EFFECT OF MICRO-CARRIERS

Use of micro-carrier as an initial support material enhances granulation in UASB reactor. The micro-carrier support material is added only initially while starting the reactor and not continuous as suspended solids. In experiments with mesophilic digestion in which hydroanthracite particle (0.25-0.42 mm particle size) were added to inoculum digested sewage sludge, a significant reduction of the time needed for granulation was observed [Wiegant *et al*., 1986]. Such an effect may be the result of better attachment of the filamentous bacteria to the particles, which offer initial nuclei for bacterial adhesion and would lead to a better retention. Once the nuclei have been introduced, the process becomes straight forward, since, this is a mere phenomenon of biofilm growth, and the generated biofilms aggregate each other to make larger granules. This simplifies the generation of UASB granules, and consequently enhances and ensures the start-up of the UASB reactors [Yoda *et al*., 1991].

Similar, results were obtained in a UASB reactor operated at 55^{o}C, where, zeolite (100③m) was added as micro-carriers, 15% of the effective reactor volume. Tight granules with good settleability were obtained in this study with sucrose, and even with VFA as substrate [Ohtsuki *et al*., 1992]. In the different study at mesophilic temperature 30^{o}C, Yoda *et al*., [1989] had also reported the transformation of all the micro-carrier in to granular sludge. The micro-carrier used was zeolite with 150 ③m size and 15% of effective reactor volume.

This phenomenon is particularly important for the wastes where the granulation process proceeds slowly and also a dense sludge is unable to be formed, and/ or granular seed sludge is getting deteriorated. The use of particulate carriers might be profitable under such circumstances, provided a stable biofilm develops on the carrier [Lettinga *et al*., 1983c].