is no discrimination in society between men, women, and third genders, we also need to fight for the fundamental rights of marginalised girls, such as access to social security, education, and financial stability. The caste-based social stigma should be lifted from marginalised impoverished individuals who are supporting themselves by working as cleaning staff, nomads, or as regular people in this society. Without our help, government initiatives and programmes must be able to release the chains bound marginalised girls' feet and undo the knots that women and construction have forced upon them. We must design curriculum that include methods of instruction that are both compassionate and thought-provoking. Together, let's fight for the rights of underprivileged girls and show social concern to save humankind.

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A Path to Inclusion: Integrating SEL into the Lives of Students with Learning Disabilities

*Ms. Shrimathi K., Research Scholar,
**Dr. Joicey P. Manickam, Associate Professor & Dean, School of Rehabilitation and Behavioural Sciences
PG & Research Department of Rehabilitation Science,
Holy Cross College, Affiliated to Bharathidasan University,
Trichy -2

ABSTRACT

The importance of social and emotional learning (SEL) in promoting inclusion for students with learning difficulties in educational settings is examined in depth in this study paper. This study highlights the many advantages of incorporating SEL practices into the lives of students with learning difficulties, emphasizing how it may foster inclusive learning settings. It does this by drawing on current literature and theoretical frameworks. The paper also discusses the fundamental elements of SEL treatments, implementation difficulties, and methods for overcoming inclusion hurdles. This study emphasizes the importance of encouraging students with learning difficulties to actively participate in educational opportunities by arguing for a complete approach to SEL that takes into account the unique social and emotional needs of these students.

Keywords: Social and emotional learning, inclusion, learning disabilities, SEL interventions, educational practice.

Introduction

Learning disabilities (LDs), also known as specific learning difficulties or specific learning disorders (American Psychiatric Association, 2013), are identified in students primarily through difficulty with reading, writing, and/or math. As a result, the creation of successful programs to promote learning processes, focusing on the areas of reading, writing, and counting, has traditionally taken precedence over the emotional and social aspects of intervention for these students.

Social and Emotional Learning (SEL) has become more and more important in today's educational discourse due to its transformative potential in promoting students' overall development and well-being. According to Durlak et al. (2011), social awareness, self-management, relational skills, self-awareness, and responsible decision-making are all included in the wide range of abilities and competences that make up SEL. SEL programs have proven to be quite effective in a variety of educational contexts, but there is still a significant lack of research on how SEL is incorporated into the lives of children who have learning difficulties. In order to close this gap, this theoretical research study looks at how SEL integration can encourage inclusion among students with learning difficulties.

But academic issues that students with LD face extend beyond domains that are specific to learning processes, such memory and attention. Numerous challenges with the social and emotional components of education for children with LD have been brought to light by a number of research (Butler & Silliman, 2008; Elias, 2004; Schiff & Joshi, 2016). "Specific learning disorders can have negative functional consequences across the lifespan, including high levels of psychological distress and poorer overall mental health," states the DSM-5 (American Psychiatric Association, 2013). Suicidality is more likely to develop in people who drop out of school and have co-occurring depression symptoms. In order to support the social and emotional development of these students, this study explores the impact of learning disabilities (LD) on children's emotional and social development in the classroom and makes the case for expanding school-based SEL programs.

Literature Review:

A burgeoning body of studies highlights the critical function of SEL in fostering all students' successful academic, social, and emotional outcomes. Improvements in prosocial behavior, mental health outcomes, and academic achievement have all been linked to SEL interventions (Durlak et al., 2011). Furthermore, research indicates that SEL programs can foster a positive school environment that is marked by improved student-teacher interactions, fewer behavioral issues, and a stronger sense of community within the school (CASEL, 2020).

The literature that is currently available, however, mostly ignores the unique requirements and difficulties that kids with learning disabilities encounter when it comes to SEL. According to Baker et al. (2012), social and emotional development is frequently impeded for students with learning disabilities by obstacles such as trouble identifying and controlling their emotions, interacting with others, and establishing lasting relationships. Therefore, it is imperative to investigate how SEL might be customized to address the special needs of this population and encourage their inclusion in educational settings.

Social, emotional challenges faced by students with LD

According to Bryan's first research (Bryan, 1974a, 1974b, 1976) and subsequent studies (Kavale & Forness, 1996; Magalit & Al-Yagon, 2002), children with learning disabilities have a sociometric status that is marked by social rejection and isolation over time. According to Mugnaini, Lassi, La Malfa, and Albertini (2009), children who are not as popular with their peers at school have less opportunities to socialize and form friendships, and they are more likely to feel lonely on a regular basis. They also exhibit poor prosocial behavior and emotional discomfort (Wentzel, Barry, & Caldwell, 2004). On the other hand, a greater psychological adjustment results from having positive relationships with classmates (Bagwell, Newcomb, & Bukowski, 1998). While some children with LD may find it easy to fit in with their social groups, other research has shown that these groups are typically more likely to exhibit behavioral issues and lower levels of prosocial behavior. Furthermore, in order to avoid social isolation and to comply with friends' requests and wishes, adolescents with LD often exhibit a greater willingness to give in to negative peer pressure and engage in risky behaviors (such as drug and alcohol abuse, unprotected sexual activity, delinquency, and gambling) (Bryan, Pearl, & Fallon, 1989). These actions are thought to be a useful means of gaining peer acceptance (McNamara, Vervaeke, & Willoughby, 2008). Students may form friendships with people who are shunned by their peers, such as students with behavioral issues, those who have similar learning difficulties, or younger children, as a result of isolation, conflict, and difficulties forming and sustaining social relationships (Bakker, Denessen, Bosman, Krijgert, & Bouts, 2007). (Wiener, 2002; Wiener & Schneider, 2002). This could be another barrier to social competence development, keeping kids with LD out of the mainstream peer group.

