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V.CHITRA

ABSTRACT

India is one of the richest sources of medicinal and aromatic plants, endowed with a diversity of agro climatic conditions and is virtually a Botanical Garden of the world. India is contributing about 75% of the medicinal needs of the world countries. The medicinal benefits of herbs have been known for centuries. Records of Indian medical practices show that herbs were used extensively to cure practically every known illness. Ancient literature also mentions herbal medicines for age-related diseases namely memory loss, osteoporosis, diabetic wounds, immune and liver disorders, etc. for which no modern medicine or only palliative therapy is available. It is increasingly being realized that many of today's diseases are due to the “oxidative stress” which then contribute to cancer, atherosclerosis, cardiovascular diseases, ageing, liver disorders, diabetes and inflammatory diseases.

Taking these views into consideration an extensive survey of medicinal plants of India was carried out and an Indian medicinal plant *Limonia acidissima*, Family: Rutaceae which is popularly called as Wood apple or Elephant apple was selected for the present research work to screen for hepatoprotective, antidiabetic, wound healing, anticancer and antioxidant properties and to isolate phytochemical constituents.

Fruits of *Limonia acidissima* (LA) were purchased from local market in Chennai and authenticated and separated into pulp and shell. The coarsely powdered fruit pulp was then subjected to extraction with hexane

followed by methanol using soxhlet apparatus. The resulting extract was thereafter utilised for phytochemical and pharmacological screening.

A preliminary phytochemical screening was carried out for the methanolic extract by standard testing procedures. Acute toxicity study was carried out for the methanolic extract according to the OECD guidelines 423. The methanolic extract (200 and 400 mg/ kg) p.o. was then screened for its effectiveness against CCl₄ induced hepatotoxicity for a period of 10 days by analysing various parameters such as Aspartate Amino Transaminase (AST), Alanine Amino Transaminase (ALT), Alkaline Phosphatase (ALP), Triglycerides (TG), Total Cholesterol (TC), Bilirubin, Reduced glutathione (GSH), Superoxide Dismutase (SOD), Catalase (CAT), Total Protein (TP) and Gamma Glutamyl Transferase (GGT) levels. A portion of the autopsied liver was subjected to histopathological studies.

Diabetes was induced by injecting 120 mg/kg i.p of alloxan to the experimental animals for first two days. Afterwards, the extract (200&400 mg/ kg) was given for a period of 21 days p.o. On 21st day, glucose level was measured as well as at every week end and antioxidant enzyme levels were measured finally in pancreatic homogenate. A portion of the autopsied pancreas was subjected to histopathological studies.

Adult male Swiss albino mice were utilized for anti-cancer activity and were inoculated (i.p.) with DAL Cells of 2×10^6 cells/mouse for cancer induction and the extract (200&400 mg/ kg) was given for a period of 14 days i.p. On day 15, the effect of methanolic extract on tumor growth and host's

survival time were examined by studying the parameters like hematological counts, tumor volume, tumor cell count, viable tumor cell count, nonviable tumor cell count, mean survival time and increase in life span.

For the assessment of the wound healing activity, excision, incision and dead space wound models were used. Skin breaking strength was measured on the 14th day for incision model. Wound closure and epithelization time were studied on 4th, 8th, 12th, 16th, 20th and 21st days till the occurrence of complete re- epithelization for excision model. In the dead space wound, the breaking strength of the granulation tissue was measured. The granulation tissue was dried in an oven at 60°C overnight and the dry weight was noted. Acid hydrolysate of the dry tissue was used for the determination of the hydroxyproline content and antioxidant enzymes like SOD and Catalase. A part of the granuloma tissue was subjected to histopathological studies.

Hence the methanolic extract was found to be active in its pharmacological effects, the phytochemical investigation was subjected to the methanolic extract to isolate and identify the constituents present in the extract. Two compounds were isolated from the methanolic extract and were screened for its antioxidant potential by DPPH method, anti-cancer activity by MTT assay upon lung carcinoma cells and proved to be active against cancer and oxidant status.

The present study may be concluded that the methanolic extract of fruit pulp as well as the two compounds isolated from *Limonia acidissima* has

potent antioxidant property which was confirmed by its hepatoprotective, wound healing, anticancer and anti diabetic activity in which the antioxidant status was also proved which was comparable with that of the reference drugs taken for comparison.