Abstract

Tartrazine is one of the azo colourants used in many foodstuffs as artificial dye worldwide. It is being excessively used in many developing countries without strict regulations. The main objective of the study was to evaluate the effect of tartrazine on the liver and spleen of mice and investigate the possible recovery role after its withdrawal with Riboflavin in mice. Twenty-four adult albino mice were equally divided into three groups, i.e., Control Group (given water only), dose group TAZ I (orally administered 135 mg/kg BW, Tartrazine for 30 days), and dose group TAZ II (orally administered 135 mg/kg BW Tartrazine and 2mg/kg BW Riboflavin for 30 days). Blood extracted from the treated group was subjected to analyze lipid and protein profile, stress markers, and risk factors. The specimens of the liver and Spleen were removed after dissection and processed for morphological, morphometric and histological study.

Tartrazine-treated group TAZ I (135 mg/kg BW, Tartrazine) showed an evident ($p<0.001$) increase in body and organ weights (Liver & Spleen) as compared to the control group, whereas significant ($p<0.001$) decrease in body and organ weights (Liver & Spleen) were observed in dose group TAZ II (135 mg/kg BW Tartrazine and 2mg/kg BW Riboflavin) in comparison with mice of dose Group TAZ I (135 mg/kg BW, Tartrazine). Blood analysis of dose group TAZ I (135 mg/kg BW, Tartrazine) showed a significant ($p<0.001$) increase in protein profile (albumin, globulin, bilirubin, A/G ratio, and complete proteins, MDA, cholesterol, triglycerides, total lipids, hepatic enzymatic activities (ALP, ALT, and AST), GAMMA GT and risk factor, while significant ($p<0.001$) decrease in GHS, lipid profile, i.e., LDL, HDL, vLDL and Globulin in comparison to control group. Dose Group TAZ II (135 mg/kg BW Tartrazine and 2mg/kg BW Riboflavin) showed significant recovery of hepatic

toxicity in lipid & protein profile, enzymatic activities, and risk factor as compared to the mice of dose group TAZ I (135 mg/kg BW, Tartrazine).

Histological analysis of dose group TAZ I (135 mg/kg BW, Tartrazine) showed some abnormalities in the Spleen of mice like parenchymatic cells with an increased number of megakaryocytes, vacuolated cytoplasm, and irregular nuclei, thickening in capsule, destruction of marginal zone, red pulp and white pulp, and vacuolated chief cells with pyknotic nuclei were detected in spleen tissues of mice. Similarly, Liver histology of dose group TAZ I (135 mg/kg BW, Tartrazine) showed defects like dilated sinusoids space, congested blood vessels, degenerated Kupfer cells, increased number of micro and macro steatosis, lipid droplets, thickening in the walls of central arteries, hepatocyte, bile duct hyperplasia, inflammatory cells infiltrations, and aggregated binuclear cells. Whereas spleen and liver tissue of dose group TAZ II (135 mg/kg BW Tartrazine and 2mg/kg BW Riboflavin) showed recovery and regeneration as treated with Riboflavin.

It is concluded that Tartrazine in excess leads to impairment in vital organs of albino mice, causing abnormalities in blood parameters and hepatic and splenic toxicity. Supplementation with Riboflavin was more efficient in minimizing toxicity in body organs and other blood parameters.