

TREATMENT OF ONLINE LEACHED WASTEWATER TO REUSE AS BOILER FEED WATER IN NATURAL RUBBER GLOVE MANUFACTURING INDUSTRY

A dissertation submitted to the
Faculty of Animal Science and Export Agriculture of
Uva Wellassa University
in partial fulfillment of the requirements for the award of the degree of
Bachelor of Science in Palm & Latex Technology and Value Addition

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2014

ABSTRACT

Water scarcity and water pollution are the main reasons of the global water crisis. Both domestic and industrial wastewater is the prime contributor for the water pollution. Among the main wastewater generating industries, rubber industry plays a significant role. Meantime, reclamation and reuse of industrial and municipal wastewater have proven promising solutions to the global water crisis. Thus, the development of suitable treatment technologies is urgent for the reclamation and reuse of wastewater at different scenarios. Therefore, a study was conducted with the aims of treating online leached wastewater generating from natural rubber glove manufacturing industry and reusing that treated water to feed the boilers used in the same industry. In this study, online leached wastewater was first collected and common water quality parameters were pretested. Then, that wastewater was subjected to four treatment steps by giving much emphasis on hardness removal (softening) as it would make scaling problems in the boilers otherwise. First, a jar test was conducted and the optimum alum ($\text{Al}_2(\text{SO}_4)_3 \cdot 14\text{H}_2\text{O}$) dosage was obtained as 80 ppm so as to accelerate the sedimentation of suspended solids *via* coagulation and flocculation. Secondly, the dosage of optimum saturated lime ($\text{Ca}(\text{OH})_2$) solution was obtained as 130 mL per Litre of alum treated wastewater so as to remove the carbonate hardness while adjusting the pH to 10 (to facilitate the precipitation process). Thirdly, the alum treated and pH adjusted wastewater was taken and an experiment was designed to determine the optimum dosage of soda ash (Na_2CO_3) for the removal of non-carbonate hardness and the result was 500 ppm of soda ash. Then a Carbon filtration system was used for the filtration process where charcoal was used as the carbon medium. Finally, all the pretested water quality parameters were again tested. The results indicated that, TSS, BOD, COD, ammonical nitrogen and total hardness could effectively be reduced by 72.72 %, 47.69 %, 61.45 %, 73.68 %, and 91.05 % respectively while raising the pH and DO by 19.42 % and 80 % of online leached wastewater respectively from the proposed treatment process and such treated water can be potentially used as boiler feed water instead of normal tap water.

Key words: Glove industry, Online leached wastewater, Reuse as boiler feed water, Wastewater treatment process, Water quality parameters