

Biomarcadores

Painel

187 - EVALUATION OF THE TOXICITY OF THE MIXTURE OF DIFLUBENZURON AND P-CHLOROANILINE IN TILAPIA FISH IN THE PRESENCE AND ABSENCE OF SOIL

DANTZGER, D. D., JONSSON, C. M., NUNES, A. A. S., AOYAMA, H.

darbioquimica@gmail.com, claudio.jonsson@embrapa.br, andbio@hotmail.com, aoyama@unicamp.br

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INTRODUÇÃO

Several chemicals occur together in the environment as a result of different sources. However, in the great majority of risk assessments only a single chemical is considered. 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. This study analyzed the activity of the enzymes: Catalase (CAT), acid and alkaline Phosphatase (ACP/ALP) of the gills of the Tilapia fish (*Oreochromis niloticus*) exposed to different concentrations of the mixture of DFB and PCA in the presence and absence of soil.

METHODS

For this, juveniles tilapia were transferred to glass aquaria containing 10 L of test solution under constant aeration and controlled temperature by thermostats. For the same test in the presence of soil, fish were transferred to glass aquaria containing 900 g of artificial soil and 10 L of test solution under conditions above mentioned. The total period of exposure to test-concentration was 96 hours. The end of the exposure period, the number of dead individuals was registered in order to determine the lethal concentration that affect 50% of the population (LC50-96h). Isobolograms were performed from these results and were used to analyze the combinatory effects of the two compounds. In the biochemical tests, adult tilapia fish were exposed to the sublethal concentrations during 96 h in presence and absence soil. After 96 h, fish were sacrificed and the gills were prepared and used to determine the enzymatic activities. The activities of alkaline (ALP), acid (ACP) phosphatases and catalase enzymes were measured by spectrophotometry.

RESULTS AND DISCUSSION

Concentrations of the individual compounds and its mixtures with the following proportions: 25%DFB+75%PCA, 50%DFB+50%PCA e 75%DFB+25%PCA were evaluated in the presence and absence of soil.

The LC50-96h mixtures containing 25, 50 and 75% DFB was 15, 40 and > 100 mg/L respectively, the absence of soil. However, in the presence of soil it was 26, 45 and > 100 mg/L, respectively. These results suggest that the compounds may have suffered adsorption with soil particles increasing LC50-96h mixtures.

The isobolograms demonstrated a antagonistic effect for the mixture containing 75% DFB and synergism to 25% PCA in presence and absence of soil. The effect to the mixture containing 50% DFB was antagonism without soil and synergism with soil. The mixtures of compounds promoted different alterations on the enzyme activities. In the absence soil the mixture (1.5 mg/L) containing 75% PCA caused increases of 123% and 78% for ACP and CAT, respectively and a decrease of 62% for ALP. For the mixture (0.8 mg/L) containing 50% PCA it was observed an increase of 147% for ALP and a decrease of 43% for CAT.

For the mixture (2 mg/L) containing 25% PCA an increase of 47% was obtained for CAT. In the presence of soil, the mixture (1.5 mg/L) containing 75% PCA caused decrease of 40% and 50% for ACP and ALP, respectively. For the mixture (0.8 mg/L) containing 50% PCA it was observed an decrease of 10%, 15% and 33% for ACP, ALP and CAT, respectively. For the mixture (2 mg/L) containing 25% PCA an increase of 20% was obtained for ALP and decrease of 17% e 55% for ACP and CAT, respectively.

CONCLUSION

With these results it is concluded that: The enzymes studied were sensitive by exposure to DFB and PCA and may be used as biomarkers of water pollution resources by these compounds.

The use of DFB in aquaculture must be done carefully.

The soil interfere in the analysis of toxicity and the biochemical analysis

DFB and PCA were toxic for the test organisms, according to the acute toxicity assay.

Results may delineate chronic studies, such as bioconcentration, and also may be used to establish the maximum permissible limits of these compounds in aquatic environment.

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