Abstract

The textile industry is one of the most important sectors of Pakistan. It contributes significantly to the country's GDP, exports as well as employment. It is, in fact, the backbone of the Pakistani economy. Production processes not only generate heavily polluted wastewater, but also waste heat, solid waste and exhaust gas. Generally, textile mills produce mixed wastewaters in large quantities, up to 600 m^3 per kg fabric, that are characterized by high organic load. The release of colored compounds into the environment is undesirable not only because of their color, which may affect photosynthesis of aquatic plants, but also because many dyes and their breakdown products may be toxic and/or mutagenic to life. In order to secure the environment from the adverse impacts of untreated industrial effluent, it is necessary that all the wastewater must be treated as an integral part of their production before discharging the wastes into the receiving streams or rivers. Since, Pakistan is facing an acute shortage of energy; therefore, encouraging the technologies like anaerobic digestion, will not only prevents the water pollution but it can help to tackle the problem of energy crises to a certain extent. For the treatment of textile mills effluent the anaerobic technology seems to be more reliable, effective and economical. In this study actual effluent of the local textile mills was used to study the start–up of the UASB reactor under control pH (neutral) and constant temperature (mesophilhic range). The OLR (Organic loading rate) was step-wise increased from 0.22 kg/m^3–day to 2.98kg/m^3–day under varying HRT (hydraulic retention time), to avoid organic shocks to the reactor. It was observed that using OLR of 2.40kg/m^3–day at HRT of 22hrs about 82% of COD could be reduced at neutral pH and constant temperature of 33^0 C, corresponding to these conditions 0.29m^3/kg-COD_{rem} of the biogas could be obtained with methane concentration of 54%. Thus this study suggests that using UASB reactor to treat textile mills effluent is technically a feasible solution and viable option.

Key words: Industrial effulent,. UASB reactor, COD, OLR, Anaerobic Digestion, HRT.

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