Assessment of the Efficiency of Effluent Treatment at the Two Food and Beverage Industries in Ghana

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ABSTRACT

The study assessed the efficiency of treatment of effluents at two beverage industries, Blue Skies Holdings, Nsawam, and Cocoa Processing Company Ltd, Tema in Ghana. Liquid effluent samples from these industries were collected at two hour-intervals for six months to ascertain the variation of physico-chemical and biological parameters during the day. The methodology involved physicochemical and microbiological analyses of effluents as well use of questionnaires and interviews. The results indicated variations of physico-chemical and biological parameters at both industries. The concentrations of physico-chemical and biological parameters recorded were generally beyond acceptable levels set by the Environmental Protection Agency (EP A) of Ghana. Average values for pH = 3.8, turbidity = 136NTU, TSS = 98mg/L, TDS = 1802mg/L, ammonia = 4.7mg/L, phosphate = 3.3mg/L, BOD = 1265mg/L, COD =2155mg/L, oil and grease = 30mJJL, Te = 1200cfull00ml and *Escherichia coli* = 70cfuJI00ml at Blue Skies Holdings exceeded the recommended limits as set by EP A of Ghana. Average values of BOD = 95mg/L, TSS = 51mg/L and oil/grease = 13mg/L at Cocoa Processing Company Limited also exceeded the recommended limits by EP A. The assessments of the effluent treatment system at the two industries involved collecting effluent samples before entry into the treatment plant, before secondary treatment and after final treatment. The effluent treatment plant at Blue Skies was made up of a primary treatment system comprising of filtration, sedimentation, parabolic screen and micro screen whiles anaerobic ponds served as secondary treatment system. There were filtration, sump and collection tanks serving as primary treatment whiles aeration tanks and sedimentation tank (secondary clarifiers)

served as secondary treatment system at CPC. The statistical differences in the treatment were compared at the influent/entry to treatment plant (A), collection point before secondary treatment (B) and final effluent treatment (C). The effluent treatment system at CPC was effective in treating pH, COD, TDS, TSS, turbidity, phosphate, ammonia and nitrate but, not effective in treating BOD, TSS and oil/grease. However, the effluent treatment system at Blue Skies was not effective in treating BOD, COD, TDS, TSS, turbidity, phosphate, ammonia, nitrate, *E. coli,* THB and TC. The questionnaire survey revealed that 45.5% of the beverage industries in Ghana do not treat their effluent whiles 54% had some form of treatment. All industries with some form of effluent treatment had environmental officers knowledgeable about effluent treatment. Based on the findings of this study, it was recommended that the primary treatment system at CPC be expanded with additional aerators. There should be frequent collection of scum and butter at the sump and collection tank. This would further reduce BOD and oil/grease at CPC to meet EPA recommended limits. The treatment system at Blue Skies was ineffective and there was a need to construct a more effective treatment plant.

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