Treatment of palm oil mill effluent using membrane bioreactor: novel processes and their major drawbacks

ABSTRACT

Over the years, different types of alternative technologies have been developed and used for palm oil mill effluent (POME) treatment. Specifically, membrane bioreactor (MBR) has been employed to relegate pollutants contained in POME under different operating conditions, and the technology was found to be promising. The major challenge impeding the wider application of this technology is membrane fouling, which usually attracts high operating energy and running cost. In this regard, novel methods of mitigating membrane fouling through the treatment processes have been developed. Therefore, this review article specifically focuses on the recent treatment processes of POME using MBR, with particular emphasis on innovative processes conditions such as aerobic, anaerobic, and hybrid processing as well as their performance in relation to fouling minimization. Furthermore, the effects of sonication and thermophilic and mesophilic conditions on membrane blockage were critically reviewed. The types of foulants and fouling mechanism as influenced by different operating conditions were also analyzed censoriously.

Keyword: POME; Membrane bioreactor; Treatment processes; Hybrid conditions; Sonication; Foulants and fouling mechanism