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Design of a low cost wastewater treatment plant for milk factories

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The Sri Lankan dairy industry annually processes about 80 million liters of milk and produces dairy products such as milk, milk powder, cheese, butter, ice cream and yoghurt. The milk farmers and milk farms bring their daily collection of fresh milk to the milk collection centers and unload milk into chilling storage tanks. Subsequently the chilled milk is transported by bowsers to the main Milco factories in Colombo, Kandy and Nuwara Eliya. A typical dairy factory which produces various dairy products carries out processes such as raw milk reception, pasteurization, standardization and filling, yoghurt processing and filling, ice cream processes and filling, sterilized milk processing, milk powder spray drying and packing.

The milk collection and chilling centre located at Dikhenpura, Munagama, and Horana collects about 4500 litres of milk per day and the collected milk is then transported to the Narahenpita Milco Factory. The chilling tanks, milk carrying cans, milk storage tanks, are washed thoroughly twice a day. About 4500 litres of wash water is discharged into nearby lands without treatment. Before designing an appropriate treatment process for the chilling centre, the characteristics of soil and wastewater were analysed and the topography of the land and the rain fall patterns of the area were studied. Considering all of these results, a wastewater treatment plant was proposed for the Horana Milco milk collection centre. The proposed system consists of preliminary treatment and secondary treatment (biological treatment). Preliminary treatment includes a primary settling tank. Anaerobic ponds and maturation ponds come under the secondary treatment.

Coarse particles are removed from the screens. The sedimentation tank removes oil and grease and suspended solid remnant will be used for animal food at a later stage. Water from the anaerobic pond will be discharged into maturation ponds and at this stage the BOD is reduced to 30 mg/l. This water is then safe to be used for cultivation. The solidified sludge from the sedimentation tank will be used for the production of animal feed. The cost of the proposed system is approximately Rs 1.1 million.

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