

4th International Conference on

Epidemiology & Public Health

October 3-5, 2016 | London, UK

ACUTE HEALTH EFFECTS AND IMMUNOSUPPRESSION UPON SUB-CHRONIC EXPOSURE TO ACEPHATE ON INDIAN SMALL-SCALE VEGETABLE AND FRUIT GROWERS

Syamantak Mani Tripathi^a, Megha Kadam Bedekar^a, Ragini Hazari^a, Prem Kumar G^a, Shyamala R^b, Vinay K. Pandey^c, Aniruddh Singh Sengor^d and Rajesh K. Sharma^a

^aNanaji Deshmukh Veterinary Science University, India

^bKannur Medical College, India

^cInternational Traceability System, India

^dApollo College of Veterinary Medicine, India

Acephate and its metabolite methamidophos are common organophosphorus insecticide used for crop protection. High uses of acephate and methamidophos have induced health issues and environmental pollution. Their undesired presence in the environment is creating Ecotoxicology and may harm human health. It is therefore essential to detect the presence of acephate even in trace level its effect on environmental and public health. This study aimed to investigate the toxic effects of long-term, low-dose acephate administration on white Leghorn birds. A total of 150 white Leghorn birds was randomly assigned to different groups: control; vehicle control; low-dose acephate (21.3 mg kg⁻¹bw⁻¹); middle-dose acephate (28.4 mg kg⁻¹ bw⁻¹); and high-dose acephate (42.6 mg kg⁻¹ bw⁻¹). The birds continuously received acephate via drinking water for 24 weeks. Bird blood plasma samples were collected at different time points to measure haemato-biochemical and immunological profiles. Liver, bursa of Fabricius and spleen tissues were subjected to histopathological examination. There was a significant decrease in the live body weight and total leukocyte count, anti-Newcastle Disease Virus (NDV) antibody titer, serum total protein (TP), serum globulin, serum albumin and organ:body weight ratios of immune organs. The delayed type hypersensitivity response to 2,4-dinitro-1-chlorobenzene (DNCB) was significantly reduced. Histopathologically, bursa and spleen showed mild depletion of lymphocytes. Furthermore, DNA fragmentation assay was performed and detected a ladder pattern (180 bp) in DNA. These results provided a basis for concern over farm workers being overexposed during application. Workers exposed to acephate (n=150) were drawn from a population of vegetable and fruit farmers of about 50 districts of Madhya Pradesh, India. They were interviewed on symptoms and personal protection, and their erythrocyte acetylcholinesterase (AChE) activity was determined during both spraying and nonspraying periods. AChE activities during spraying and nonspraying period were comparable. The prevalence of cough, headache, abdominal pain, excessive sweating, nausea, excessive salivation, diarrhea, and vomiting differed non-significantly between spraying and nonspraying periods. There was no suggestion of decreased AChE in exposed subjects who complained of acephate related symptoms compared to symptomless exposed subjects. Use of gloves, long boots, head cover and face cover was significantly associated with AChE activity. No marked AChE depression was found during spraying season, which may explain the lack of association between symptoms and AChE. The fact that only moderately toxic acephate was used may indicate that toxicity was not sufficiently high to cause depression. Experience, however, suggests that occupational poisoning remains a potential serious danger in vegetable and fruit cultivation in India. It was concluded that subchronic acephate exposure at medium and high concentrations may affect immune responses in avian species and human health.

Biography

Syamantak Mani Tripathi is an Assistant Professor in the Department of Veterinary Pharmacology and Toxicology, College of Veterinary Science and Animal Husbandry, India. He has over six years experience with hand-on applications including teams of researchers and technicians in the Pharmacology & Toxicology and Biotechnology division. 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 Ph.D. in Veterinary Pharmacology and Toxicology from the Nanaji Deshmukh Veterinary Science University at Jabalpur (MP), India.

vjt93@yahoo.com