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Pretreatment of contaminated raw water by a novel double-layer biological aerated filter for drinking water treatment

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ABSTRACT

Polluted source water presents a challenge for the conventional water treatment process. Biological pretreatment would be helpful if feasible. To our knowledge, few literatures were reported about the pretreatment of polluted source water by biological aerated filter. A novel double-layer biological aerated filter (DLBAF) was devised using floating media (polyethylene) and sunken media (clinoptilolite) as the under layer and the upper layer media, respectively. The results indicated that DLBAF was efficient for ammonium, TOC and UV_{254} removal, with an average removal rate of 80.87%, 24.62%, 20.74%, respectively. Particle counts with sizes of 2~15 μm presented a removal rate above 55%, although the sizes distribution had not been altered. Microorganisms on the surface of the media were observed by scanning electrical microscope (SEM), and it indicated that there were different bio-film structures in the under and the upper media. The novel DLBAF got a simultaneous removal of organic matter and ammonium, and had a great potential for pretreatment of polluted drinking water resources.

Keywords: Polluted source water; Floating and sunken media; Clinoptilolite; Double-layer biological aerated filter; Biological pretreatment; Drinking water treatment

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