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Development of denitrifying phosphate accumulating and anammox micro-organisms in anaerobic hybrid reactor for removal of nutrients from low strength domestic sewage

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2 **micro-organisms in anaerobic hybrid reactor for removal of nutrients**
3 **from low strength domestic sewage**

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10 **Abstract**

11 Low strength domestic sewage was treated in an Anaerobic Hybrid Reactor. The first
12 phase was focused on the enhancement of denitrifying phosphate accumulating
13 organisms (DPAOs) for the concurrent removal of nitrogen and phosphate. 16S rRNA
14 gene confirmed the presence of *Flavobacterium* spp. and *Pseudomonas caligenes* spp.
15 which are dominant DPAOs. The second phase was the anaerobic ammonium oxidation
16 (anammox) enrichment phase, and it exhibited much higher chemical oxygen demand
17 (87%) and nitrogen removal (90%) as compared to the first phase. However, it had
18 failed to remove the phosphate from the system. In case of anammox, the dominant
19 specie detected was *Candidatus Brocadia*, along with minor counts of *Candidatus*
20 *Jettenia* and *Anammoxoglobus Propionicus*. Apart from that, ammonia oxidizing
21 bacteria (*Nitrosomonas europaea*, *Nitrosomonas nitrosa*) and methanogens
22 (*Methanosaeta*, *Methanobacterium*) were also detected in the system. This study
23 showed the feasibility of anammox species over DPAOs in treating domestic sewage.

24 **Keywords:** Low strength wastewater, Anaerobic hybrid reactor (AHR), Anammox,
25 Denitrifying phosphate accumulating organisms

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