World Academy of Science, Engineering and Technology
International Journal of Biotechnology and Bioengineering
Vol:18, No:01, 2024

Hepatoprotective Effect of Ethyl Acetate Fraction of Ficus carica L. Leaves against Carbon Tetrachloride-Induced Toxicity in vitro and in vivo

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Abstract : Background: Liver diseases cause serious health issues. Plants contain active compounds that significantly help in the treatment of various diseases. Ficus carica is traditionally used for the treatment of liver diseases. The purpose of the present study was the isolation and identification of active components from F.carica leaves which are responsible for hepatoprotective activity. Methods: The study was designed to identify the most active hepatoprotective sub-fraction from ethyl acetate fraction of Ficus carica by in vitro study and evaluation of its in vivo hepatoprotective effect in animal models. Ethyl acetate fraction was subjected to column, and a total of eight sub-fractions were obtained. In vitro, the hepatoprotective effect of all sub-fractions was determined on HepG2 cell lines. Toxicity was induced by CCl_4 (Carbon tetrachloride), and silymarin was used as a positive control. On the basis of the results, the most active sub-fraction was subjected to LC-MS and FT-IR analysis for the identification of bioactive compounds. In vivo, the hepatoprotective effect was determined in mice. Toxicity was induced by CCl_4; at the end of the experiment, biochemical parameters such as ALT, AST, ALP, bilirubin, and total protein were estimated in serum. Histopathology of liver tissues was also done. Results: Sub-fraction FVI exhibited significant ($P<0.05$) hepatoprotective activity as compared to other sub-fractions, which was almost similar to the standard drug silymarin. Six known bioactive compounds were identified from this sub-fraction after LC-MS analysis. In vivo, the hepatoprotective activity of sub-fraction FVI was evaluated in CCl_4-induced toxicated mice. Administration of CCl_4 significantly increased level of ALT (Alanine transaminase), AST (Aspartate aminotransferase), ALP (Alkaline phosphatase), and bilirubin and decreased the total protein. Treatment with sub-fraction FVI significantly ($p<0.05$) reversed the level of these biomarkers toward normal at both doses of 25 mg/kg and 50 mg/kg. Conclusion: Our findings confirmed the hepatoprotective effect of ethyl acetate fraction of F.carica. It could be a good candidate for the development of a natural hepatoprotective drug; pre-clinical investigation on ethyl acetate fraction is recommended.

Keywords : Ficus carica, hepatoprotective, CCl_4, bioactive compounds, liver markers
Conference Title : ICPPAA 2024 : International Conference on Phytochemistry, Pharmacognosy and Advanced Applications
Conference Location : Istanbul, Türkiye
Conference Dates : January 29-30, 2024