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Phosphatases and Antioxidant Enzymes as Potential Biochemical Indicators of Toxicity in Aquatic Non-Target Organisms

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Diflubenzuron (DFB), the most used compound to combat parasites in aquaculture, can be toxic for non-target species. When degraded, it generates p-chloroaniline (PCA), a potentially carcinogenic and mutagenic compound. Both these compounds were tested in the activities of acid (FAT) and alkaline (FALK) phosphatases, catalase (CAT) and superoxide dismutase (SOD) of the aquatic organisms: microalgae *Pseudokirchneriella subcapitata*, microcrustacean *Daphnia similis* and fish *Oreochromis niloticus*. The enzyme activities were determined by spectrophotometry, based on the 50% effective concentration (EC50) for *in vivo* tests. The DFB EC50 values were 0.00096, 0.009 and higher than 100 $mg.L^{-1}$ for algae, daphnia and fish, respectively, in acute test. The PCA EC50 values for daphnia and fish were 0.27 and 24 $mg.L^{-1}$, respectively. However, algae had no change in their growth during exposure to PCA. *In vivo* assays showed that DFB and PCA caused alterations in the activities of FAT, FALK, CAT and SOD for the test organisms. The enzymes studied were sensitive by exposure to DFB and PCA *in vivo* studies and may be used as biomarkers of water pollution resources by these compounds. The aquatic organisms tested showed to be adequate for this kind of studies. Finally, the use of DFB in aquaculture must be done carefully.

Keywords: Phosphatases, Antioxidant Enzymes, Biochemical Indicators, Diflubenzuron.

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