

Abstract

The plant species *Melia azedarach*, more generally referred to as the Chinaberry tree, has a lengthy history of utilization in ancient healing methods. The primary purpose was to examine the phytochemical composition of *Melia azedarach* and assess its potential toxicological effects. The research utilized phytochemical analysis to determine the phytochemical components present in *Melia azedarach*. The initial results indicated the existence of alkaloids, flavonoids, saponins, and tannins. The methanolic extract of *Melia azedarach* leaves was prepared and administered orally to experimental animals. Following the toxicological evaluations, both acute and chronic toxicity studies were undertaken to investigate the potential negative impacts linked to *Melia azedarach* leaves. The findings from acute toxicity experiments revealed the LD₅₀ as 3.7 g/Kg, it is suggested that it's important to exercise caution when utilizing products produced from *Melia azedarach*. The chronic toxicity evaluations have revealed that there were no significant changes in body weights whereas the hematological parameters such as erythrocytes, platelets and hematocrit values did not change significantly while leukocyte counts were significantly increased and hemoglobin levels were significantly decreased due to the presence of alkaloids and tannins. The biochemical parameters such as glucose levels were increased significantly due to the presence of meliacin, cholesterol and creatinine levels were also significantly different due to the presence of meliatoxins. Liver function markers (ALP, SGOT and SGPT) and total bilirubin levels were increased significantly. These findings highlighted the adverse effects of prolonged exposure of *Melia azedarach* leaves on glucose metabolism, lipid profile, kidney and liver functions and require further investigation for clinical implications. Histopathological findings indicated liver damage with sinusoidal congestion and hepatocyte swelling in both groups. Kidney damage, characterized by cellular swelling and tubular epithelial cell alterations, was observed in the 400 mg/Kg MaMe group, while heart and brain tissues displayed no significant alterations. Further studies are required to investigate its genotoxicity, fetotoxicity along with demonstration.