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## Amelioration of sub-chronic acephate induced immunotoxic effects by *Achyranthes aspera* and *Phyllanthus niruri* in white leghorn cockerels

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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. Medicinal plants, since times immemorial, have been used virtually in all cultures as a source of medicine for altering the immune systems. A group of medicinal plant including Apamarg (*Achyranthes aspera*) and BhuiAmla (*Phyllanthus niruri*) growing in India were examined for their immunomodulatory effect in White Leghorn cockerels. The present study was undertaken in day-old white leghorn cockerels to assess immunotoxicity for subchronic exposure to acephate. The chicks were divided into nine 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. Chicks of groups T1+Aa, T2+Aa, T3+Aa, T1+Pn, T2+Pn and T3+Pn were administered acephate together with extract of two medicinal plants *A. aspera* and *P. niruri* extract suspended in groundnut oil at 21.3 mg/kg+Aa (1ml), 28.4 mg/kg+Aa (1ml) and 42.6 mg/kg+Aa (1ml), 21.3 mg/kg+Pn (1ml), 28.4 mg/kg+Pn (1ml) and 42.6 mg/kg+ Pn (1ml) respectively orally for 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 RDE, 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. No significant alteration in the live body weight gain, absolute and the relative weights of spleen, thymus and bursa of Fabricius, antibody response to RDE, delayed type hypersensitivity response to 2,4-dinitro-1-chlorobenzene or PHA-P, the ability of lymphocytes proliferation in response to antigen RD-F and mitogen Con A and histopathology of bursa and spleen were observed in the birds concurrently exposed to acephate and *A. aspera* and *P. niruri*. Therefore, immunotoxicological effects should be considered when assessing the acephate risk to human and animal health. It was concluded that subchronic acephate exposure at low concentrations may affect immune responses in avian species. Furthermore, the immunotoxicity induced by acephate could be efficiently ameliorated by *A. aspera* and *P. niruri*.

### 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 academic work was focused on "Immuno-genotoxicity of organophosphorous insecticide 'acephate' in white leghorn birds". 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. He has Memberships included in the Indian Society of Toxicology, Indian Society of Veterinary Pharmacology and Toxicology.

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