

Evaluation of sonication process in vegetable tannery wastewater treatment

Alireza Mohammadi Aghdam

University of Pisa, Italy ; Email:alirezamohamadiaghdam@gmail.com

Abstract

In April 2020, the International Water Association (IWA) established a Task Force to serve as a leadership team within IWA, with the mission of keeping abreast of and communicating emerging science, technology, and applications for understanding the impact and ability to respond to the COVID-19 pandemic, with a focus on water professionals and industries.

Italy's tanning sector makes a substantial contribution to the European economy. At the same time, it's common knowledge that this industry produces a lot of toxic effluent. Organic matter (COD) levels in vegetable tannery wastewater are high, with a high percentage of resistant organic compounds. Due to the intricacy of the chemical composition, vegetable tannery effluent has a number of problems. To avoid serious environmental consequences, contaminants must be transported. Activated sludge methods, on the other hand, are important technology in wastewater treatment. Massive amounts of waste activated sludge (WAS) or other bio-solids are produced by these biological processes. To minimise the sludge charge, mechanical, thermal, and/or chemical WAS conditioning procedures have been proposed. Among them are WAS therapies, with sonication as a pre-treatment being one of the most creative. The effect of high-frequency sonication on decreasing organic matter, with or without the use of H₂O₂ and aeration, is the main focus. The parameters that influence the removal of organic matter (COD) and soluble COD (SCOD), as well as total nitrogen (TN) and total organic carbon (TOC), were studied and compared. The presence of H₂O₂ is then studied to see how it impacts the process' performance, as well as how it affects the combined sonication and biological processes.

In other words, the research looks at the impact of Son lysis on waste activated sludge solubilization and anaerobic biodegradability of vegetable tannery wastewater and primary sludge from a tannery wastewater treatment plant in Santa Croce (Tuscany, Italy). The findings of a pilot scale study carried out at the Tannery wastewater treatment plant (Cuoiodepur). The combination of a sonication pre-treatment with the use of H₂O₂ produced good results in terms of COD and SCOD reduction on vegetable tannery wastewater and primary sludge for recovery and reuse in the tannery treatment cycle during the test. The sonication pre-treatment was able to remove around 25% of COD and SCOD from wastewater, as well as more than 40% of COD reduction and 18% increase in SCOD in the primary sludge of vegetable tannery effluent. Furthermore, sonication with H₂O₂ had a 35 percent and 30 percent effect on total suspended solid (TSS) and volatile suspended solid (VSS), respectively. On the other hand, the primary sludge of vegetable tannery effluent exhibited a 27 percent reduction in total organic carbon (TOC).

The goal of this review paper is to give readers a better understanding of what is known about COVID-19 and to provide risk mitigation advice based on what is currently known about viruses in wastewater. This research article looked at several scenarios for both the developed and developing worlds and offered risk management recommendations. The purpose of the review paper is to bring together information about the pandemic and other viruses. This review document, according to the IWA Task Team, will give the necessary direction for the worldwide response to the current pandemic.

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