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Bioactivities and Phytochemical Studies of Acrocarpus fraxinifolius Bark Wight and Arn

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Abstract : Acrocarpus is a genus of flowering plants in the legume family Fabaceae which considered as a large and economically important family. This study aimed to investigate the phytoconstituents of the petroleum ether extract (PEE) of Acrocarpus fraxinofolius bark by Gas chromatography coupled with mass spectrometry (GC/MS) analysis of its fractions (fatty acid and unsaponifiable matter). Concerning this, identification of 52 compounds constituting 97.03 % of the total composition of the unsaponifiable matter fraction. Cycloeucalenol was found to be the major compound representing 32.52% followed by 4a, 14a-dimethyl-A8~24(28)-ergostadien (26.50%) and ß-sitosterol(13.74%), furthermore Gas liquid chromatography (GLC) analysis of the sterol fraction revealed the identification of cholesterol (7.22 %), campesterol (13.30 %), stigmasterol (10.00 %) and β - sitosterol (69.48 %). Meanwhile, the identification of 33 fatty acids representing 90.71% of the total fatty acid constituents. Methyl-9,12-octadecadienoate (40.39%) followed by methyl hexadecanoate (23.64%) were found to be the major compounds. On the other hand, column chromatography and Thin layer chromatography (TLC) fractionation of PEE separate the triterpenoid: 21β-hydroxylup-20(29)-en-3-one and β- amyrin which were structurally identified by spectroscopic analysis (NMR, MS and IR). PEE has been biologically evaluated for 1: management of diabetes in alloxan induced diabetic rats 2: cytotoxic activity against four human tumor cell lines (Cervix carcinoma cell line[HELA], Breast carcinoma cell line [MCF7], Liver carcinoma cell line[HEPG2] and Colon carcinoma cell line[HCT-116] 3: hepatoprotective activity against CCl4-induced hepatotoxicity in rats and the activity was studied by assaying the serum marker enzymes like AST, ALT, and ALP. Concerning this, the anti-diabetic activity exhibited by 100mg of PEE extract was 74.38% relative to metformin (100% potency). It also showed a significant anti-proliferative activity against MCF-7 (IC50= 2.35µg), Hela(IC50=3.85µg) and HEPG-2 (IC50= 9.54µg) compared with Doxorubicin as reference drug. The hepatoprotective activity was evidenced by significant decrease in liver function enzymes, i.e. AST, ALT and ALP by (29.18%, 28.26%, and 34.11%, respectively using silymarin as the reference drug, compared to their concentration levels in an untreated group with liver damage induced by CCl_4. This study was performed for the first time on the bark of this species.

Keywords : Acrocarpus fraxinofolius, antidiabetic, cytotoxic, hepatoprotective
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