

**ANAEROBIC GRANULE FORMATION WITHOUT SEED SLUDGE IN A HEAT EXCHANGER TYPE ANAEROBIC BIOFILM REACTOR (HEABR)**

**Ramiro Escalera Vásquez**

**ABSTRACT**

The anaerobic granule formation occurring during the start-up of a Heat Exchanger type Anaerobic Biofilm Reactor (HEABR) was experimentally studied. The reactor was utilized in the treatment of low concentration molasses wastewater,  $0.45 \text{ g-C L}^{-1}$ , at low liquid bulk mean temperatures ( $15^\circ \text{ C}$  a  $25^\circ \text{ C}$ ), under one-pass upflow mode and hydraulic retention times (HRT) of 16 h and 6.1 h. Granule formation can occur without using initial large amounts of seed anaerobic sludge, provided that the microorganisms are well adapted to the type of wastewater and environmental conditions. Effective wastewater treatment was feasible at volumetric loading rates of 1.8 y  $3.3 \text{ g-COD L}^{-1} \text{ d}^{-1}$ , average temperatures below  $25^\circ \text{ C}$  and biomass concentrations as low as  $2 \text{ g-VSS L}^{-1}$ . Granules of 0.5 – 2 mm diameter can be formed within three months at mean temperatures below  $25^\circ \text{ C}$ .

**Keywords:** Anaerobic Biofilm Reactor, Granulation, Molasses Wastewater Treatment.