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Topic: - Aerobic granulation: An option to treat the anaerobic effluents

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Findings

The anaerobically treated effluent does not meet the national disposal standards of certain countries, such as India and Brazil. To meet the required standards, it is necessary to upgrade the anaerobic wastewater treatment technologies through a post-treatment system. The specific aim of this research work is to achieve organic materials and nutrient removal from anaerobically treated effluent treating sewage using aerobic granular biomass. Key Findings include:

1. The two reactors, namely anaerobic, aerobic or oxic, and anoxic (A/O/A) cyclic mode aerobic granular biomass reactor (AGBR) and A/O/A cyclic mode Continuous flow Intermittent decant (CFID) type reactor, have the capability to treat the anaerobically treated effluent.
2. The use of medium-strength sewage as a substrate in both the reactors proved beneficial in reducing the granule start-up time for treating low-strength anaerobic effluent.
3. Results inferred that the 3 h cycle with [Filling phase - 27 minutes; Anaerobic phase – 45 minutes; Aeration – 90 minutes; Anoxic – 9 minutes; Settling – 5 minutes; followed by Decanting – 4 minutes] in A/O/A cyclic mode AGBR has been considered an optimal cyclic time distribution for the treatment of anaerobic effluent.
4. In A/O/A cyclic mode CFID type reactor, the 3 h cycle with [Anaerobic phase - 45 minutes; Aeration – 99 minutes; Anoxic phase – 18 minutes; Settling – 8 minutes; followed by Decanting – 10 minutes] achieved the highest removal of 79.83% COD, 84.52% NH_4^+ -N, 71.75% total nitrogen, and 53.43% phosphate.

The overall results demonstrated that the granular biomass cultivated in cylindrical A/O/A cyclic mode CFID reactor displayed superior treatment performance and compact structure of

granules. Consequently, this reactor proved to be the most effective option for the post-treatment of low-strength anaerobic effluent when compared to other reactors investigated in this research study. The findings suggest that the cylindrical A/O/A cyclic mode CFID reactor has the potential to offer enhanced treatment outcomes and can be considered the preferred choice for the upgradation of already existing full-scale anaerobic wastewater treatment technologies.