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ENHANCEMENT OF AMETRYN BIODEGRADATION EFFICIENCY USING ANTHRAQUINONE-2,6-DISULPHONATE IN ANAEROBIC- AEROBIC TREATMENT

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Abstract

Ametryn (2-(ethylamino)-4-(isopropylamino)-6-(methylthio)-s-triazine), a herbicide present in different type of wastewater was treated using the anaerobic-aerobic batch reactor in the presence of anthraquinone-2,6-disulphonate (AQS) as a redox mediator. The anaerobic co-treatment process was conducted for an influent ametryn concentration of 8-10 mg/L during 280 days in previously acclimated biomass. Different intermediate compounds of ametryn were identified in the anaerobic effluent using the liquid chromatography-mass spectrophotometer (LC-MS). Low mixed liquor volatile suspended solids/mixed liquor suspended solids (MLVSS/MLSS) ratio between 0.71-0.81 indicated a stable anaerobic performance. Food to microorganism ratio (F/M), sludge age and solids retention time (SRT) for anaerobic reactors observed was 0.19 – 0.27, for 7 days and 64-190 days respectively. The aerobic reactor was coupled sequentially to remove trace organic matter and the intermediate compounds in the anaerobic effluent. In the aerobic reactor, MLVSS/MLSS ratio observed was 0.68-0.75, F/M ratio was 0.166, sludge age 15 days, and SRT 190-310 days. The overall removal efficiency of anaerobic-aerobic treatment was >99% for both ametryn and COD. Anaerobic-aerobic effluent was fed to the micro-algae *Chlorella vulgaris* and *Scenedesmus quadricauda*, and the effluent has contributed to algal growth.

Keywords: AQS, ametryn, biodegradation, redox mediator

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