The effect of low self-efficacy and self-esteem

Studies have shown that classroom isolation, the challenges of meeting academic expectations, and recurrent experiences of academic failure may have a negative impact on the self-efficacy and self-esteem of children with learning disabilities (LD) (Zeleke, 2004). Children with learning disabilities often feel different, undervalued, and less skillful from their peers when they compare their performance to their peers' (Gadeyne, Ghesquière, & Onghena, 2004; Humphrey & Mullins; 2002). Uncomfortable, anxious, and frustrated feelings are frequently linked to circumstances where students struggle with academic requirements like reading aloud in front of their peers or when they use traditional teaching methods that only focus on writing and reading abilities. Students with learning disabilities suffer from such circumstances in terms of learning motivation and engagement, as they avoid tasks requiring any kind of academic effort or skills (Nelson & Harwood, 2011).

Social, emotional imbalances induce behavioural difficulties in students with LD

Students with learning disabilities (LD) appear to struggle more with accurately identifying emotional expressions, including anger, fear, excitement, and shame. They also appear to have greater trouble correctly comprehending social circumstances and projecting the behavioral outcomes of particular behaviors. In addition, when compared to peers without LD, they demonstrate fewer and less complex conflict resolution strategies, particularly when it comes to tasks requiring social situation understanding, like the propensity to incorrectly infer negative intents from other people's behavior and emotional states (Pina, Marino, Spadaro, & Sorrentini, 2013).

According to Cullinan (2002), students with LD are also more likely to exhibit behavioral issues, such as difficulty establishing and maintaining positive social connections and aggressive behaviors, both verbal and nonverbal, toward peers. The effect of these issues grows as reading challenges throughout the early elementary school years develop, and if they are not identified and understood in the context of the particular learning disability, they may worsen over time. Similarly, when the right diagnosis is not received, one may become frustrated and demotivated, which can have worse outcomes like dropping out of school (Fuchs & Fuchs, 2006). While depressive symptoms and anxiety become increasingly apparent in puberty, about 10% of children with LD may also exhibit somatic symptoms including migraine and stomach discomfort (Mugnaini, Lassi, La Malfa, & Albertini, 2009). (Margari, et al., 2013).

Social-emotional learning activities to enhance personal and academic development

The "compensatory hypothesis" for the development of a positive self-concept in children with learning disabilities is supported by research findings that highlight the children's empowerment through non-academic domains (like physical activity, sports, and social and emotional learning) to get over the perception of learning difficulties (Wong & Donahue, 2002). A meta-analysis found that implementing psycho-motor activities in school-based programs appears to be a strong protective factor for positive self-esteem. Extracurricular activities have been shown to be highly significant in helping children with LD develop social skills in a setting other than the

classroom and to boost their confidence in forming and sustaining relationships with others (Brooks, 2013). In this paper, we make the case for universal social-emotional learning programs as a safeguarding and empowering approach for kids with learning disabilities. While targeted treatments are intended for children at risk (selected interventions) or exhibiting developmental challenges (indicated interventions), universal programs are created for all students in the school and are typically implemented with the entire class.

Numerous studies have documented the beneficial effects of universal social-emotional learning programs on social, emotional, and academic outcomes. These effects include a decline in conduct behaviors, emotional distress, depressive symptoms, and aggressive, antisocial, and aggressive behaviors (Wilson & Lipsey, 2007; Horowitz & Garber, 2007; Tobler et al., 2000). Recent studies have demonstrated that these programs significantly improved prosocial behavior and academic learning, as well as positive attitudes toward oneself, others, and learning (Catalano, Berglund, Ryan, Lonczak, & Hawkins, 2002; Taylor, Oberle, Durlak, & Weissberg, 2017). These studies include meta-analyses and reviews of evaluation studies.

The five fundamental SEL competencies identified by the Collaborative for Academic, Social, and Emotional Learning (CASEL) framework—self-awareness, self-management, social awareness, relational skills, and responsible decision-making—are the basis for this study (CASEL, 2020). This approach views the incorporation of SEL into the lives of kids with learning difficulties as a complex process that takes into account both contextual and individual aspects.

Furthermore, SEL methods can be successfully modified to take into account a variety of learning requirements and styles according to the theoretical foundations of Universal Design for Learning (UDL) (CAST, 2018). To guarantee that students with learning disabilities have equitable access to SEL teaching, educators can implement flexible instructional methodologies, offer numerous modes of involvement, representation, and expression, and give individualized support by implementing a UDL approach.

All schoolchildren, irrespective of their color, socioeconomic status, or school location, have reported the benefits of universal SEL programs (Durlak et al., 2011; Taylor et al., 2017). Moreover, reviews of evaluation studies (Weare and Nind, 2011; Wilson and Lipsey, 2007; Clarke, Morreale, Field, Hussein, & Barry, 2015) discovered that these kinds of programs worked especially well for kids who were at risk. In their 2007 evaluation of programs aimed at preventing aggressive behavior, Wilson and Lipsey came to the conclusion that universal programs offered to every kid in a classroom or school are essential for both preventing and reducing aggressive behavior in school-age children.

According to Clarke et al. (2015), children and young people who are most at risk of developing problem behaviors benefit most from universal interventions that increase social and emotional skills and decrease problem behaviors. In a similar vein, Weare and Nind (2011) found that universal methods improved every child's mental health and that interventions seemed to work best for the most vulnerable kids.

