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Title: Biochanin A Protects against Acute Carbon Tetrachloride-Induced Hepatotoxicity in Rats

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Abstract: Biochanin A (BCA) is an isoflavone found in red clover possessing multiple pharmacological activities including antimicrobial, antioxidant, and anticancer ones. The present study aimed to assess its hepatoprotective potential at different doses in a carbon tetrachloride (CCl4)-induced hepatotoxicity model in rats. The effects on hepatic injury were explored by measuring serum levels of alanine aminotransferase, aspartate aminotransferase, and alkaline phosphatase. Furthermore, the serum levels of glucose, urea, creatinine, total bilirubin, total proteins, triglycerides, and total cholesterol were determined. The metabolic capacity of the liver was assessed by measuring changes in cytochrome P450 2E1 activity. The underlying mechanisms were substantiated by measuring oxidative stress markers as catalase, superoxide dismutase, glutathione peroxidase, glutathione transferase, glutathione reductase, reduced glutathione, total antioxidant capacity, and lipid peroxidation, as well as inflammation markers such as nitric oxide, inducible nitric oxide synthase, cyclooxygenase2, tumor necrosis factor-alpha, and leukocyte-common antigen. The results were confirmed by histopathological examination, and the median lethal dose was determined to confirm the safety of the drug. BCA successively protected against CCl4-induced damage, normalizing many parameters to that of the control group. The study indicates that BCA possesses multimechanistic hepatoprotective activity that can be attributed to its antioxidant, anti-inflammatory, and immunomodulatory actions.

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