

Deltamethrin-Induces Oxidative Stress to the Freshwater Ciliate Model: Paramecium tetraurelia

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Abstract : The problem of environmental contamination by the excessive use of organics cannot be neglected. Extensive application is usually accompanied with serious problems and health risk. It is established that many chemicals, in common use, can produce some toxic effects on biological systems through their mode of action or by production of free radicals that damage all cell compounds. Deltamethrin, a widely used type II pyrethroid pesticide, is one of the most common contaminants in freshwater aquatic system. In this study, we investigate the effects of deltamethrin exposure on the induction of oxidative stress to the freshwater ciliate *Paramecium tetraurelia*. After the treatment of paramecium cells with increasing concentrations of insecticide, we followed up the growth kinetics, generation time and the percentage response. Also, we studied the variation in biomarkers of stress such as: GSH content, GST, GPX and CAT activities. Our results showed a significant decrease in the proliferation of cells correlated by the decrease in generation number and the increase in generation time. Also, we noted an inhibition in the percentage response. The monitoring of biomarkers revealed depletion in GSH content in a proportional and dose dependent manner accompanied by an increase in the GST activity. In parallel, a strong induction in the CAT and GPX activities was noted specially for the highest dose. In summary, under the current experimental conditions, deltamethrin is highly toxic to the freshwater ciliate *Paramecium tetraurelia*. Exposure to low concentrations showed significant adverse on growth accompanied with the induction of oxidative damage supported by the decrease in GSH content and the intensification of the antioxidant enzymes.

Keywords : deltamethrin, *Paramecium tetraurelia*, growth, oxidative stress, biomarkers, antioxidant

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