Enzymatic Degradation of Congo Red by Turnip (*Brassica rapa*) Peroxidase

Afaf Ahmedi^a, Mahmoud Abouseoud^{a,b,*}, Annabelle Couvert^c, and Abdeltif Amrane^c

- ^a Laboratoire de Biomatériaux et Phénomènes de Transfert, Faculté des Sciences et de la Technologie, Université Yahia Fares de Médéa, Pole Universitaire, RN1, Médéa, 26000, Algeria. Fax: 0021325581253. E-mail: aseoud2002@yahoo.fr
- ^b Laboratoire de Génie de la Réaction, Faculté de Génie Mécanique et Génie des Procédés, Université Houari Boumediene, Bab Ezzouar, Alger, 16111, Algeria
- ^c Ecole Nationale Supérieure de Chimie de Rennes, CNRS, UMR 6226, Avenue du Général Leclerc, CS 50837, 35708 Rennes Cedex 7, France
- * Author for correspondence and reprint requests

Z. Naturforsch. 67c, 429-436 (2012); received August 2, 2011/June 28, 2012

The enzyme peroxidase is known for its capacity to remove phenolic compounds and aromatic amines from aqueous solutions and also to decolourize textile effluents. This study aims at evaluating the potential of a turnip (*Brassica rapa*) peroxidase (TP) preparation in the discolouration of textile azo dyes and effluents. An azo dye, Congo Red (CR), was used as a model pollutant for treatment by the enzyme. The effects of various operating conditions like pH value, temperature, initial dye and hydrogen peroxide concentrations, contact time, and enzyme concentration were evaluated. The optimal conditions for maximal colour removal were at pH 2.0, 40 °C, 50 mM hydrogen peroxide, 50 mg/l CR dye, and TP activity of 0.45 U/ml within 10 min of incubation time. Analysis of the by-products from the enzymatic treatment by UV-Vis and IR spectroscopy showed no residual compounds in the aqueous phase and a precipitate of polymeric nature.

Key words: Congo Red, Discolouration, Peroxidase