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**Photo-altered toxicity of carbofuran on *Duttaphrynus melanostictus*
(Asian common toad) larvae**

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This study investigated the alteration of the toxic potential of a pesticide due to the exposure to natural solar radiation. This was tested using larvae of the Asian Common Toad, *Duttaphrynus melanostictus* (Schneider, 1799) and a commonly used carbamate pesticide carbofuran. In order to examine the effects of irradiation, a stock solution ($1000 \mu\text{g l}^{-1}$) of the commercial grade carbofuran (Curaterr 3G) was exposed to natural sunlight between 1000 - 1500 hrs on a sunny day with a clear sky (with an average UV index of 10). *D. melanostictus* tadpoles of Gosner stages 24-25 were housed in glass tanks and exposed to three concentrations (150 , 250 and $500 \mu\text{g l}^{-1}$) of irradiated carbofuran for four days (96 hrs), while controls with the same concentrations were conducted with the non-irradiated pesticide. The tanks were maintained in a room with no UV radiation. Each of the treatments and control were maintained in triplicate ($n=56$ tadpoles per treatment or control). Mortality was recorded at the end of the trial of four days whilst body length measurements and activity were recorded (in terms of swimming) on the initial and final day of the experiment.

The present study revealed that toxicity of carbofuran is markedly reduced by exposure to solar radiation. The mortality of the tadpoles exposed to $250 \mu\text{g l}^{-1}$ of non-irradiated carbofuran at the end of the trial (55.5 %) was significantly reduced to half (25.9 %) ($T = 6.05$; $P < 0.05$) as a result of irradiation of the pesticide before exposure of the tadpoles. The potential of carbofuran to cause growth impairments and retard activity of larvae were also reduced as a result of the exposure to solar radiation. The tadpoles exposed to $250 \mu\text{g l}^{-1}$ of irradiated carbofuran on the fourth day were significantly larger (5.4 ± 0.05 mm) than those exposed to non-irradiated carbofuran (4.8 ± 0.25 mm). The capacity to reduce the toxic potential through photo-irradiation was observed in all three tested concentrations of carbofuran. Hence, with regard to alterations in toxicity by photo-irradiation, this study has demonstrated that exposure to natural sunlight may in fact reduce harmful impacts of the pesticide making it less toxic to tadpoles.