Cultivation and characteristics of micro-aerobic activated sludge with weak magnetic field

Hui-xia Lan, Rui Chen, Ping Ma, Heng Zhang, Shan-hong Lan, Yong-dong Wang

ABSTRACT
Dynamic experiments were carried out in two reactors with anaerobic sludge as the seed sludge under low dissolved oxygen concentration (lower than 1.0 mg/L) condition, one reactor with magnetic particle and the dosage being 4 g/L determined by the static experiments and the other as the blank control. The synthetic glucose solution was used to culture the micro-aerobic sludge. The results indicated that the reactor with magnetic particles had a higher chemical oxygen demand removal efficiency and mixed liquid suspended sludge than the blank in which no magnetic particles existed. The sludge under the influence of weak magnetic field had better settling property with the average value of sludge volumetric index (SVI) lower than 100 mL/g, while in the reactor without magnetic particles, the sludge had a loose structure, poor setting property, and a SVI value higher than 200 mL/g. The influence of the weak magnetic field on the flocculation capability of the sludge was investigated through the testing of the indexes such as the total dose of extracellular polymers, the ratio of protein and polysaccharides, flocculating ability, relative hydrophobicity, and surface charge. The results showed that the existence of magnetic particles had greatly increased flocculating performance of the sludge.

Keywords: Weak magnetic field; Micro-aerobic; Activated sludge; Cultivation; Magnetic particles

Received 6 April 2013; Accepted 6 August 2013

Desalination and Water Treatment
www.deswater.com
doi: 10.1080/19443994.2013.834272

January