

Induced Acetamiprid Toxicity in Mice: A Review

Tej Bahadur Singh¹, Sunit Kumar Mukhopadhyay^{1*}, Tapas Kumar Sar² and Subha Ganguly^{3*}

¹Department of Veterinary Pathology, West Bengal University of Animal and Fishery Sciences, Kolkata, West Bengal 700 037, India

²Department of Veterinary Pharmacology & Toxicology, Faculty of Veterinary & Animal Sciences, West Bengal University of Animal and Fishery Sciences, Kolkata, West Bengal 700 037, India

³AICRP-PHT (ICAR), Department of Fish Processing Technology, Faculty of Fishery Sciences, West Bengal University of Animal and Fishery Sciences, Kolkata, West Bengal 700 094, India

Summary

Acetamiprid induces decrease in body weight and clinical symptoms like respiratory depression, sitting in the corner, diarrhea, depression, dullness etc. in mice at the different dose levels (considering the LD50 value). Test mice administered with acetamiprid show significant decrease in overall hematological profile. Acetamiprid at a particular safe dose level can be considered non-toxic to the experimental animal.

Keywords: Acetamiprid; LD50 value; Mice

Introduction

Acetamiprid, a member of the neonicotinoid group of insecticide is highly effective for the controlling aphids, beetles, moth, leafhopper, pests on crops and leafy vegetables, along with fleas infesting livestock and pet animals. It is a systemic insecticide with translaminar action which has a contact and stomach action. Moreover, acetamiprid being highly water soluble indicates a high potential for the compound to leach in soil or to run off in surface water. Acetamiprid group of insecticides are the most highly effective and largest selling insecticides worldwide for crop protection [1]. Therefore, the relative risks and benefits of this insecticide must be compared to existing pesticide. Although, acetamiprid is highly used in India and abroad but there are still many doubts related to its toxicity and health hazards.

Exposure of animals and birds to insecticides for a short duration induces a state of stress leading to decrease in production and behavioral as well as biochemical changes [2]. The continuous use of pesticide imposes hazardous effect on the physiological function of various body systems [3]. Human and animal are exposed to low level of pesticide residues in air, water and food chain.

The need for higher agricultural production as one of the prerequisites for improving the population's standard of living involves the use of various chemicals. Pesticides to prevent losses of cultivated plant, food and feedstuff stress. However, large scale use of pesticides has brought about many problems. In this way thousands of tons of chemical compounds often very toxic or with other properties, are in current use.

It is in view of paucity of information available on acetamiprid toxicity regarding its biochemical alterations in mice; the present article was constructed to review the extent of induced acetamiprid toxicity at different dose levels and its effect on different physiological parameters.

Effects of Toxicity on Physiological Parameters

Body weight

There is dose dependent significant decrease in body weight of male mice when treated with acetamiprid [4] and their mixtures with lead acetate and cadmium acetate. Zhang et al. [1] also observed similar effect in male mice treated with acetamiprid. However, in male wistar rats treated with imidacloprid reported no effect on body weight in all treated groups [5].

Clinical signs

The clinical signs like respiratory depression, profuse salivation, smacking were also observed by Mondal [6] in female rats given orally acetamiprid. The clinical signs observed in the present study were also observed by [5] and Bhardwaj et al. [7] in wistar rats given imidacloprid orally.

Hematological studies

A significant decrease in total leukocyte count (thousands/cu.mm) was observed by Mondal et al. [8] in female rats after oral administrations of acetamiprid. However, El – Shahawy et al. [4] in male albino mice after sublethal doses of acetamiprid, lead acetate, and cadmium acetate observed increase in white blood cells. However Bhardwaj et al. [7] found no changes in WBC after oral administrations of imidacloprid at various dose levels for 90 days.

Biochemical studies

Mondal [6] performed oral administration of acetamiprid to female wistar rats; Chakraborty [9] found a significant shift in the blood biochemical parameters in acetamiprid oral administration in goat. Zhang et al. [1] confirmed significant increase in activity of serum Alanine transaminase (ALT) of male mice in acetamiprid toxicity. Bhardwaj et al. [7] reported elevation in GPT in imidacloprid toxicity in female rats. The present findings of increase in the value of AST was in agreement with the findings of Bhardwaj et al. [7] in female rats following administration of Imidacloprid and Zhang et al. [1] in male mice following administrations of acetamiprid. Increase in Alkaline phosphatase value was also reported by other workers such as

***Corresponding authors:** Sunit Kumar Mukhopadhyay, Department of Veterinary Pathology, West Bengal University of Animal and Fishery Sciences, Kolkata, West Bengal 700 037, India, E-mail: skmpath@gmail.com

Subha Ganguly, AICRP-PHT (ICAR), Department of Fish Processing Technology, Faculty of Fishery Sciences, West Bengal University of Animal and Fishery Sciences, Kolkata, West Bengal 700 094, India, E-mail: ganguly38@gmail.com

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acetamiprid toxicity in female rats [8], acetamiprid in male mice Zhang et al. [1], dichlorovos in male mice [10]. The increase in ALP usually occurred due to its increased synthesis due to damaged liver conditions [11]. Elevated plasma ALP might be due to acute hepatocellular damage and destruction of epithelial cells in gastrointestinal tracts [12].

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