BIOMARKERS FOR NEONICOTINOID INSECTICIDES TOXICITY IN EXPOSED RATS

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Abstract: In recent years, various environmental problems and substantial hazard to the public have led to an increased concern about potential toxicity from exposure to pesticides. The neonicotinoid insecticides are neurotoxins that act as agonists of insect nicotinic acetylcholine receptors and are lethal through disruption of the insect nervous system, and effective against many insects. Imidacloprid (belongs to the nitro-containing neonicotinoids) is the first member of this family and acetamiprid (a cyano-containing neonicotinoids) belongs to second generation of the nicotinoids and has a broad-spectrum insecticide effect against several groups of insects. The insecticide has an ingestion and stomach action and has a strong osmotic and systemic action. The aim of the study is to explore the potential toxicity of Imidacloprid and acetamiprid exposure in albino rats using biochemical markers such as acetylcholinesterase EC3.1.1.7 (AChE), cytochrome P450 monooxygenases EC1.14.14.1 (CP450), glutathione-S-transferases EC2.5.1.18 (GST). The hematological parameters, white blood cells (WBCs), red blood cells (RBCs), hemoglobin (HGB), clotting time (HCT), mean corpuscular volume (MCV) , mean corpuscular hemoglobin (MCH), mean corpuscular Hemoglobin concentration (MCHC), platelets (PLTs) were counted. Acute toxicity study was performed on adult female white rats. One dose of 14.6 mg a.i. (acetamiprid) or 45 mg a.i. (imidacloprid) / kg body weight in distilled water was orally administered through gavage to each animal. The administered doses were corresponding to 1/10 the LD50 of each compound. Serum, plasma, liver and brain samples were taken 6, 12, 24 and 48 hours post treatment .Changes in enzyme activities and the hematological parameters correlated to the insecticides exposure were recorded and the results were discussed.

Key words: neonicotinoid insecticides, exposure, rats, acute toxicity, biomarkers.