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ELECTROLYTIC TREATMENT OF OIL-BASED EFFLUENT

A PROJECT REPORT PRESENTED BY

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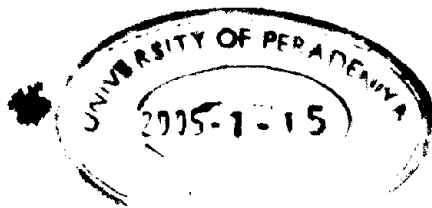
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ABSTRACT

**ELECTROLYTIC TREATMENT OF OIL BASED EFFLUENT****S.P. Indrasena**

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Service stations generate different type of pollutants such as used motor oils, fuel oils, detergents, paint droplets, clay, silt, sand, tire particles of service stations etc. Discharging of untreated wastewater to natural water ways causes adverse effects on the aquatic life and quality of water. One of the main contaminants in wastewater of service stations is oil and grease. Oils exist in wastewater in two ways. One fraction exists as emulsion and the other is in suspension. The nonseparable oil content of wastewater is a result of the formation of an emulsion with water, clay and other suspended solids in wastewater. These clay particles do not settle down to the bottom as they are bound to droplets of oil. In Sri Lanka, chemical coagulation [addition of $\text{Al}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}$] is used to remove these suspended solids in wastewater.

The main objective of the study was to design a low-cost treatment plant to remove oils in wastewater. Treatment was done by aeration and an application of direct current through electrodes (ferrite electrodes). Electrodes were placed horizontally in the sample of 500 ml (cathode in the top and anode in the bottom). The experiments were done at pH 6, 7 and 8. Concentrated sulfuric acid was used to adjust above pH values from initial pH of the sample of 8.5. A 0.01g salt (NaCl) was added as an electrolyte prior to the treatment. Treatment was done at different voltages as 12, 24, 36, 48, 60, 72, 84, 96 and 108 V. Finally, turbidity of the samples was measured at 1, 2, 3, 4 and 5 hours durations of the treatment.

Aeration has given the highest removal of oil and grease of about 75%, which was recorded at 5 hour duration. The lowest removal of oil and grease was recorded at 1 hour

duration and it was around 46% (Table 4.9). The highest removal efficiency of turbidity of 74% (22.5NTU) was recorded at pH 6, and at 108 V after 1hr duration (Table 4.18). The current needed (Appendix II) for this was 0.89A (96.12W) per 500 ml of sample. The lowest removal percentages were recorded at pH 8. If initial turbidity of the sample is low, the removal efficiency of the turbidity is high. It was indicated the results of pH 8. At pH 8, 108 V has been indicated 68.09% (15 NTU) of removal percentage during 1hr period. The current taken at this pH was 0.44A.

The highest removal efficiency (i.e.; best performance) was obtained with pH 6 and at 108 V and 1 hour duration of electrolysis. BOD, COD and turbidity of treated water (Figure 4.21) have satisfied the general standards for discharge of waste effluent in to inland surface waters. Therefore, it was concluded that by electrolytic treatment as described in this report can bring automobile service station waste effluent to the standard prescribed by the Central Environmental Authority of Sri Lanka.

