Estimation of Bone Marrow DNA Damage Induced by Lambda cyhalothrin and Dimethoate Insecticides using Alkaline Comet Assay

Doha Yahia1, Marwa F. Ali2, Doaa S. Abd El-Maguid3

Abstract:

Dimethoate (DM) and Lambda cyhalothrin (LCT) are commonly used insecticides. Human being and farm animals are expected to have acute toxicity. The present work aimed to explore the effect of acute exposure to DM and LCT on hematological parameters and to detect DNA damage in bone marrow of Sprague Dawley rats using the alkaline single cell gel electrophoresis assay (comet assay). Thirty animals were divided into three groups of ten rats each. LCT group administered 26 mg/kg body weight, DM group administered 103 mg/kg body weight orally for 24 and 48 hours, while the control group received the vehicle only. Blood samples were collected for hematological analysis, bone marrow was flushed from the femur bone for comet assay and spleen samples were preserved in formalin for histopathological examination. Results showed minor changes in blood profile in all exposed groups associated with mild changes in histology of spleen tissue. Alkaline single cell gel electrophoresis assay in bone marrow cells showed that LCT and DM caused extensive and severe DNA damage after 48 h exposure expressed as significant increases in all comet parameters (% DNA in tail, tail length, tail moment and Olive tail moment). The results concluded that LCT and DM induced DNA damage in bone marrow of rats, LCT showed higher degree of DNA damage in comparison with DM.

Keywords:

Lambda cyhalothrin, Dimethoate, DNA damage, Bone marrow; Spleen, Blood

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