Consequences for including pupils with learning disabilities According to the discussion above, universal SEL should be a keystone of instruction for kids with LD (Bhan & Farooqui, 2013). Universal SEL promotes the social and emotional development of students with LD in a mainstream, inclusive classroom, without diminishing the significance of individualized programming and focused interventions. It eliminates the possibility of stigmatization and labeling that could arise from tailored, focused, and extracurricular activities. However, it also promotes the equal valuation of students with LD among their mainstream peers and aids in the development of competencies such as healthy relationships, teamwork, and work habits (Cavioni & Zanetti, 2015; Cefai et al., 2014; Durlak et al., 2011; Zins, Bloodworth, Weissberg, & Walberg, 2004).

Programs for universal SEL must be supplemented and strengthened by inclusive practices and social and emotional learning in the classroom and throughout the school. Among these are the development of social skills and a feeling of community among all pupils in the classroom. According to Riddick (2010), kids with LD feel less alone and more confident about themselves when they have friends who have comparable LD inside or outside of the classroom and have the opportunity to share school efforts and support interventions with them. Effective classroom support signals acceptance behaviors and encouragement that promote inclusion and respect for each student's unique educational needs, while also ensuring a sense of belonging and minimizing experiences of humiliation and failure. This is achieved through the teacher's caring relationship with the student and responsive pedagogy (Hamre & Pianta, 2006).

Positive reactions can mitigate the negative effects of learning disabilities (LD), preserving and boosting students' self-esteem in spite of setbacks in the classroom (Bear & Minke, 1996). These include acceptance behaviors and encouragement that fosters inclusion and respect for each student's unique

educational needs. Another crucial whole-school procedure to support the social and emotional learning and inclusion of such students is forming a collaborative partnership with the families of students with LD on shared goals to support the students' social and emotional development and inclusion (Cefai & Cavioni, 2016; Riddick, 2010).

There is a lack of research on the effects of universal SEL programs on the development, learning, and well-being of students with learning disabilities (LD), despite the fact that worldwide research has continuously highlighted the benefits of such programs for all students, including those who are at risk or facing challenges. Therefore, further research is required to determine how universal programs affect students with LD's academic performance, good behavior, mental health, and social inclusion. "Proportionate universalism" is a promising strategy that addresses the social and emotional requirements of kids with disabilities, like LD, in a whole-classroom universal program setting (Cefai et al., 2015).

Implications for Practice:

Bringing SEL into the lives of students with learning difficulties requires a thorough, all-encompassing strategy that touches on many aspects of their schooling. First off, kids can acquire critical social and emotional skills in addition to academic knowledge when SEL objectives are included into the curriculum (Durlak et al., 2011). Furthermore, kids who receive explicit education in SEL competencies are better prepared to negotiate social situations, control their emotions, and form wholesome connections. Furthermore, it is critical to provide a welcoming and inclusive classroom environment in order to assist the social and mental health of students with learning difficulties (Baker et al., 2012). All children can develop interpersonal skills and a sense of belonging by participating in community-building activities, peer support, and collaborative learning that educators can provide.

Challenges and Future Directions:

Even though SEL may help students with learning difficulties, there are a number of obstacles that prevent it from being used effectively in educational settings. Significant impediments to the widespread adoption of SEL projects include a lack of funding, inadequate training for educators, and institutional constraints within educational systems (Skinner et al., 2016). Moreover, the diversity of learning disorders calls for SEL strategies that are specifically designed to meet each student's distinctive needs and talents.

Subsequent studies ought to concentrate on locating research-proven strategies for incorporating SEL into the lives of students with learning difficulties and getting beyond implementation hurdles. Furthermore, in order to guarantee that SEL is equally provided for all students and to promote its importance in educational policy and practice, cooperation between educators, researchers, legislators, and stakeholders is crucial.

Conclusion:

In summary, there is a great deal of promise for social and emotional learning to help children with learning difficulties become inclusive in the classroom. Through attending to these students' social and emotional needs and creating a nurturing learning environment, SEL can enhance their success in school as well as their active participation. To fully reap the benefits of SEL, however, calls for coordinated efforts to remove obstacles, customize treatments to fit a range of needs, and promote the fair delivery of SEL instruction to all kids. Thus, the debate in this paper is a call to action for the creation and assessment of universal programs for social-emotional learning that simultaneously focus on the academic and social inclusion of children with learning disabilities in inclusive settings.

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Corresponding Author : Ms. K. Shrimathi
Email id : shrimathi@hcctrichy.ac.in

THREATS AND CHALLENGES FACED BY TEENAGE GIRLS IN SOCIAL MEDIA

❖ *DR. P. SWARNAKUMARI*
Associate Professor
❖ *KRISHNAVENI*
❖ *AISHWARYA*
PG & RESEARCH DEPARTMENT OF REHABILITATION SCIENCE, HOLY CROSS COLLEGE, TRICHY -2

ABSTRACT

Social media has revolutionized communication, offering teenage girls new avenues for connection and self-expression. However, this digital landscape also presents significant threats and challenges that impact their mental and emotional well-being. This paper explores the specific issues faced by teenage girls on social media, focusing on five primary threats: cyberbullying, online predators, privacy violations, exposure to inappropriate content, and the implications of digital footprints. Cyberbullying, which includes harassment and intimidation, is a prevalent issue. Online predators exploit teenage girls' vulnerabilities, while privacy violations often lead to identity theft and unauthorized access. Exposure to inappropriate content and a lack of

understanding of digital footprints further exacerbate these problems.

The study also addresses major challenges such as mental health issues, including anxiety and depression, linked to prolonged social media use. Unrealistic beauty standards contribute to body dissatisfaction and eating disorders, while social comparison and peer pressure amplify feelings of inadequacy and compel risky behaviors. Social media addiction negatively affects time management and academic performance.

