

A compact process for the treatment of olive mill wastewater by combining UF and UV/H₂O₂ techniques

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Received 21 November 2002; accepted 22 September 2003

Abstract

Olive oil production results in important quantities of wastewater containing large amounts of total solids and organic carbon as well as low oil concentrations. This paper describes the treatment of olive mill wastewater (OMW) by combining an ultrafiltration (UF) technique and an advanced oxidation process (AOP) using UV/H₂O₂. It further demonstrates the technical feasibility of this compact and stable process to remove a large part of total solids and organic carbon. Indeed, UF reduces the pollutants contained in the OMW with an apparent rejection coefficient R_{COD} in the range of 94%. The UV/H₂O₂ oxidation process may be easily used, in combination with UF, to finish the treatment of the permeate. The results obtained in batch and continuous mode showed that this technique offered a treated solution which complies with legal requirements. A final concentration of 17 mg_{TOC} dm⁻³ was obtained, which corresponds to a final COD of 52 mg dm⁻³, while the legal requirement is 125. Furthermore, the final effluent is fully decolorized.

Keywords: Olive mill wastewater; Advanced oxidation process; Ultrafiltration

1. Introduction

Olive oil production is an important economic activity of Mediterranean countries. Unfortunately, this activity leads to significant liquid and solid pollutant wastes. The treatment of olive mill wastewater (OMW) by a combination of

chemical or physical processes and a biological process has, however, not been completely successful, and a longer lag phase has been found to be necessary for biological treatment [1–3]. Moreover, the color of OMW cannot be dealt with using traditional biological waste treatment methods such as aerated lagoons or anaerobic digestion [4,5].

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