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Dose dependent effect of deltamethrin on reproductive system impairment in Wistar rats

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Abstract

Deltamethrin is a synthetic pyrethroid insecticide used wideworld in agriculture, home pest control, protection of foodstuff, and disease vector control. Although initially thought to be least toxic, a number of recent reports showed its reproductive toxicity in mammalian and non-mammalian laboratory and wildlife animal species. The current study was performed to assess the dose dependent effect of deltamethrin on sex organ weight, fertility parameters, sex hormones, oxidative stress parameters and testes histology in male Wistar rats. Twenty four rats were divided in four groups (n=6/group). Group A served as normal control. Group B, C and D were administered with different doses (2 or 3 or 6 mg/kg corresponding to $1/30^{th}$ or 1/20th or $1/10^{th}$ of LD_{50}) of deltamethrin for 28 days. Study showed significant decline in weight of testes and epididymis, reduction in sperm count, sperm motility and enhancement in sperm abnormalities. In addition, serum testosterone (T), follicle stimulating hormone (FSH), leutinizing hormone (LH) level was significantly decreased. A significant decrease in glutathione (GSH), catalase (CAT), superoxide dismutase (SOD), glutathione S transferase (GST), glutathione reductase (GR), glutathione peroxidase (GPx) was also noted. Deltamethrin exposure showed a significant increase in lipid peroxidation (LPO) level. In histological examinations, ingestion of deltamethrin resulted in degeneration of seminiferous tubules and intertubular tissues, congested blood vessels with marked hemorrhage. The results indicated that deltamethrin at dose of 6mg/kg induces more damage as compare to 2mg and 3mg/kg. The study concluded that the reproductive toxicity of deltamethrin in male Wistar rats was dose dependent.

Biography

I have completed my PhD in 2002 from Dr BR Ambekar University, Agra Uttar Pradesh. Currently I am working as Assistant Professor in Department of Zoology Bundelkhand University, Jhansi Uttar Pradesh. I have published more than 32 papers in reputed journals and presented papers in national and International conferences. I have supervised 3 PhD and 14 M Phil students. I am working in the area of environmental toxicology and natural antioxidant. I have completed 02 research project funding received from CSIR (19 Lacs) and running 01 research project grant received from UGC (12.68 Lacs).