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Evaluation of antiulcer activity of root and leaf extract of P*olyscias balfouriana* var.marginata

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Abstract

Polyscias Balfouriana is an ornamental plant which belongs to the family Araliaceae. The plant is a bushy shrub with glossy green coloured leaves with white margins. The chemical nature of the active principles is high content of triterpenoid saponins. The family and the chemical nature of this plant are same as that of Panax Ginseng. Since ginseng is well established for its anti stress property, it was used as the standard drug for evaluating the anti ulcer activity. Ulcer was induced by physical and chemical method. The leaf and root extract was given in two different concentrations of 250mg/kg and 500mg/kg body weight. It was observed that the leaf extract of 500mg/kg body weight showed better anti ulcer activity.

Key Words: Antiulcer activity, *Polyscias Balfouriana.*

Introduction

The state of stress of any nature produces a non-specific state in any living organism[1]. This state of stress syndrome is characterized by adrenal hypertrophy, depletion of adrenal ascorbic acid and cortisol[2]. Any potentially damaging stimulus or stressor induces the secretion of adrenal corticosteroids and catecholimines and produces gastrointestinal lesions. The changes observed in the stress syndrome have been explained on the basis of hypothalamo-hypophyseal-

adrenal axis[3].The present study aims at the anti ulcer activity of *Polyscias Balfouriana* an ornamental plant belonging to the family Araliaceae which can also be said as 'ginseng family'. Hence these plants are also known as 'aralias' in trades and horticulture. Some of the synonyms of the plant are Dinner plate Aralia, Scutellarium and *Balfour Polyscias*. *Polyscias Balfouriana* is a woody, bushy shrub in habitat. They grow to a height of 8m.the leaves are leathery coarsely toothed glossy green with white margins. Since Panax ginseng has been well established for anti stress/ anti ulcer activity and belongs to the same family it was selected as standard. The chemical nature of the active principles in this plant was found to be similar to that of ginseng.

Materials and Methods

All chemicals and reagents used in this study were of analytical grade. The plants *Polyscias Balfouriana* was collected from Tamil Nadu agricultural University Coimbatore. The fresh leaves and roots were extracted for 72 hours with 70%ethanol by hot continuous extraction using soxhlet apparatus. The extracts obtained were concentrated under vacuum distillation below 60^{o}C.They were diluted with water and further extracted with chloroform to remove the lipid materials. The water extracts left behind were extracted with ethyl acetate and then with n-butanol. The n-butanol layers were separated and evaporated to dryness to give the crude saponin extracts. This was designated as NBS extract.

Preliminary chemical studies

In the preliminary chemical tests the NBS extract shows highly positive results for triterpenoid, saponins and gave good colour reactions for Salkowsky test and Liebermann burchard test[4].

Acute toxicity study

The acute toxicity study was carried out by the method of Smith (1960) in Wistar albino rats[5].

Immobilization stress ulceration

Wistar albino rats of either sex weighing between 75-100g were used for the screening. They were divided into 7 groups of 5 animals each. Then the animals were marked for their identity and left for overnight starvation. Animal group I-IV received NBS extract of root and leaf of *Polyscias Balfouriana* dissolved in 1% CMC at doses of 250mg/kg and 500mg/kgbody weight. Animal groups V and VI received root powder of white Panax ginseng. Animal group VII received 1% CMC. The physical stress for one set rats were induced by tying the limbs of the rats upside down to a wooden board for a period of 5 hrs[6-8].

Chemical stress was induced to another set of rats by oral administration of aspirin at a dose of 200mg/kg body weight. After 5hrs all the animals were killed using anesthetic ether and opened the abdominal cavity and the stomach was excised. The excised stomach was opened along the greater curvature and cleaned the interior by normal saline and examined for the degree of ulceration. The ulcerogenic indices were determined according to the pattern shown in Table 1.

Table No. 1: Determination of ulcerogenic indices

Type of ulcer	Score
Minute sporadic punctuate lesion	0.5
Hemorrhagic strokes	1.0
One lesion of large extension or multiple moderate size lesions	2.0
Several large lesions	3.0

The ulcer indexes of each group animals were calculated using the formula:

(UI /10)+ (Avg ulcer/group) + (Avg ulcer /stomach)

Where UI = ulcer incidence

The values obtained for the test was compared with the control values. The results obtained for both the chemical stress induced ulcers and physical stress induced ulcer are tabulated in the Table no. 2 and 3 respectively.

Table No. 2: Chemical stress induced ulcer

Animal group	Drug	Dose (mg/kg) oral	Aspirin	Average ulcer/stomach	Average severity of ulcer/group	Ulcer incidence/group	Ulcer index
Group1	PBML	250mg/kg	200mg/kg	3.5	0.7	53.84	9.584
Group2	PBML	500mg/kg	200mg/kg	2.5	0.5	38.46	6.846
Group3	PBMR	250mg/kg	200mg/kg	4.0	0.8	61.53	10.953
Group4	PBMR	500mg/kg	200mg/kg	3.0	0.6	46.15	8.215
Group5	Ginseng	250mg/kg	200mg/kg	2.5	0.5	38.46	6.846
Group6	Ginseng	500mg/kg	200mg/kg	2.0	0.4	30.76	5.476
Group7	2%CMC	2ml	200mg/kg	6.5	1.3	100	17.8

PBML- *Polyscias Balfouriana* Marginata leaf extract; PBMR- *Polyscias Balfouriana* Marginata root extract

Table No. 3: Physical stress induced ulcer

Animal group	drug	Dose (mg/kg) Oral	Average ulcer/ stomach	Average severity of ulcer/group	Ulcer incidence/ group	Ulcer index
Group1	PBML	250mg/kg	3.0	0.6	50	8.6
Group2	PBML	500mg/kg	2.0	0.4	33.33	5.73
Group3	PBMR	250mg/kg	3.5	0.7	58.33	10.03
Group4	PBMR	500mg/kg	2.5	0.5	41.66	7.16
Group5	Ginseng	250mg/kg	2.5	0.5	41.66	7.16
Group6	Ginseng	500mg/kg	1.5	0.3	25.00	4.3
Group7	1%CMC	2ml	6.0	1.2	100	17.2

Results and Discussion

The main aim of the present study was to evaluate anti-ulcer activity of *Polyscias Balfouriana* leaf and root by keeping Ginseng as the standard drug of choice. The reason behind this was both the plants belong to the same family and the chemical nature of the constituents was same. Leaf

extract of P. balfouriana at a dose of 500 mg/ Kg body weight showed an ulcer incidence per group as 38.46 and ulcer index of 6.846. The standard drug Ginseng at 500 mg/ Kg body weight showed an ulcer incidence per group as 30.76 and ulcer index of 5.476 respectively for the chemical induced ulcer. Results of physical induced ulcer activity of leaf extract were found to be 33.33 and 5.73 as ulcer incidence per group and ulcer index respectively. Standard Ginseng gave 25 and 4.3 as ulcer incidence per group and ulcer index respectively. The results of this anti-ulcer screening gave a good positive response for both leaf and root extracts of the plant on comparison with standard drug ginseng. This may be due the presence of the triterpenoid saponins present in the leaf and root. The leaf extract showed a better anti ulcer activity at a dose of 500mg/ml body weight than the root extract at the same concentration.

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