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Biological Treatment of Paint Industry Effluent

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ABSTRACT

The untreated effluent released from industries become high threat to the environment. In this work, vastly available and cheaper cost plant materials were selected for treating the effluent released from the paint industries. Polar solvents such as methanol, ethanol and non polar solvents such as chloroform and benzene extracts of leaves of *Prosopis juliflora* and *Nymphaea ampla* were treated with effluent released from paint manufacturing industry situated at Nagalkeni falls under Chennai sub urban area. After treatment, results showed good reduction of harmful contents such as Chloride, SO_4, Cr(VI) and nitrate by extracts of *Nymphae ampla.* TDS was highly reduced by *Prosopis juliflora* extracts.

KEYWORDS: Effluent, solvent extract, plant material, TDS, sulphate, chloride and nitrate.

1. INTRODUCTION

Main purpose of coating of paint is to decorate and protect surface. The paint waste water has salinity, sulfate and high level of suspended solids (Aboulhassan, 2006). The release of such wastewater into the environment slows down the penetration of light, damages the quality of the streams and may be toxic micro organisms (Fent, 1996) and also affects aquatic life. The paint wastewater must be required to release after treatment due to legal restrictions in organized industrial zone and environment conservation. Hence many methods have been adopted for the treatment of this effluent. The biological aerated filter system was commonly used systems (Allan, 1998). In another research coagulation followed by flocculation of effluent showed good reduction in important parameters (Dovletoglou, 2002). Recent studies showed the effects of various extracts of plant material for treating leather industry liquid waste **(**Sharmila, 2013) and domestic waste water (Sharmila, 2013). In this work, extracts of plant material such as *Prosopis juliflora* (Delli mullu*)* and *Nymphae ampla* (White water lilly) various leaf extracts were used for treating paint industry effluent.

2. EXPERIMENTAL PROCEDURE

Collection of effluent and Plant materials: Collections of plants were done from Madambakkam (*Prosopis juliflora)*, Selaiyur, Chennai and Agaram lake, Agaram Then (*Nymphae ampla)*, Chennai, Tamil Nadu. Then, these plant materials were dried, powdered and stored. Paint industry effluent was taken from the Nagalkeni, Chennai.

Preparation of plant extract: The powdered plant samples were soaked in polar solvents such as methanol, ethanol and non polar solvents such as chloroform and benzene for forty eight hours. Filtering of plant extracts which were soaked in solvents were done by filter paper.

Waste water from paint comapny was treated with these plant extracts and parameters such as TDS, Hardness, Sulphate, nitrate, chloride and Cr(VI) were analyzed after treatment.

Table.1 Plant Extracts

S.No	Plant	Extracts			
		Methanol	Ethanol	Chloroform	Benzene
1	*Nymphae ampla*	MNA	ENA	CNA	BNA
2	*Prosopis juliflora*	MPJ	EPJ	CPJ	BPJ

3. RESULTS & DISCUSSION

Paint industry effluents were treated with various extracts of *juliflora* (Delli mullu*)* and *Nymphae ampla* (White water lilly) *and* their effects were analyzed.

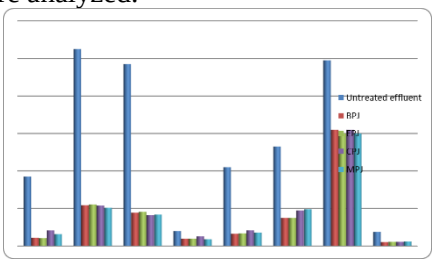

Figure.1. Effect of *Prosopis juliflora* extracts on effluent

About 89% of TDS was reduced by ethanolic extracts of *P.juliflora* which was higher than *M.koenigii* (Sharmila, 2013) and *M.oleifera* (Md Saduzzaman, 2013). Another study discovered that combination of pronase E enzyme and cellulose reduced nearly eighty percentages of solids present in the effluent (Roman, 2006).

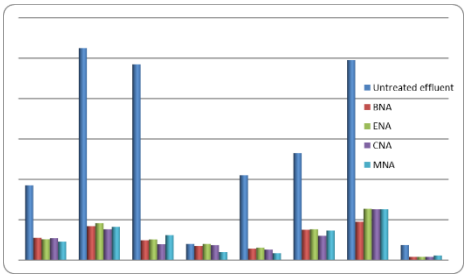

Figure.2. Effect of *Nymphae ampla* extracts on effluent

Among all the extracts, hardness was greatly reduced by CAN than others. About 92% of chloride content was reduced by MNA in the effluent followed by CAN, BNA and ENA (Fig.1 &2)

As per Environment Protection Act 2002, the allowable limit of S (sulpur) to the ecosystem is fixed as 750mg/l. CNA followed by MNA, BNA, BJP, and BJP. Cr (VI) is very mucg toxic to the human being health. Currently adsorption technique was used for falling Hexavalent chromium. Maximum of ninety six percentage was reduced by *Spirogyra spp.* (Gupta, 2001). Extracts of *N.ampla* reduced chromium level considerably. BNA greatly reduced Cr (VI) present in effluent followed by CAN, MNA, ENA. In this work about 79% of nitrate content was reduced by BNA, ENA and CAN (Fig.1&2).

4. CONCLUSION

Current study showed that the effective usage of plant extracts on treatment paint effluent in an cost-effective manner. In future, optimization may be done out to improve the efficiency.

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