

Study On EM Biological Carrier In Wastewater Treatment System

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Abstract

EM (effective microorganisms) are the compound microorganism colony made of multi-species bacteria, whose efficiency of wastewater treatment depends on the microorganism quantities and activity level. In the biotreatment system, the solidified technology is normally adopted in order to prevent species of bacteria from being washed away which will reduce the bacterial activity and increase the cost of treatment. Therefore, study on the biological carrier and treatment process is very important.

Pottery clay and attapulgite clay possessing comparatively strong absorptive decoloration and absorptive capacity are good biological carriers. The experiment of non-online concentrating culture of EM, respectively using pottery clay and attapulgite clay both of which are reformed by adding $AlCl_3$, $MgCl_2$ and $MnSO_4$ then are sintered and using activated sludge granule as biological carriers in the high strength organic wastewater, is conducted in a pilot-scale intermittent biological aerated filter. The results from it demonstrate: (1) the concentrating culture of EM in the high concentration organic wastewater can greatly enhance the EM quantities, activity and adaptability to the wastewater treatment environment; (2) when pottery clay, attapulgite clay and activated sludge granule used as biological carriers, the operational use time of biodegradation is 20d, 10d and 3d correspondingly, moreover, the removal rate of COD_{cr} exceeds 90%; and (3) with the prolongation of reaction time, activated sludge will disintegrate and species of bacteria will degenerate when the biological carrier is activated sludge granule.

As mentioned as above, through the concentrating culture of EM, the bacterial concentration and adaptability to the environment will be raised, which are fit for the formation of biofilm and the improvement of degradability. Biological carrier is the mainbody where microorganisms reproduce and degrade, whose property directly influences and restrains efficiency of wastewater treatment process. Therefore, as a kind of biological carrier having coarse surfaces and plentiful internal interstices, pottery clay, attapulgite clay and activated sludge granule have the greater absorbency which aids to create good environment where plentiful nutrients are filled and biofilm can be easily formed. When using activated sludge granule as the carrier of EM, the microorganism concentration and degradability will be reduced due to the antagonism between EM and activated sludge granule, which directly affects the normal operation of system. While for pottery clay and attapulgite clay, organic substance is degraded by way of absorption in the early period due to the plentiful interstices. When the absorption of carrier is reduced, hanging film has been formed quickly. The wastewater treatment process of intermittent aeration benefits the compound microorganism colony to grow and reproduce so as to form complicated microecosystem, thus making good use of the effect of compound degradation of EM with multi-species bacteria.

Keywords: *effective microorganism, biological carrier, pottery clay, attapulgite clay, activated sludge, intermittent aeration wastewater treatment system.*