

## A catalytic oxidation process of olive oil mill wastewaters using hydrogen peroxide and copper

S. De Rosa\*, A. Siciliano

*Department of Soil Protection, University of Calabria, via P. Bucci, cubo 44B, Arcavacata di Rende (CS), 87030, Italy  
Tel. +39 (098) 4496535; email: derosa@dds.unical.it*

Received 6 November 2009; Accepted 11 March 2010

---

### ABSTRACT

The Mediterranean region is the largest olive oil producer in the world, consequently in this area olive oil mill wastewaters have a high seasonal pollution potential. Due to the presence of phytotoxic compounds, such as poly-phenols, the olive oil mill wastewater is not easily biodegradable, and, therefore, the direct biological treatment is not recommended. Many techniques have been proposed for the their treatment, such as catalytic wet oxidation, ozonization, photo-catalysis, etc., among which, the catalytic oxidation seems to give good results. The present paper reports the results of an experimental investigation carried out with the aim to define a new catalytic oxidation process with hydrogen peroxide using copper-based catalyst, able to reduce the phytotoxicity of olive oil mill wastewaters and to recover the catalyst after oxidation treatment. The experimental results have showed that, operating in a slurry type reactor at mild operating conditions, it is possible to reduce the organic chemical oxygen demand down to 10% and the polyphenols amount of wastewater down to 1%. Therefore, the process is able to increase the rapidly biodegradable substrate content up to 80%, to remove color and total suspended solid amount and to minimize the metal loss of the catalyst after oxidation process, with a recover of about 80% with respect to its initial amount, permitting to reuse it for a long life cycle.

*Keywords:* Catalytic oxidation; Copper; H<sub>2</sub>O<sub>2</sub>; Poly-phenols

---

\* Corresponding author.