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COMPARATIVE EVALUATION OF ANTI-INFLAMMATORY ACTIVITY OF *DRONAPUSHPI* (*LEUCAS ASPERA* SPRENG.) *SWARASA* AND *KWATHA* IN ALBINO RATS.

[1]Dr Ashwini K.R, [2]Dr Yogini Kulkarni

[1]Professor & HOD, PG Director & HOD,

[1]Department of Dravyaguna

Tapovana Ayurvedic Medical College & Hospital, Davanagere, Bharat

Abstract:Leucas aspera Spreng.is one of the commonly available drug which is said to have *Shothahara* (anti-inflammatory activity) property according to the ayurveda classics. So this study was intended to evaluate anti-inflammatory activity of *Dronapushpi Swarasa* and *Kwatha.* Anti-inflammatory activity was studied using Caarrageenan induced rat paw edema model in Wistar strain rats. *Dronapushpi* (*Leucas aspera* Spreng.) Swarasa was administered at the dose of 4.8 ml/kg and Kwatha 9.6 ml/kg was studied against Aspirin (100 mg/kg body weight, p.o) as standard. *Dronapushpi Swarasa* administered at the dose of 4.8ml/kg and and *Kwatha* 9.6 ml/kg showed significant ant-inflammatory activity ($p<0.05$) when compared to Control and standard.

KEY WORDS: *Leucas aspera* Spreng., *Dronapushpi Swarasa* and *Kwatha*, *Shothahara*, Anti-inflammatory activity

1.INTRODUCTION:

Leucas aspera Spreng is one of commonly available plant growing as weed in crop field belonging to Lamiaceae family[1]. This drug was widely used in treatment of *Vishama jwara*[2], *Kamala*[3], *Shotha*[3]etc., In classics there is only the reference of usage of Dronapushpi in fresh form[2]. In this study both the Swarasa and Kwatha has been used as test drug and compared because it is always not possible to procure fresh drugs in day today practice and also to see the significance of swarasa dosage form. Dose of *Swarasa* and *Kwatha* is just converted human dose into animal dose. Route of administration is also simulated as that of human.

2.MATERIALS AND METHODS:

TEST DRUG: *Leucas aspera* Spreng. was collected from its natural habitat and authenticated by ICMR, RMRC, Belgaum. Freshly collected leaves of *Leucas aspera* Spreng was collected cleaned and juice was expressed after making paste with Pestle and Mortar. *Kwatha* was prepared using 5 g shade dried coarse powder of *Dronapuspi Patra* with 80 ml of water and reduced to 10 ml[6].

ANIMALS :24 Male Wistar strain rats weighing 130-150 g were procured and acclimatized in the laboratory for a week before experimentation. They were fed with standard diet and *water ad libitum.* Ethical clearance was obtained from Instituitional Animal Ethical Committee.

3.CARRAGEENAN INDUCED RAT PAW EDEMA:

Rats were divided into four groups of six animals each. They were starved overnight with water prior to the day of experiment. Control group received distilled water orally, while Standard group received Aspirin 100mg/kg[7], Test Group-1 received *Dronapushpi Swarasa* 4.8 ml/kg and Test Group-2 received *Dronapushpi Kwatha* 9.6 ml/kg.

After 1 hour of administration of the *Swarasa, Kwatha* and Aspirin, 0.1ml of 1% Carrageenan in 0.9% normal saline was injected into sub plantar region of the right hind paw[8]. A mark was put on the leg at the malleolus to facilitate uniform dipping at subsequent readings. The paw edema volume was measured with the help of plethysmograph by mercury displacement method at zero hour (immediately after injecting carrageenan). The same procedure was repeated at 1hr, 2hr, 3hr, 4hr, 5 hr, 6hr and 7th hour. The difference between 0 hour and subsequent reading was taken as actual edema volume.

4.STATISTICAL ANALYSIS:

Statistical analysis was carried out using Paired t-test, one way analysis of variance (ANNOVA) followed by Post Hoc Test.

5.RESULTS AND DISCUSSION:

Dronapushpi is an aromatic drug whose reference can be traced from Vrinda Madhava. The sample was collected during *Varsha Ritu* according to *Sushhruta* which prescribed time for collection of leaves and same was subjected to analytical studies. Experiment was conducted in *Hemanta Ritu*. For the preparation of *Swarasa* the drug was freshly collected during *Hemanta Ritu*. *Kwatha* was prepared from sample collected during *Varsha Ritu*. Fresh as well as dry sample was highly aromatic with strong odour tasting bitter. Preliminary phytochemical analysis shown the presence inorganic components Sodium, Chloride, Iron and Sulphate which substantiates Lavana Rasa as mentioned by Bhavamishra and Kaiyadeva. Aqueous and alcoholic extracts of Dronapushpi shown the presence of Glucose, Alkaloids and Tannins. Aqueous extract shown the presence of Monosaccharides, Hexose Sugar where as Steroids and Proteins were present in both aqueous and alcoholic extracts.

