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PHARMACOGNOSTIC, PHYTOCHEMICAL AND ANTI-INFLAMMATORY ACTIVITY OF MARTYNIYA ANNUA LEAVES LINN. (FAMILY: MARTYNIACEAE)

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ABSTRACT: The present research was conducted to investigate the anti-inflammatory activity of methanolic extracts of plants of *Martynia annua*. (Family: Martyniaceae) The anti-inflammatory activity of the methanolic extracts of the *Martynia annua* at the dose of 50, 100, 200 mg/kg body weight was evaluated against the standard drug - pentazocine at a dose of 25 mg/kg body weight. Adult Swiss albino mice of either sex of six numbers in each group was undertaken for study and evaluated by carrageenan-induced paw edema method. The methanolic extracts of plants of *Martynia annua* showed greater anti-inflammatory activity when compared with the standard drug. Results of present studies suggest that methanolic extract of *Martynia annua* significant (P-value < 0.01) anti-inflammatory activity.

INTRODUCTION: Inflammation is an immune system response to protect the body from infection. Inflammation occurs when white blood cells migrate out of blood vessels into the infected area, where they act as phagocytes (destroyers of foreign matter). The white cells can also wall off the infected area, preventing its spread to other parts of the body. A secondary aspect of inflammation involves the movement of protein containing fluids to the affected area. The dilation of upstream and constriction of downstream blood vessels to the infected area results in a loss of blood plasma at the site, which leads to swelling. Pain results from the compression of nerve endings, the swelling causes. Inflammation progresses through four stages: Redness, Heat, Swelling, and Pain.

Inflammation can also bring on general flu-like symptoms such as fever, chills, fatigue, loss of energy and headaches. Inflammation as a response to injury is non-specific in that it occurs identically regardless of the situation that prompts it. Inflammation is a necessary and integral part of the immune system. However, excess or chronic inflammation can be damaging to our health. Recent research indicates that inflammation may be a major contributor to atherosclerosis, Alzheimer's disease, and some cancers. Excessive inflammation is a by-product of many diseases.

Martynia annua Linn. is commonly known in Ayurveda kaakanassikaa belongs to family Martyniaceae. It small herb found in throughout India, and it is native of Mexico. In Ayurveda, the plant is known as kakanasika, which is being used in Indian traditional medicines for epilepsy, inflammation, and tuberculosis. The leaves and fruits are a biologically active part of this plant. The leaves of the *Martynia annua* are edible and used as antiepileptic and antiseptic, applied locally to tuberculosis glands of the neck, the juice of the



leaves as a gargle for sore throat and the leaf paste for wounds of domestic animals¹². It is herbaceous, stout, erect, branched, clammy pubescent, annual plant growing to a height of 90 - 120 cm. Found throughout India, in waste places, rubbish heaps and along roadsides.

Flowers contain cyanidin-3-galactoside whilst p-hydroxybenzoic acid, snopic acid; and gentisic acids are present in flowers. The leaves also contain chlorogenic acid; and fatty acids (such as palmitic acid, stearic acid, and arachidic acid), P-hydroxy benzoic acid, snopic acid and fatty acids such as palmitic acid and stearic acid present in leaves. The seed also contains arachidic acid, linoleic acid, malvalic acid, oleic acid, palmitic acid, stearic acid, apigenin, apigenin-7-O-beta-D-glucuronide.

The fruit is considered alexiteric and useful in inflammations while ash of fruit mixed with coconut oil applied on burns. The fruits of *M. annua* used as a local sedative and also used as an antidote to scorpion stings to venomous bites and stings. Seed oil applied on abscesses and for treating itching and skin affections. The Ayurvedic Pharmacopoeia of India recommended the seed of *M. annua* for arresting of graying of hair¹⁵.