Reviewing related research, the paper cites Twenge et al. (2017) on the link between social media use and depression, Smith and Duggan (2013) on gender differences in cyberbullying, Vogel et al. (2014) on social comparison effects, Marwick and Boyd (2014) on privacy concerns, and Boursier et al. (2020) on body dissatisfaction.

Using a mixed-methods approach with surveys, interviews, and focus groups involving 40 teenage girls, the study reveals widespread issues including cyberbullying, privacy concerns, and mental health problems. The findings underscore the need for targeted educational programs, enhanced parental involvement, and robust policy interventions. Recommendations include integrating social media safety into school curricula, promoting parental oversight, and strengthening support systems to address these challenges effectively.

In summary, the study highlights critical threats and challenges faced by teenage girls on social media and advocates for a comprehensive approach to improve their digital experience

INTRODUCTION

The rapid proliferation of social media platforms has revolutionized communication, allowing users to connect, share, and express themselves in unprecedented ways. For teenage girls, social media offers opportunities for social interaction, self-expression, and community building. However, this digital landscape also presents a range of threats and challenges that can impact their mental and emotional well-being. Teenage girls are particularly vulnerable due to their developmental stage, where self-esteem and social validation are critical. This paper explores the specific threats and challenges that teenage girls face on social media, highlighting the impact of these issues and reviewing existing research to understand the scope and nature of these problems.

OVERVIEW OF SOCIAL MEDIA USE AMONG TEENAGE GIRLS

Statistics indicate that a significant majority of teenage girls actively engage with various social media platforms daily. These platforms often serve as primary channels for communication and social interaction among peers. Social media platforms frequently contribute to shaping the self-image and identity of teenage girls. Exposure to curated content and unrealistic standards on these platforms can lead to feelings of inadequacy and pressure to conform to societal ideals.

Social media significantly influences peer relationships and social dynamics among teenage girls. It can impact their friendships, social circles, and the way they perceive themselves in relation to others, both positively and negatively.

TYPES OF THREATS IN SOCIAL MEDIA

1. **Cyberbullying:** One of the most prevalent threats is cyberbullying, where teenage girls are subjected to harassment, intimidation, or humiliation through online platforms. This can include hurtful comments, spreading rumors, or exclusion from online groups.
2. **Online Predators:** Social media can expose teenage girls to online predators who may engage in manipulative or exploitative behavior. These individuals may use deceptive tactics to build trust and potentially exploit the vulnerability of young users.
3. **Privacy Violations:** Teenage girls may inadvertently share personal information that can be used to invade their privacy. This includes the risk of data breaches, identity theft, or unauthorized access to private content.
4. **Exposure to Inappropriate Content:** Social media platforms often contain content that may not be suitable for teenagers, including explicit material, violent imagery, or harmful ideologies. Exposure to such content can have a negative impact on mental health and development.
5. **Digital Footprint:** Actions and posts made on social media contribute to a digital footprint that can affect future opportunities. Teenage girls may not fully understand the long-term implications of their online presence.

MAJOR CHALLENGES FACED

1. **Mental Health Issues:** Prolonged use of social media can lead to mental health issues such as anxiety, depression, and low self-esteem. The constant comparison with idealized images and the pressure to present a perfect life can be overwhelming.
2. **Body Image Concerns:** Social media often portrays unrealistic beauty standards, leading to body dissatisfaction and eating disorders. Teenage girls are

particularly susceptible to these pressures due to their developmental stage.

3. **Social Comparison:** Social media encourages social comparison, where teenage girls compare themselves to their peers or influencers. This can result in feelings of inadequacy and lower self-worth.

4. **Peer Pressure:** Social media can amplify peer pressure, as teenage girls may feel compelled to conform to trends, participate in risky behaviors, or seek validation through likes and comments.

5. **Addiction and Time Management:** Excessive use of social media can lead to addiction, impacting time management and academic performance. This challenge affects the overall well-being and productivity of teenage girls.

Review of Related Studies

1. **Study by Twenge et al. (2017):** This research found a correlation between increased social media use and higher rates of depression among adolescents. The study highlighted that excessive screen time and online interactions could contribute to mental health issues.

2. **Smith and Duggan (2013):** Their study on cyberbullying indicated that teenage girls are more likely to experience cyberbullying compared to boys. The research emphasized the need for targeted interventions to address the unique experiences of teenage girls.

3. **Vogel et al. (2014):** This study explored the impact of social comparison on self-esteem. It found that exposure to idealized images on social media could negatively affect body image and self-worth among teenage girls.

4. **Marwick and Boyd (2014):** Their research focused on privacy concerns among teenagers. They discovered that many teenagers are unaware of how to protect their privacy and the long-term implications of their online actions.

5. **Boursier et al. (2020):** This study examined the relationship between social media use and body image dissatisfaction. It concluded that social media platforms contribute significantly to body dissatisfaction among teenage girls.

OBJECTIVES OF THE STUDY

1. To identify and document the various threats that teenage girls encounter on social media platforms, including cyberbullying, online predators, privacy violations, exposure to inappropriate content, and the impact of their digital footprint.
2. To assess the major challenges faced by teenage girls related to mental health, body image concerns, social comparison, peer pressure, and issues related to social media addiction and time management.
3. To gain a deeper understanding of teenage girls' personal experiences and perceptions of social media threats and challenges through qualitative data.
4. To develop recommendations for parents, educators, and policymakers on how to mitigate the negative effects of social media on teenage girls and support their well-being.

METHODOLOGY

Universe:

The study was conducted within a high school setting. The universe consisted of teenage girls aged 13-18 enrolled in this high school, who are active users of social media platforms

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SAMPLE:

A purposive sampling method was used to select a sample of 40 teenage girls from this universe. Participants were chosen based on their active use of social media and their willingness to provide insights into their experiences and challenges. This sample size was selected to provide a manageable yet representative view of the issues faced by teenage girls in this specific demographic.

