

39-26 Bench-scale study using PVA gel as a biocarrier in a UASB reactor treating corn steep liquor wastewater

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PVA-gel beads were used to serve as a biocarrier for treatment of corn steep liquor wastewater containing high levels of volatile fatty acids (VFA), where retention of biomass could be either solely in the porous microstructure of the gel or by granule formation using the gel bead as a nucleus. With stable COD removal efficiencies of 90% or greater, continuous treatment was demonstrated over four months, with organic loading rates being increased stepwise from 2.5 to 22.5 kg COD/m³ d. In addition, VFA in the effluent were, with few exceptions maintained close to zero. Gas production increased over the course of the study and reached a level of 0.38 m³/kg COD consisting of 65% methane with the remainder mostly as carbon dioxide. Biomass granules containing of methane producing bacteria progressively formed around PVA-gel beads during the study. In contrast, very few small natural granules developed apart from a PVA-gel nucleus indicating that PVA gel may serve well as a seeding material to enhance granulation when natural occurrence is lacking.