MATERIAL AND METHODS:

Collection and Authentication of Plant: The Leaves of plant *Martynia annua* belonging to family Martyniaceae were collected from Kopergaon region, Tal: Kopergaon Dist: Ahmednagar. The plant was authenticated by P. A. Ingle, Joint Director, Botanical Survey of India, Pune. Voucher specimen number BSI/WRC/IDEN.CER./2016/417 dated at 25/10/2016 species as *Martynia annua* L.

Preparation of Extracts: The leaves of *Martynia annua* was collected, washed and dried at room temperature. Leaves were ground into the fine powder, extracted with different solvents in decreasing order of solvent polarity, i.e. petroleum ether (40-60 °C), chloroform and methanol. The extract was dried in a vacuum oven to obtained constant weight.

Phytochemical Evaluation: The methanolic extract was used to analyze qualitatively various phytoconstituents such as alkaloids, glycosides, proteins, steroids, carbohydrate, phenolic compounds, tannins, and flavonoids using standard procedures.

Anti-inflammatory Activity:

Anti-inflammatory Activity by Carrageenan-Induced Paw Edema Method: The technique is based upon the ability of anti-inflammatory agents to inhibit the edema produced in hind paw of the rat after injection of an irritant. Adult Swiss albino mice of either sex were divided into six groups. Animals fasted overnight. The control mice received vehicle (1% dimethyl 1 formamide in water for injection) and subplantar injection of 0.1 ml of 1% suspension of carrageenan with 2% gum acacia in normal saline was given in right hind paw of mice 1h after oral administration to test animals pet. ether extract, chloroform extract and methanol extract at dose of 50 mg/kg b.w, 100 mg/kg b.w, 200 mg/kg given orally. Pentazocine was given intraperitoneally (25 mg/kg body wt).

The paw was marked with ink and immersed in water cell of plethysmometer up to the mark. The paw volume was measured by plethysmometre (Medicaid digital vol. metre) at 1, 2, 3 h after carrageenan injection. The difference between '0' readings and after 1, 2, 3 h readings was taken as the volume of edema. The paw volume for the control group was then compared with the test group. 90% Inhibition will be calculated using,

$$\% \text{ Inhibition } \% = [1 - (V_t - V_c)] \times 100$$

Where, V_c = Mean relative change of the volume of the light hind paw of mice in the control group, V_t = Mean relative change of the volume of the right hind paw of mice in the test group.

RESULTS AND DISCUSSION: Methanolic extract of leaves of *Martynia annua* Linn. were screened for anti-inflammatory activity. The fraction isolated from methanolic extract of leaves is bis (2-ethylhexyl) phthalate. The anti-inflammatory activity of extract of leaves of *Martynia annua* Linn. was performed. Anti-inflammatory activity of the extract was compared with the standard drug pentazocine. Results were analyzed for statistical significance with the help of one-way ANOVA followed by Dunnet test.

A P value < 0.01 was significant. The methanol extracts exhibit greater anti-inflammatory activity as compared to petroleum ether and chloroform extract of the plant of *Martynia annua*.