DATA COLLECTION METHODS:

1. **Surveys:**
   - A structured questionnaire was developed to gather quantitative data. The questionnaire included multiple-choice questions, Likert scale items, and some open-ended questions designed to capture a range of experiences and perceptions related to social media threats and challenges.
   - The surveys were administered online to ensure ease of access and to align with the digital habits of the participants.

2. **Interviews:**
   - Semi-structured interviews were conducted with a subset of 10 participants from the sample. These interviews aimed to explore individual experiences in greater depth.
   - The interview questions were designed to elicit detailed responses about specific incidents of cyberbullying, privacy concerns, and personal feelings regarding social media content and interactions.

3. **Focus Groups:**
   - Focus group discussions were organized with 5 groups of 6-8 participants each. These discussions

were facilitated to identify common themes and shared experiences among teenage girls.

- The focus groups were structured around key topics such as mental health impacts, body image concerns, and peer pressure.

Data Analysis:

1. **Quantitative Analysis:**
   - Survey responses were analyzed using statistical tools to identify trends and patterns. Descriptive statistics were used to summarize the data, while inferential statistics were employed to examine correlations between different variables such as the frequency of social media use and reported mental health issues.

2. **Qualitative Analysis:**
   - Interview and focus group data were transcribed and coded using thematic analysis. Key themes and patterns were identified to provide a nuanced understanding of the qualitative aspects of the threats and challenges faced by teenage girls.
   - Thematic coding involved grouping responses into categories such as cyberbullying experiences, privacy concerns, and body image issues.

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ETHICAL CONSIDERATIONS:

1. Informed Consent: Participants and their guardians will be informed about the study's purpose, and consent will be obtained before participation.
2. Confidentiality: All personal data will be kept confidential and anonymized to protect the privacy of participants.
3. Support Services: Access to counseling services will be provided to participants if needed, to address any emotional distress encountered during the study.

EMERGENT FINDINGS AND INTERPRETATIONS

1. **Prevalence of Cyberbullying:** The study found that a significant proportion of participants had experienced cyberbullying, with many reporting harassment through social media comments and direct messages. This finding underscores the need for targeted anti-cyberbullying measures and educational programs.
2. **Concerns about Privacy:** Many teenage girls reported concerns about privacy, including incidents where personal information was shared without consent or used inappropriately. This suggests a gap in understanding privacy settings and the potential risks associated with oversharing.
3. **Impact on Mental Health:** The data revealed a strong correlation between extensive social media use and mental health issues such as anxiety and depression. Participants frequently mentioned feeling pressured to present a curated version of their lives, which contributed to feelings of inadequacy and stress.
4. **Body Image Issues:** Exposure to idealized images and unrealistic beauty standards on social media was identified as a significant concern. Many participants reported dissatisfaction with their body image and expressed a desire for more diverse and realistic representations online.
5. **Peer Pressure and Social Comparison:** The study highlighted that peer pressure and social comparison were prevalent among participants. The desire to fit in and gain approval from peers led to risky behaviors and a constant comparison with others, impacting self-esteem and well-being.
6. **Addiction and Time Management:** Excessive use of social media was linked to poor time management and academic performance. Participants admitted to spending considerable time on social media, which interfered with their study habits and other responsibilities.

MAJOR IMPLICATIONS OF THIS STUDY

1. **Increased Awareness and Education:** The study underscores the need for greater awareness and education about the risks associated with social media use among teenage girls. Educational programs should focus on cyberbullying prevention, privacy protection, and the mental health impacts of social media.
2. **Enhanced Parental Guidance:** Parents need to be more proactive in guiding their children's social media use. This includes monitoring online activities, discussing the potential risks, and setting appropriate boundaries to protect their children's well-being.
3. **Policy Development:** There is a need for stronger policies and interventions at both the school and governmental levels to address cyberbullying and online privacy issues. Schools should implement clear guidelines and support systems for dealing with social media-related problems.
4. **Support Systems:** The findings suggest a need for improved mental health support systems for teenage girls affected by social media-related issues. Schools and communities should provide accessible counseling services and resources for managing online stressors.
5. **Digital Literacy Programs:** Implementing comprehensive digital literacy programs that teach responsible social media use, privacy management, and the long-term implications of a digital footprint can help mitigate some of the identified challenges.

RECOMMENDATIONS OF THIS STUDY

1. **Educational Programs on Social Media Risks:**

- **Develop Comprehensive Curriculum:** Schools should incorporate lessons on the potential risks of social media, including cyberbullying, privacy concerns, and mental health impacts, into their curriculum.
- **Workshops for Students and Parents:** Organize regular workshops and seminars for students and parents to discuss social media safety, effective privacy settings, and strategies to handle online harassment.

2. **Strengthening Parental Involvement:**
- **Parental Controls and Monitoring Tools:** Encourage parents to use digital tools and settings that allow them to monitor their children's social media use and ensure they are adhering to safe practices.
- **Open Communication Channels:** Foster open dialogue between parents and teenage girls about their online experiences and concerns. Parents should be approachable and supportive when discussing social media issues.

3. **Policy and School Interventions:**
- **Anti-Cyberbullying Policies:** Schools should implement and enforce strict anti-cyberbullying policies, providing clear procedures for reporting and addressing incidents.
- **Privacy Education:** Integrate privacy education into the school curriculum to help students understand the importance of protecting their personal information online.

4. **Mental Health Support:**
- **Counseling Services:** Provide access to counseling services in schools to support students dealing with social media-related mental health issues, including anxiety and depression.
- **Peer Support Programs:** Establish peer support programs where students can seek help and advice from their peers regarding social media challenges and mental health.

