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A REVIEW ON OCCURRENCE, MEASUREMENT, TOXICITY AND TANNIN REMOVAL PROCESSES FROM WASTEWATERS

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Abstract

A wide range and globally active agro-industries such as olive oil processing, winery, tannery, textile and food production discharge a large volume of wastewater containing tannins. Tannins are complex structured chemicals which cause high organic content, requiring high dissolved oxygen in wastewater treatment plants or producing oxygen depletion in the aquatic environment. Tannins are known to be hardly degraded in biological treatment. There has been evidence that the presence of natural tannins can, to some extent, form antioxidant potential in wastewater while their degradation products can interact with the oxidants used in the treatment or final disinfection, the final effluent can display toxicity to aquatic species as well. Therefore, there has been a progressive but still to a limited extent of search to remove these compounds effectively. Several processes including physico-chemical, adsorption biological treatment, membranes treatment and advanced oxidation processes (AOPs) such as ozone, electrocoagulation, UV/H_2O_2, Fenton processes, photocatalysis have been attempted to treat tannins in general as integrated to biological processes. This paper aims to present a critical review of the chemistry, as well as sources of tannins in industrial wastewater and gives informative data on their toxicity. It finally reviews treatment methods with their descriptive data on their efficacy to remove the tannins from different origin wastewater.

Keywords: vegetable and synthetic tannins, toxicity, AOPs, removal of tannins, wastewater

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