

Ultrasonic Treatment on Wet Coffee Processing Wastewater: Assessing Its Impact on Organic Content

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Wet coffee processing generates large volumes of wastewater with high organic matter content (83.5 g/L Total Chemical Oxygen Demand [TCOD]), making its treatment challenging and causing a negative impact on receiving water bodies. Therefore, ultrasonic treatment was studied through kinetic experiments at different power levels to evaluate its effect on the removal of TCOD and soluble (SCOD), total solids (TS), volatile solids (VS), and carbohydrates. Wastewater treatment was carried out in a 2.4L reactor, at a frequency of 40kHz, and power levels of 100, 200, and 300W for 1 hour, achieving TCOD removal of 13%, 18%, and 22%, respectively. On the other hand, SCOD showed an increase in all cases up to 30 minutes, followed by a downward trend. Additionally, a slight decrease in carbohydrate concentration was recorded during the sonication time. These results suggest simultaneous degradation of organic products alongside solubilization, caused by the generation of reactive oxygen species, and subsequent attack on dissolved organic matter in the medium. The slight reduction in carbohydrate content is attributed to its structural complexity, which includes components such as pectin, hemicellulose, and cellulose. Ultrasound treatment proved to be effective as a pretreatment to reduce organic pollution from wet coffee processing wastewater.

Biography:

I'm a doctoral student in Biotechnological Innovation Sciences, committed to innovative research and advancing knowledge in the treatment of liquid waste. With an academic background in chemical engineering and environmental engineering, I have dedicated years to exploring the complexities of various physical, chemical, and biological treatments for waste. My previous projects include the use of natural adsorbent materials in removing contaminants from liquid mediums, as well as their potential reuse in subsequent processes.