5. **Promoting Digital Literacy:**
- **Interactive Workshops:** Conduct interactive workshops and seminars focused on digital literacy, including safe social media practices, understanding digital footprints, and managing online stress.
- **Resource Development:** Develop online resources and guides that are accessible to both teenagers and parents, offering practical advice on navigating social media safely.

CONCLUSION

The study provided a comprehensive overview of the threats and challenges faced by teenage girls on social media. The findings indicated a range of issues, from cyberbullying and privacy violations to mental health impacts and body image concerns. These insights underline the importance of developing effective strategies to address these challenges, such as enhancing digital literacy, implementing support systems, and fostering open communication between teenagers, parents, and educators.

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Biomass Production of Entomopathogenic Fungi and their Production Economics

Dr. Cecily RoseMary Latha R[1], Hansy[1], Dr. Rajathi D Modilal[1]
[1]PG and Research Department of Zoology, Holy Cross College, Tiruchirappalli, India

ABSTRACT

Biomass Production of entomopathogens namely *Metarhizium anisopliae, Trichoderma viride, Isaria fumosorosea and Beauveria bassiana* in conventional (PDB) and low-cost media using Jaggery as substrates and with and without starch were evaluated. Spore production, CFUs and cost economics were estimated for the culture of these entomopathogens in different media. *T. viride* and *M. anisopliae* formed 0.5 mm thick dark green layered mat and *B. bassiana* and *I. fumosorosea* formed white layered mat with 0.3 mm and 0.5 mm thickness respectively in PDB and Jaggery medium with starch (JYSB). No significant difference in the biomass production with respect to the fresh weight of the mycelium for *T. viride, M. anisopliae* and *B. bassiana* was observed in PDB, JYSB and in Jaggery medium without starch (JYB). Among the four EPF tested for spore production in Jaggery medium, highest spore load was observed for *T. viride* followed by *M. anisopliae* , *B. bassiana* and *I. fumosorosea.* All the four EPF cultured in JYSB formed a minimum of 3 colonies to more than 50 colonies (CFUs) at 10^{-8} dilution in PDA/PDAS medium fulfilling the criteria for its application in the field. Another important finding was growth of *Isaria fumosorosea* was significantly inhibited in the absence of starch and addition of starch significantly enhanced mycelial yield, spore production and CFUs both in PDA and Jaggery medium. The production cost per gram biomass in PDB ranged from 0.23 to 0.35 rupees/gm and in Jaggery medium from 0.13 to 0.18 rupees/gm. In conclusion, the present study revealed that JYB could be used for the mass production of *T. viride, B. bassiana* and *M. anisopliae*, and JYSB can be used for the large-scale production of *I. fumosorosea* as the yield of mycelium, spore load and CFU count was significantly high and at par with the growth in PDB medium. Production economics, clearly indicates that this indigenous Jaggery medium (JYSB and JYB) could be used for the commercial mass production of all the tested entomopathogenic fungal strain, as it gives excellent yield of mycelium, spores and is easily available and also highly cost effective.

Key words: Entomopathogens, Biomass production, Jaggery medium, Production economics

Introduction:

Entomopathogenic fungi are being widely used globally as biological control agents for the insect species for the past few decades. Many fungal species including the strains of *Metarhizium anisopliae, Beauveria bassiana* and *Verticillium lecanii* are being used as a biocontrol agent for a number of crops, livestock and human nuisance pest (Tanada and kaya, 1993). Production of adequate quantities of inoculum of good quality is essential for any programme based on biocontrol agent. The choice of a suitable and economic medium, which supports rapid growth without loss of virulence for number of generations, is one of the basic and important requirements in the mass production of fungi for microbial control of insect pest.Studies on the mass production of entomopathogenic fungi have demonstrated that the quality and quantity of propagules produced are dependent on numerous factors, such as the nature of isolates, nutrients required for growth, density of the inoculum and environmental conditions (Leite *et al*., 2003).

Commercially viable mass culture of these entomopathogenic fungi (EMF) must be standardized for the control of important crop pests. Utilization of any EMF on a commercial level will be successful, only when the mass production is cost effective. Present study is aimed at the evaluation of the conventional

laboratory media as well as locally and easily available substrates (Viz. using Jaggery media with and without starch) for cost effective mass production of *Trichoderma viride,* Metarhizium *anisopliae, Isaria fumosorosea*, *Beauveria bassiana* and *Pseudomonas fluorescens* in laboratory.

Materials and Methods:

Mass production of *Trichoderma viride:*

The nucleus culture of *Trichoderma viride was* procured from the authentic source, provided by 'Central Integrated Pest Management Centre' (CIPMC), Ministry of Agriculture & Farmers' Welfare, Government of India. PDA medium in petri plates was employed to prepare *Trichoderma viride* mother culture. The liquid broth (JYS broth) was prepared by using 40gram Jaggery, 10gram of yeast and 10gram starch and JY broth without starch in 2L distilled water. The mixture was stirred well to dissolve the contents in water. Both, JYS and JS broth were sterilized in autoclave at 121ºC for 15 mins. From the mother culture, *Trichoderma viride* mycelial disc was inoculated aseptically to sterilized media and incubated for 10 days at 25-27º C. After 10 days of incubation the growth of the mycelial mat was observed on the top of JYS and JY broth and analysed.

Mass production of *Pseudomonas fluorescens*

The nucleus culture of *Pseudomonas fluorescens was* procured from the authentic source and the mother culture was prepared in King B petri plates, and sub cultured in King B broth with and without starch. The inoculated broths were incubated in a shaker at room temperature 28 ± 2ºC for 48 hours. The development of turbidity in the broths were observed and measured.

