

Abstract

Wastewater management in Palestine has an important priority in order to protect the environment and conserve water resources out of pollution. Anaerobic wastewater treatment as low cost and energy method in moderate temperature country still need more investigation, on the other hands proper post-treatment after anaerobic reactor should be tested.

This thesis presents the results of a pilot system comprised of one UASB septic tank reactor followed by two series of ponds, Algae Based Pond (ABP) and Duckweed Based Pond (DBP). The UASB septic tank has a volume of 350 liters, being operated at two different hydraulic retention time (HRT) of 16.5 and 8 hours. UASB septic tank fed with domestic wastewater from cesspits of Birzeit city, Palestine. Each pond series consist of four equal ponds with a volume of 2700 liters and total area of 12 m² for each series, being operated at two hydraulic retention time of 32 and 16 days. These different operational conditions caused different pollutants removal efficiencies.

After almost more than 4 months of continuous monitoring, the UASB show good results in terms of COD and BOD removal at HRT 16.5 hours. The (UASB-lagoon) system also produced very good results in terms of COD, BOD and nutrients removal. The average COD and BOD removal in UASB septic tank at HRT 16.5 hours where 67.6 % and 72 % respectively, while preliminary results show dropping of the efficiency to 34.6% and 45% at HRT 8 hours. In ABP at HRT 32 and 16 days another 70% and 49.4% BOD removal were achieved , where BOD removal in DBP reach average of 80% and 71.6% at HRT 32 and 16 days respectively. PO₄ and NH₄ removal varied according to type of ponds and flow rate conditions.

In DBP hydraulic retention time of 16 days were quite enough to maintain the BOD concentration below 30 mg BOD/l, while in ABP more than 24 days needed to reach the same value .The UASB/DBP system is very promising alternative for the treatment of domestic sewage in Palestine and other

developing countries, since the system achieve good effluent quality in addition to low costs of investment and running costs compared to aerobic treatment systems.

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