A STUDY ON THE EFFICIENCY OF A WASTEWATER TREATMENT PLANT: A CASE STUDY OF THE CARBONATED BEVERAGE INDUSTRY IN SRI LANKA

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ABSTRACT

The Ole-Springs Bottler`s (Pvt) Ltd; Ranala is a carbonated beverage industry that produces `Pepsi', `Seven-Up' and `Mirinda'. The wastewater discharging from the bottling factory is treated in a wastewater treatment plant where the main operation units are biological processes ie; the suspended growth (activated sludge) and the attached growth (trickling filter) treatment processes.

The effluent is discharged into a river which in turn is used for domestic purposes etc. Therefore, the efficiency of the treatment plant is vital because improperly treated wastewater could cause severe environmental problems.

The study was carried out on the samples that were collected over a period of eight months commencing from September 1994 to April 1995. The samples were collected in every other week, from six places along the wastewater treatment plant. The samples were then analysed by physico-chemical and microbiological methods to evaluate the parameters useful in efficiency measurement.

As physico-chemical parameters, p^H, Temperature, Colour, Total Nitrate, Total Suspended Solids, Chemical Oxygen Demand (COD) and Bio-chemical Oxygen Demand (BOD) were measured.

Since this is a biological wastewater treatment plant, BOD was considered as the major parameter to determine the efficiency of the plant.

The Total Aerobic Plate Counts, Total Coliform Counts and *E.coli* Counts were carried out as microbiological parameters. In addition, the study was also aimed to isolate and to identify the bacteria present in the wastewater samples.

The percentage reduction of BOD by attached growth and suspended growth processes was 7.6 and 46.5 respectively. This was below the recommended standard levels of the two processes.

The total aerobic bacterial counts of the wastewater samples collected from the aeration tank in-let, aeration tank out-let and trickling filter out-let were relatively low, compared to the standard values that were expected to be present. Therefore, the microbial load present in the biological processes were not sufficient for an effective waste stabilization process.

The organisms belong to the genera *Bacillus*, *Micrococcus*, *Aeromonas*, *Flavobacterium*, *Acinetobactor*, *Escherichia*, *Enterobacter*, *Pseudomonas*, *Alcaligenes* and *Chromobacterium* were identified.

The load of the aerobic microorganisms in the samples created the low percentage reduction of BOD in the wastewater treatment plant. The low counts could be due to some mechanical faults associated with the biological treatment processes.

Therefore, the study concluded that the suspended growth and the activated sludge processes did not function as designed. As a result, the overall efficiency of the wastewater treatment plant has reduced.