Mass production of *Metarhizium anisopliae* and *Beauveria bassiana:*

PDA medium in petri plates was employed to prepare the mother culture of *Metarhizium anisopliae* and *Beauveria bassiana.* The liquid broth (JYS broth) is prepared by using 40gram Jaggery, 10gram of yeast and 10gram starch and JY broth without starch in 2L distilled water. From the mother culture, the mycelial disc was inoculated aseptically to sterilized media and incubated for 10 days at 25-27º C. After 10 days of incubation the growth of the mycelial mat was observed on the top of JYS and JY broth and analysed.

Mass production of *Isaria fumosorosea*

The mother culture of *Isaria fumosorosea* was prepared in PDA plates. The liquid broth (JS broth) is prepared by using 40gram Jaggery, and 15gram starch and Jaggery broth (JB) 40gram Jaggery in 2L distilled water. From the mother culture, *Trichoderma viride* mycelial disc was inoculated aseptically to sterilized media and incubated for 10 days at 25-27º C. Thick mycelial mat was grown on the top of JSB and JB medium and analysed.

Preparation of Potato dextrose broth (PDB)

PDA broth is prepared by using 100g of peeled and sliced potato, to which 250 ml of distilled water is added and boiled until they became soft. The contents of the beakers were filtered through muslin cloth and all liquid were squeezed out. 10g dextrose was dissolved in water and added to the extract and the volume was made up to 500ml with Distilled water. 100ml of the broth was dispensed to each conical flask and plugged with non- absorbent cotton. The flasks were sterilized at 121ºC (15 psi pressure) for 20 minutes in an autoclave. After cooling, 5 mm fugal disc of entomopathogenic fungus was inoculated aseptically to sterilized media and incubated for 10 days at 25-27º C. After 15 days of incubation the growth of the mycelial mat was observed on the top of the PDB broth. After 15 days, biomass of mycelial growth was quantified by weighing. Spore counting was done in haemocytometer after serial dilutions. Plating technique was used to estimate CFUs. Also cost economics was calculated for the different media. Each treatment was replicated three times.

Spore Counting

Three replications were maintained for each fungal strain. After 7 days of inoculation in the suitable culture broth, to break the mycelial mat and to avoid clumping. the flasks were shaken vigorously. After 15 days of incubation, 1ml of homogenous sample was transferred to 100 mL sterilized distilled water

containing Tween 80 (0.05%) solution in 250 mL conical flasks. Mechanical shaker was used to shake the flask for 10 min and the suspension was filtered through double layer muslin cloth. After serial dilution of the suspension, counting of spore's were made using double ruled Neubauer haemocytometer and for number of conidia in 1 ml of the culture medium was determined (Bhanu *et al.,* 2010). Three replications were made to perform the count.

Results and Discussion

Biomass production:

In this study three different culture media *viz.,* potato dextrose Broth (PDB), Jaggery medium with starch (JYSB) and without starch (JYB) were evaluated for the mass production of all the four entomopathogenic fungi (EPF). The results of the Biomass production of all the EPF in PDB, JYSB and JYB is presented in Table 1. Results indicated that *Trichoderma viride,* formed 0.5 mm thick green layered mat in both JYSB and JYB and conventional PDB medium. In terms of biomass production, the PDB medium produced 9.6g (fresh weight) whereas; the JYSB and JYB medium could produce only 5.37g and 4.8g of biomass respectively. Biomass includes both fungal conidia and mycelia.

M*etarhizium anisopliae* formed 0.5 mm thick dark green layered mat in both JYSB and JYB medium and were on par with the PDB in terms of biomass production. *Beauveria bassiana* formed 0.3 mm thick white layered mat in all the three culture medium and there was no significant difference in the biomass production in PDB and Jaggery medium with and without starch with respect to the fresh weight of the mycelium. Both the EPF *M. anisopliae* and *B. bassiana,* have direct relevance to sugarcane pest control both in India and abroad (Calderon *et al.,* 1995; Sharma *et al.,* 1999; Gupta *et al.,* 2002; Easwaramoorthy *et al.,* 2002). According to Ibrahim and Low (1993) and Sharma *et al*. (2002), rice was found to be the suitable media for the mass culture of *B. bassiana*.

Table 1: Biomass production of entomopathogenic fungi in different media

S.No	Name of the organism	Fresh weight of biomass (gram/litre)*		
		PDB	Jaggery medium with starch (JYSB)	Jaggery medium without starch (JYB)
1	*Trichoderma viride*	99. 5	94.29	92.7
2	*Metarhizium anisopliae*	141.5	120	122.86
3	*Beauveria bassiana*	149.5	108.57	105.71
4	*Isaria fumosorosea*	130.8	117.14	-

* Mean of 3 replications

Isaria fumosorosea formed 0.5 mm thick white layered mat after 15days of incubation in PDB and JYSB medium. But *Isaria fumosorosea* failed to grow in the Jaggery medium without starch (Table 1). Biomass did not differ significantly in PDB and JYSB. *Pseudomonas fluorescens* showed good growth in King B Broth, both with and without starch as turbidity measurements did not reveal any significant difference.

Spore production:

Trichoderma viride produced $2.5X10^{10}$ conidia in PDB medium and $9.5X\ 10^{8}$ and $8.5X\ 10^{8}$ spores in JYSB and JYB medium respectively (Table 2). Spore production of *M. anisopliae* was found to be same and did not differ significantly in all the three tested medium. Puzari *et al.* (1997) have reported more sporulation of *M. anisopliae* in the rice husk medium supplemented with 2% dextrose solution. Among the four EPF tested for spore production in Jaggery medium, highest spore load was observed for *Trichoderma viride* followed by *M. anisopliae*, *Beauveria bassiana* and *Isaria fumosorosea.* Among the three media, PDB produced significantly higher spore production in all tested fungi. Both JYSB and JYB medium supported spore production for *T. viride, M. anisopliae, B. bassiana* and the spore load was observed upto 10^{-8} dilution. JYB without starch was not used for *Isaria*

fumosorosea for spore production as growth was insignificant in the absence of starch.

