Treatment of Sewage Containing Micropollutants

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Abstract—*Sewage treatment plants are constructed for the reduction of organic matter and nutrients, the removal of micropollutants is not considered in the design. Due to this fact, a vast number of these compounds are not completely removed, being a significant fraction of them continuously discharged to the environment. Organic micropollutants refer to a wide group of carbon containing chemical compounds, mainly of xenobiotic nature created by industrial processes either intentionally or as by products, such as pharmaceutical, personal care products, harmones, pesticides, brominated flame retarders, plasticisers, etc. some of these compounds are persistent organic pollutants i.e. compounds that are resistant to environmental degradation through biological, chemical or photochemical processes, thus capable of long range transport, bioaccumulation in human animal tissue. Micro-pollutants have been detected in surface waters in most of the countries and they are of increasing importance in water pollution control.*

The present study was carried out to study the biodegradation of micropollutants, namely Metronidazole and Barbituric acid, commonly found in sewage due to vast consumption as drugs, through use of sequential anaerobic aerobic treatment. Sequential treatment was carried out in order to achieve complete mineralization of the pollutants as either aerobic or anaerobic treatment alone may not result in the complete degradation of the compounds. Anaerobic treatment was carried out in a hybrid reactor consisting of suspended growth in the bottom and attached growth in the top portion of the reactor. Aerobic reactor used in the present investigation was a submerged aerobic fixed film reactor containing both suspended as well as attached growth. The overall BOD/ COD removal from the reactor system was 92% and 80% respectively. GC MS analysis was done to evaluate the fate of micropollutants in the system. The results of GC-MS analysis showed the absence of the parental compounds and formation of intermediate products. This shows the degradation of pharmaceutical based pollutants from both the anaerobic and aerobic treatment systems employed in the study.