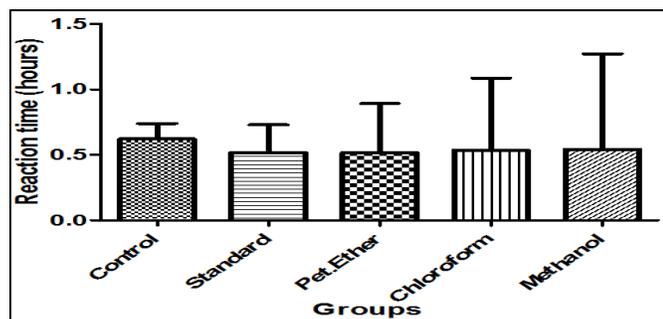
TABLE 1: PRELIMINARY PHYTOCHEMICAL SCREENING OF EXTRACTS

Tests	Petroleum ether extracts	Chloroform extracts	Methanol extracts
Test for Steroids			
Salkowaski test	-	-	+
Liebermann- Burchant test	-	-	+
Test for Glycoside			
Bontrager's test	-	-	-
Modified Brontragers test	-	-	-
Keller-killani test	-	-	-
Test for Carbohydrate			
Molisch's test	-	-	+
Barfoeds test	-	-	+
Benedicts test	-	-	+
Test for Proteins			
Millions test	-	-	+
Xanthoproteic test	-	-	+
Biuret test	-	-	+
Ninhydrin test	-	-	+
Test for Tannins			
Ferric chloride test	-	-	+
Dilute nitric acid test	-	-	+
Test for Flavonoids			
Shinoda test	+	-	+
Lead acetate test	+	-	+
Test for Saponin			
Foam test	-	-	+
Hemolysis test	-	-	+
Test for Alkaloid			
Dragandroffs test	-	+	+
Mayer's test	-	+	+
Hager's test	-	+	+
Wagner test	-	+	+

TABLE 2: ANTI-INFLAMMATORY ACTIVITY OF DIFFERENT EXTRACTS OF LEAVES OF MARTYNIA ANNUA BY CARRAGEENAN INDUCED PAW EDEMA METHOD

Groups	Treatment	Paw edema in ml at h				
		Basal	1	2	3	4
Control	D/W 10 ml/kg	3.16±0.30	3.83± 0.16	3.83±0.16	3.83±0.16	3.50± 0.22
Standard	Pentazocine 25 mg/kg	3.66±0.21 ns	5.16±0.25**	7.00±0.44**	10.50±0.34**	13.66±0.21**
Extract pet. ether	50 mg/kg	3.22±0.004 ns	0.45±0.005*	0.40±0.004**	0.35±0.006**	0.33±0.004**
	100 mg/kg	3.71±0.16 ns	4.40±0.21*	6.25±0.31**	9.23±0.30**	11.45±20**
	200 mg/kg	0.61±0.002 ns	0.40±0.004*	0.35±0.004**	0.25±0.005**	0.23±0.004**
Extract chloroform	50 mg/kg	3.21±0.005 ns	0.42±0.004*	0.40±0.004**	0.35±0.005**	0.33±0.006**
	100 mg/kg	0.60±0.005 ns	0.42±0.004*	0.42±0.005**	0.25±0.002**	11.00±019**
	200 mg/kg	0.60±0.003 ns	0.40±0.005*	0.35±0.003**	0.25±0.005**	0.23±0.004**
Extract methanol	50 mg/kg	3.63±0.005 ns	0.44±0.005**	0.39±0.005**	0.36±0.004**	0.32±0.007**
	100 mg/kg	0.61±0.003 ns	0.45±0.003*	0.40±0.004**	0.29±0.004**	0.22±0.003**
	200 mg/kg	0.65±0.004 ns	0.39±0.004*	0.34±0.003**	0.29±0.004**	0.24±0.004**

(ns- non-significant, *<0.05, **p<0.01 values are mean ± SEM, n= 6, When compared with control by using one way ANOVA followed by Dunnett's multiple comparison test)

**FIG. 1: ANTI-INFLAMMATORY ACTIVITY OF DIFFERENT EXTRACTS OF LEAVES OF MARTYNIA ANNUA BY CARRAGEENAN INDUCED PAW EDEMA METHOD**

CONCLUSION: From all the experiments done on leaves of *Martynia annua* L. It is concluded that the *Martynia annua* L. plant shows the presence of alkaloids, glycosides, carbohydrate, tannins and phenolic compound, flavonoids, proteins, steroids, and sterols. The phytochemical studies showed the presence of most of the biologically active compounds in the plant. Bis (2-ethylhexyl) phthalate was found as a compound in methanolic extract. Methanolic extract of *Martynia annua* L. leaves was found to be significant in anti-inflammatory activity.

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CONFLICT OF INTEREST: Nil

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