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PAPER

A Biological System with Bristle Fiber of Coconut to Reduce COD Level of Synthetic Rubber Waste

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It is a great problem to reduce COD (Chemical Oxygen Demand) levels of water soluble synthetic rubber waste which comes from rubber factories. Solid waste can be removed by using alum and lime. After removing solid waste subjecting to clarifier, the effluent is treated by secondary digestion using aerobic and anaerobic bacteria.

Bristle fiber bacterial system is used for secondary digestion and efficiency of this system was very high. After the chemical treating, COD level was between 2000 mg/L and 4000 mg/L. The retention time of the new system was 30 hours and it contained anaerobic system, rotating batch contactor (RBC) system, and finalizing system. Bristle fiber of coconut was used as retention medium in every step and specially developed bacterial culture was used.

Under the lab scale project, the following data were reported. Average value of input COD was 2784 mg/L. System A (anaerobic tank, tank capacity-50 L, flow rate-24 L/hour, retention time - 2 hours, output COD - 2202 mg/L, COD reduction percentage - 20.89%, pH - 6.8), System B (RBC with Bristle fiber, tank capacity - 350 L, flow rate - 24 L/hour, retention time - 14 hours, output COD- 330 mg/L, COD reduction percentage - 67.26%, pH - 7 and System C (contact with bristle fiber, tank capacity - 350 L, flow rate - 24 L/hour, retention time - 14 hours, output COD- 110 mg/L, COD reduction percentage- 7.89%, pH - 7). The final COD, BOD, pH and total suspended solids (TSS) values of treated water were 110 mg/L, 23mg/L, pH 7 and 20mg/L respectively while total COD reduction percentage was 96% and total retention time was 30 hours. The treated volume of water per day was 576 L.

In the large scale project, the following data were reported. Average value of input COD was 2790.8 mg/L. System X (anaerobic tank, tank capacity - 7000 L, flow rate – 625 L/hour, retention time - 11.4 hours, output COD - 1755 mg/L, COD reduction percentage - 36.16%, pH - 6.8), System Y (RBC system with Bristle fiber, tank capacity – 10000 L, flow rate - 625 L/hour, retention time - 16 hours, output COD - 84.7 mg/L, COD reduction percentage 60 %, pH - 6.8) and System Z (contact with bristle fiber, tank capacity - 1500 L, flow rate - 625 L/hour, retention time - 2.6 hours, output COD - 62.45 mg/L, COD reduction percentage - 0.82%, pH - 6.8). Final COD value of treated water was 62.45 mg/L. Total COD reduction percentage was 96.8% and total retention time was 30 hours. The treated volume of water per day was 15000 L. 96% of COD can be reduced through this system within 30 hours.