Abstract

The trickling filter is nonsubmerged, fixed-film, biological reactor using rock or plastic packing over which wastewater is distributed continuously. Treatment occurs as the liquid flows over the attached biofilm. Trickling filters have been used to provide biological wastewater treatment of municipal and industrial wastewaters for nearly 100 years. The concept of trickling filter grew from the use of contact filters in England in the late 1890s. Originally they were watertight basins filled with broken stones and were operated in a cyclic mode.
In the 1950's plastic packing began to replace rock in the United States. The use of plastic packing allowed the use of higher loading rates and taller filters with less land area, improved process efficiency and reduced clogging. In the 1960's, practical designs were developed.

The advantages of using trickling filters include : 1) simple, reliable biological process that is suitable in areas where large tracts of land are not available for a treatment system, 2) may qualify for equivalent secondary discharge standards, 3) effective in treating high concentrations of organic material depending on the type of media used, 4) appropriate for small- to medium- sized communities and onsite systems, 5) high degree of performance reliability, 6) ability to handle and recover from shock loads and 7) relatively low power requirements. Among the disadvantages of trickling filters are : 1) additional treatment may be needed to meet strict discharge standards, 2) generates sludge that must be treated and disposed of, 3) regular operator attention is needed, 4) relatively low loadings are required, depending on the media and 5) limited

flexibility and control in comparison with activated sludge processes.

The project research work is an attempt to study the design, construction/fabrication of trickling

filter system and demonstration of the equipment by treating canteen waste and studying about the working efficiency of the system. Trickling filters that use plastic packing have been built in round, square and other shapes with depths varying from 3 to 12 m. In addition to the packing, other components of the trickling filter include a wastewater dosing or application system, an underdrain, and a structure to contain the packing. Compared with rock, plastic sheet media has 2-3 times the specific surface area, which provides proportionally more area for biomass attachment. The underdrain system is important both for collecting the trickling filter effluent liquid and as a porous structure through which air can circulate. The collected liquid is passed to a sedimentation tank where the solids are separated from the treated wastewater. In practice, a portion of the liquid collected in the underdrain system or the settled effluent is recycled to the trickling filter feed flow, usually to dilute the strength of the incoming wastewater and to maintain enough wetting to keep the biological slime layer moist. The biological community in the filter includes aerobic and facultative bacteria, fungi, algae, and protozo. Higher animals, such as worms, insect larvae, and snails, are also present.

In project pilot trickling filter system PVC foils are used as packing media. During canteen wastewater characterization and treatment, day-by-day increase in efficiency is found out and it is coming to be 50-55 %. Thus, by continuous operation and recycling of activated sludge from clarifier, the treatment efficiency increases. There is not much effect of pH on treatment efficiency. Also, because of higher surface area reduction in diameter of trickling filter tower, the land requirement decreases.

In this pilot plant, with wastewater, by adding other compounds like phenol, toluene, benzene, etc., degradation can be studied, which enlarges future scope for the project. Thus, other new data generation may be possible by using different chemicals with wastewater.

Key Words : Biological Waste Water Treatment, Trickling filter Development.