

TITLE: ANTIOXIDANT ENZYMES AS INDICATORS OF CONTAMINATION BY THE PESTICÍDA BARRAGE® (CYPERMETHRIN) IN MICROALGAE IN CENTRAL BRAZIL

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ABSTRACT: Contamination with agrochemicals and pesticides corresponds to the second most relevant type of water contamination in Brazil. Barrage® is the most used pesticide in the Federal District. The active constituent in this product, cypermethrin, is a type II synthetic pyrethroid, which is classified as a highly toxic and risky pesticide to the environment. One of its effects on algae is oxidative stress, leading to an increased activity of antioxidant enzymes. This work aimed to analyze the responses of catalase (APX) and ascorbate peroxidase (APX) enzymes in the periphery of a pristine Cerrado lagoon and in a unialgal culture of *Chlorolobium braunii*, in order to detect early the effect of the pesticide Barrage® (cypermethrin) in metabolism. The periphyton was collected in Lagoa Bonita (ESECAE) and *C. braunii* was collected in the tributary of Ribeirão do Gama-DF (APA-Cabeço de Veado). Photosynthetic parameters evaluated by fluorescence of PSII were measured over 96 h, from 0 to 5 mg/L in the periphyton and 0 to 30 mg/L of Barrage® (cypermethrin) for *C. braunii*, in order to obtain the values of IC25 and IC50, as well as the measurement of APX and CAT activities. There was a significant reduction of Fv/Fm over time in the periphyton, but there was not enough inhibition to reach the IC25 and IC50 values. In *C. braunii*, IC25 was 8.1 mg/L, and IC 50, 15.75 mg/L cypermethrin. For the periphyton community, there was a 170% increase in APX activity at 5 mg/L, and a 66.6% increase in CAT activity at a concentration of 1 mg/L after 96 h exposure to cypermethrin. *C. braunii* submitted to 30 mg/L of cypermethrin showed an increase of 89% in APX and 123% in CAT, after 96 h of treatment. This study corroborates the use of photosynthetic parameters of the fluorescence of photosynthesis and the activity of oxidizing enzymes can be used as early bioindicators of cypermethrin contamination in the aquatic environment within a few hours, with fluorescence being a more robust parameter and the most sensitive enzymatic activity. Sampling in the different biological materials indicated that the complexity of the periphytic community may have a buffering capacity to the action of the pesticide in comparison to the unialgal culture.

Keywords: Ascorbate peroxidase; Catalase; *Chlorolobium* sp.; Periphyton.

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