

Removal of Colour from Dyeing Industry Effluents

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The effluents from dyeing industries make the environment unaesthetic, contaminate groundwater and hence will cause ill effects on health of the inhabitants. The removal of colour from wastewater is often more important than the removal of other organic colourless chemicals because of aesthetic and environmental concerns. Dye production, textile preparation, dyeing and finishing plants are currently being forced to treat their effluents at least partially prior to discharge into treatment plants because of the high organic load, strong and resistant colour as well as high dissolved solids content of the discharged wastewater.

The dyeing industries of Maruthamunai, considered in this project, too are not exceptional. The owners of the dyeing industries had either no idea of wastewater treatment or didn't want to invest on wastewater treatment. As a result, they were under pressure from the Kalmunai MC, Public Health Inspector (PHI), neighbours and the recreational users of the beach. Some of the owners were at the verge of closing the industry, which would have resulted losing jobs for them as well as their employees. Also, the local (handloom) textile industry too would have suffered without raw material (coloured yarn) for their products. In this study, we tried to remove or reduce the colour intensity of the effluent, at low cost and with simple efforts.

Effluents were collected from a couple of dyeing plants of Maruthamunai, which were subjected to analysis for various physico-chemical parameters. Trials were carried out to remove/reduce the colour (dye particles) from the coloured effluents by various filtration, adsorption and coagulation methods on different materials, such as lime (powder and aq. solution), burnt charcoal from the industry itself and sand that are freely available in the area of study.

The majority of the compounds found in wastewaters generated from a dyeing industry were derivatives of phenol, aniline and benzene, along with organic acids. Some of the identified compounds were chlorinated derivatives, resulting from the chlorination treatment (bleaching) carried out by some industries. The laboratory studies revealed that the colour reduction by different materials was 3.1% with charcoal (burnt firewood obtained from the industry), 39.8% with sand and 55.1% with filter paper. Whereas the field studies indicated, the reduction of the colour intensity by sand was lower (around 30%). The COD reduction was also promising; it was 26.3% with charcoal (burnt firewood), 40.2% with sand and 47.9% with filter paper. The field studies indicated the reduction of the COD values by around 29%. A combination of different methods can be considered that would reduce the wastewater loading and the treatment cost.

Key words: Dye, Colour, Effluent, Industry