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CFU estimation:

The unit used to evaluate the number of viable fungal or bacterial cells in the culture medium is defined as Colony forming units(CFU). The number of visible colonies present on the agar medium is multiplied by the dilution factor to get CFU. Table 2 depicts the CFUS of all the tested fungi cultured in PDB, JYSB and JYB medium *Trichoderma viride* produced 6.33. 5.66 and 4.33 colony forming units, at 10^{-8} dilution in PDB, JYSB and JYB medium respectively. On an average *Trichoderma viride* cultured both in PDB and Jaggery medium with and without starch could produce a minimum of 5 colonies in PDA medium at 10^{-8}dilution.

Metarhizium anisopliae could produce a minimum of 7 CFUs in PDA medium at 10^{-8} dilution. Biomass production, spore count as well as the CFUs did not show any significant variation in the Jaggery medium with and without starch. *Beauveria bassiana* cultured in Jaggery medium both with and without starch when plated in PDA medium produced a minimum of 7 colonies/ CFUs at par with PDB medium.

One of the interesting findings of this study is more than 50 CFUs were produced in PDA medium with starch by *Isaria fumosorosea* at 10^{-8}dilution. At the same time CFUs were just 1 or 2 in the absence of starch. For *Metarhizium* spp, blastospore yields was more than 10^8/ml in all standard culture medium (Kleespies and Zimmermann 1992; 1998).

Table 2: Spore production and CFU of entomopathogenic fungi in different media

S. No	Name of the organisms	Conidial count/ml of the medium*			CFU at 10^{-8}dilution* done in PDA/PDAS medium (for *Isaria*)		
		PDB	JYSB	JYB	PDB	JYSB	JYB
1	*Trichoderma viride*	2.5×10^{11}	9.5×10^{8}	8.5×10^{8}	6.33	5.66	4.33
2	*Metarhizium anisopliae*	9.4×10^{10}	4.5×10^{7}	5.4×10^{7}	7.66	7.33	6.33
3	*Beauveria bassiana*	4.3×10^{9}	2.5×10^{7}	1.5×10^{7}	3.66	4.33	3.33
4	*Isaria fumosorosea*	2.8×10^{9}	12.6×10^{6}	-	53.3 in PDAS	49.3	-

* Mean of 3 replications

Spore load upto 10^{-8} dilution is the main criteria for the application of these entomopathogenic fungi in the field to be an effective bio-control agent. In our study, all the tested fungi, *Trichoderma viride, Metarhizium*

anisopliae, *Beauveria bassiana* and *Isaria fumosorosea* could satisfy these criteria, hence all these EPF are mass produced in Jaggery medium with starch and applied to the field and given to the farmers as an effective biocontrol agents to control various plant pests.

Determination of Cost Economics

The costs of each ingredient in the different media were considered, to calculate the production cost. The cost of one litre of PDB, JYSB and JYB medium were found to be RS 35.00, Rs17.00 and Rs16.00 respectively. Production cost was calculated by dividing the cost of 1litre media in Rupees by the biomass production in g/l. The production cost per gram biomass in different media ranged from 0.13 to 0.35 rupees (Table 3). Vegetable waste, fruit juice waste and rotten wheat grains have been used for the cost-effective mass production of *T. viride* (Chaudhari *et al*., 2011). Cost of synthetic media varied from 0.15 to 15.11 rupees/gm whereas the cost of production with the use of food grains per gram of fresh biomass ranged from 0.01 to 0.08 rupees (Kishore *et al.,* 2014).

In our study, the cost of production per gram of fresh biomass of *Trichoderma viride* cultured in jaggery medium with and without starch were 0.18 and 0.17 rupees/gm respectively (Table 3), but the production cost was more in PDB medium, 0.35 rupees per gram indicating the fact that this indigenous Jaggery media (JYSB and JYB) could serve the purpose of cost-effective commercial production of this strain.

The cost of production per gram of fresh biomass of *Metarhizium anisopliae*, *Beauveria bassiana* and *Isaria fumosorosea* in PDB medium ranges from 0.23 to 0.28 rupees, whereas the cost of production in Jaggery medium is significantly less for all the tested fungi ranging from 0.13 to 0.16 Rupees (Table 3).

Table 3: Cost economics of mass production of entomopathogenic fungi in different media

S. No	Name of organism	Production cost /litre in Rs			Production cost in Rs /gram [cost in Rs/l divided by production in g/l]		
		PDB	JYSB	JYB	PDB	JYSB	JYB
1	*Trichoderma viride*	35	17	16	0.35	0.18	0.17
2	*Metarhizium anisopliae*	35	17	16	0.25	0.14	0.13
3	*Beauveria bassiana*	35	17	16	0.23	0.16	0.15
4	*Isaria fumosorosea*	37	17	-	0.28	0.15	-

Based on our study we conclude that Jaggery medium without starch (JYSB) could be used for the mass production of *Trichoderma viride*, *Metarhizium anisopliae* and *Beauveria bassiana* and and Jaggery medium with starch (JYB) for the mass production of *Isaria fumosorosea* as the biomass production, spore load and CFU count was significantly high and at par with the growth in PDB medium. Determination of production economics, clearly indicates that this indigenous Jaggery medium (JYSB and JYB) could be used for the commercial mass production of all the tested entomopathogenic fungal strain, as this medium gives excellent yield of mycelium, spores and is easily available and also highly cost effective.

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