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Immunotoxicity of acephate in white leghorn chickens: Effects on lymphocytes and the immune responses in a sub-chronic exposure study

Syamantak Mani Tripathi^{1,4}, Y P Sahni⁴, Megha Kadam Bedekar^{2,4}, Prem Kumar G^{3,4}, Manohara C³, Shyamala R⁵ and B C Sarkhel⁴

¹Chhattisgarh Kamdhenu Vishwavidyalaya, India

²CAR, India

³Animal and Fisheries Sciences University, India

⁴Nanaji Deshmukh Veterinary Science University

⁵Kannur Medical College, India

Acephate, widely used insecticide in agriculture, is a common environmental contaminant. Although health effects of the acephate are documented, however developmental immunotoxic studies are scanty and need more attention. The present study was undertaken in day-old white leghorn chicks to assess immunotoxicity for subchronic exposure to acephate. The chicks were divided into five groups. Groups C1 and C2 served as plain control and vehicle control respectively. Chicks of groups T1, T2 and T3 were administered acephate suspended in groundnut oil at 21.3 mg/kg, 28.4 mg/kg and 42.6 mg/kg respectively orally for up to 60 days. All the chicks were vaccinated with Ranikhet disease virus (F-strain; RD-F) on days 1 and 30. During the course of study and at term, parameters of cellular and humoral immunity were determined. The live body weight gain, absolute and the relative weights of spleen, thymus and bursa of Fabricius, antibody response to RDF and delayed type hypersensitivity response to 2,4-dinitro-1-chlorobenzene or PHA-P were significantly reduced in the medium and extremely toxic treatment groups. The ability of lymphocytes proliferation in response to antigen RD-F and mitogen Con A was also significantly suppressed following subchronic exposure to acephate. Furthermore, histopathologically, bursa and spleen showed mild depletion of lymphocytes. It was concluded that subchronic acephate exposure at low concentrations may affect immune responses in avian species. Therefore, immunotoxicological effects should be considered when assessing the acephate risk to human and animal health.

Biography

Syamantak Mani Tripathi is an Assistant Professor in the Department of Veterinary Pharmacology and Toxicology, College of Veterinary Science and Animal Husbandry, Chhattisgarh Kamdhenu Vishwavidyalaya, Durg-491001 (Chhattisgarh) India. He has over six years experience with hand-on applications including teams of researchers and technicians in the Pharmacology & Toxicology and Biotechnology division. His training and experience also includes applied animal investigation skills as a research scholar in the field of pesticide induced immunotoxicology and safety pharmacology studies. He has worked in multiple successful research projects funded by Indian Council of Agricultural Research and Department of Biotechnology, Government of India, supporting clinical development and leading to strong regulatory submissions for pesticides uses in agriculture. His research program is focused on the study of immune response to pesticide and xenobiotics in avian model. He received his Bachelor's in Veterinary Science and Animal Husbandry from Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur (MP), India; Master's of Veterinary Pharmacology from Anand Agricultural University, Anand (Gujarat), India and his PhD in Veterinary Pharmacology and Toxicology from the Nanaji Deshmukh Veterinary Science University at Jabalpur (MP), India. His work contributes towards understanding the molecular mechanism of acephate toxicity in avian model; studying interleukin gene(s) associated with immunity and development of test series to study immunotoxicity. Memberships he has include the Indian Society of Toxicology, Indian Society of Veterinary Pharmacology and Toxicology.

vjt93@yahoo.com