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Anaerobic-aerobic biodegradation of antibiotic wastewater

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ABSTRACT

The purpose is to improve the treatment effect on the antibiotics in the wastewater of livestock farms. The antibiotic wastewater from a livestock farm is taken as the research object. The wastewater from the livestock farm is sampled and analyzed through batch anaerobic biochemical degradation experiment and direct aerobic biochemical degradation experiment. Also, an anaerobic and aerobic biochemical test device is constructed in the laboratory to study the removal effect on the antibiotics in the wastewater based on anaerobic biochemical degradation and aerobic biochemical degradation technologies. The results show that the removal rate of antibiotics in the wastewater of the livestock farm by anaerobic biochemical degradation technology is only about 25%. The main reason is that sulfa mono methoxine (SMM) is difficult to be degraded by anaerobic degradation technology, and its concentration in the wastewater is more than 95%. And the degradation effect of anaerobic biochemical treatment on sulfonamide antibiotics is far less than that on lactam antibiotics. When the concentrates of sulfadiazine (SD), sulfamethoxazole (SMX), sulfamethazine (SMZ), and SMM (sulfamonomethoxypyrimidine) in the wastewater are high, the degradation effect of anaerobic sludge on the four is SMX > SD > SMZ > SMM. In the direct aerobic biochemical treatment, aerobic sludge has good degradation ability for sulfonamides and β-lactam antibiotics, and the overall removal rate of antibiotics in the wastewater can reach more than 80%. When the concentrates of SD, SMX, SMZ, and SMM in the wastewater are high, the degradation effect of aerobic sludge on the above four antibiotics in the direct aerobic treatment is SD > SMX > SMZ > SMM.

Keywords: Antibiotics; Anaerobic biochemical treatment; Aerobic biochemistry treatment; Degradation effect