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DEVELOPMENT OF TECHNO-ECONOMICAL TREATMENT SYSTEM FOR BULK MILK COOLER EFFLUENT IN INDIA

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Abstract

This paper addresses the present status of milk procurement practices in India, advancements in milk chilling technology, cleaning operations of milk chiller units and discusses the issues related to Bulk Milk Cooler (BMC) effluent treatment. Analysis of various physico-chemical parameters revealed that BMC effluent has wide variation in characteristics. BMC effluent discharged after every cleaning process are mainly characterized by the presence of high oil & grease (O & G) (120 – 2177 mg/L), organic load (COD: 2000 – 13000 mg/L; BOD_3: 500 – 7700 mg/L), suspended solids (425 – 2450 mg/L) and dissolved solids (1075 – 4610 mg/L). Suitability of employing an anaerobic treatment system consisting of settling cum digestion, baffle reactor and up flow media filtration was studied for its efficacy in treatment of BMC effluent at various loadings. The studies indicated that the stand-alone anaerobic-media treatment with OLR up to ~ 2.0 kg COD/m^3.d and ~36-40 hours HRT was able to achieve substantial removal efficiencies of 82.77, 81.33, 96.92, and 94.2% for parameters COD, BOD, O & G, TSS respectively. Even though the system worked satisfactorily at higher loadings, it is necessary to adopt a holistic approach with an addition of tertiary treatment considering the complexity and wide variation in effluent characteristics in order to ensure its reuse for various non-potable purposes and ensure environmental compliance.

Keywords: anaerobic reactor, bulk milk cooler, effluent treatment, hydraulic retention time, organic loading rate

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