

Carbendazim Toxicity and Ameliorative Effect of Vitamin E in African Giant Rats

Authors : A. O. Omonona, T. A. Jarikre

Abstract : Increase specialization in agriculture and use of pesticides may inadvertently cause ecosystem degradation and eventually loss of biodiversity. The populations of numerous wildlife species have undergone a precipitous decline. Many of these problems have been attributed directly to habitat loss and over exploitation resulting from unregulated pesticide uses. Carbendazim a broad spectrum benzimidazole fungicide and a metabolite of benomyl, is used to control plant disease in cereals and fruit. The effect of carbendazim exposure and the ameliorative effect of tocopherol (vitamin E) were assessed on African giant rat AGR. Hematological, biochemical and histological changes were used to determine the health condition of the animals exposed to pesticide. Sixteen AGR were stabilized, weighed and then divided into four experimental groups (A to D). Two groups were pretreated with vitamin. Group A was exposed to carbendazim only, B- carbendazim + vitamin, C- vitamin only, and D- blank (control). Packed cell volume PCV was estimated by the microhematocrit method, Leucocyte and Platelet counts were determined using the hemocytometric method. Cholinesterase (AChE) and markers of oxidative stress were quantified, and tissue changes examined microscopically. There were no behavioral changes observed in the animals, but there was a decrease in body weight and abortion after 23 days of exposure to carbendazim. There was significant differences in the packed cell volume, the hemoglobin concentration and the red blood cell counts ($p < 0.05$). The increases in malonyl aldehyde MDA was significant ($p < 0.05$) in the pesticide intoxicated rats compared to control. Vitamin E supplementation reduced MDA level significantly ($p < 0.05$). There was a sharp remarkable decrease in acetylcholinesterase levels in the pesticide intoxicated rats ($p < 0.05$). Vitamin E supplementation normalise the AChE levels comparable to that in control. Grossly, the vital organs appeared normal in the pesticide exposed and control groups except moderate pulmonary congestion. Microscopically, there was severe diffuse hepatocellular swelling in carbendazim exposed group. The severity of hepatocellular injury was reduced in the rats with vitamin E. This study ascertained the toxic effect of carbendazim and antioxidative properties of vitamins in the Africa giant rat.

Keywords : African giant rat, antioxidant, carbendazim, pesticides, toxicity

Conference Title : ICWERC 2015 : International Conference on Wildlife Ecology, Rehabilitation and Conservation

Conference Location : Paris, France

Conference Dates : April 27-28, 2015