Dronapushpi is indicated in freshly expressed juice form in classical reference where as Kwatha form is not mentioned. Considering the flexibility of Kashaya form where one can store the raw material in dried form and used whenever necessary and to establish the significance of Swarasa, Kashaya form was also taken for the study. Paired t test shows *Swarasa* Group has shown significant reduction ($p<0.05$) by 2nd, 3rd up to 7th hour. *Kwatha* group has also shown significant reduction in edema by half, 1st up to 7th hour when compared to 0 hour. (Ref: Table No.I,II,III,IV). Four Diterpenes Leucasperones A(1), Leucasperosides A(5) and B (6) and linifolioside showed inhibition of prostaglandin induced contractions.[4] In the study conducted on various extracts of *Leucas aspera* Spreng concluded that preliminary screening of crude extracts of Leucas aspera, ethanol and distilled water extracts exhibited significant anti-inflammatory activity where as only ethanolic (95%) extract produced long term analgesia in the experimental animals at the dose of 400mg/kg/body weight at $p<0.001$ when compared to control[5].

6.CONCLUSION: Present study proves the efficacy of *Dronapushpi swarasa* and *Kwatha in Aagantuja Shotha (*Carrageenan induced rat paw oedema*). Dronapushpi Swarsa* and *Kwatha* showed significant reduction in the carrageenan induced oedema at the dose of 4.8ml/kg and 9.6 ml/kg body weight respectively when compared to Control and Standard Group ($p<0.05$) (Ref: Table No.V,VI)

Table No.I showing Paired t test of Control Group

		Paired differences			
		Std. Error Mean	t	df	Sig.(2-tailed)
Pair 1	Zero-Half Hour	0.10853	-3.071	5	0.028
Pair 2	Zero-one Hour	0.07923	-5.259	5	0.003
Pair 3	Zero-Second Hour	2.99485	-1.247	5	0.268
Pair 4	Zero- Third Hour	0.8819	-6.425	5	0.001
Pair 5	Zero-Fifth Hour	0.13581	-3.191	5	0.024
Pair 6	Zero-Sixth Hour	0.10954	-4.564	5	0.006
Pair 7	Zero-Seventh Hour	0.11949	-5.719	5	0.002

Table No.II showing Paired t test of Standard Group

		Paired differences			
		Std. Error Mean	t	df	Sig.(2-tailed)
Pair 1	Zero-Half Hour	0.05426	-1.536	5	0.185
Pair 2	Zero-one Hour	0.10220	-2.283	5	0.071
Pair 3	Zero-Second Hour	0.09574	1.567	5	0.178
Pair 4	Zero- Third Hour	0.08466	-1.772	5	0.137
Pair 5	Zero-Fifth Hour	0.06540	-1.274	5	0.259
Pair 6	Zero-Sixth Hour	0.07303	0.000	5	1.000
Pair 7	Zero-Seventh Hour	0.05627	-2.666	5	0.045

Table No.III showing Paired t test of *Swarasa* Group

		Paired differences			
		Std. Error Mean	t	df	Sig.(2-tailed)
Pair 1	Zero-Half Hour	0.01667	-1.000	5	0.363
Pair 2	Zero-one Hour	0.01667	-7.000	5	0.001
Pair 3	Zero-Second Hour	0.06540	-11.977	5	0.000
Pair 4	Zero- Third Hour	0.05627	-16.882	5	0.000
Pair 5	Zero-Fifth Hour	0.06831	-7.319	5	0.001
Pair 6	Zero-Sixth Hour	0.09309	-4.297	5	0.008
Pair 7	Zero-Seventh Hour	0.07638	-5.892	5	0.002

Table No.IV showing Paired t test of *Kwatha* Group

		Paired differences			
		Std. Error Mean	t	df	Sig.(2-tailed)
Pair 1	Zero-Half Hour	0.06708	-3.727	5	0.014
Pair 2	Zero-one Hour	0.06009	-11.926	5	0.000
Pair 3	Zero-Second Hour	0.09545	-3.841	5	0.012
Pair 4	Zero- Third Hour	0.08724	-6.686	5	0.001
Pair 5	Zero-Fifth Hour	0.05578	-11.355	5	0.000
Pair 6	Zero-Sixth Hour	0.11180	-2.236	5	0.076
Pair 7	Zero-Seventh Hour	0.08433	-3.162	5	0.025

Table No.V showing the f test (ANNOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between groups	3.328	3	1.109	41.346	**0.000**
Within groups	0.537	20	0.027		
Total	3.865	23			

Table No- VI showing results of Post Hoc Test (Multiple Comparisons) of different groups

(J) VAR00002	(I) VAR00002	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence	
					Lower Bound	Upper Bound
Swarasa	Kwatha	0.23333	0.09458	0.096	-0.0314	0.4980
	Control	0.91667*	0.09458	**0.000**	0.6520	1.1814
	Standard	0.75000*	0.09458	**0.000**	0.4853	1.0147
Kwatha	Swarasa	-0.23333	0.09458	0.096	-0.4980	0.0314
	Control	0.68333*	0.09458	**0.000**	0.4186	0.9480
	Standard	0.51667*	0.09458	**0.000**	0.2520	0.7814
Control	Swarasa	-0.91667*	0.09458	**0.000**	-1.1814	-0.6520
	Kwatha	-0.68333*	0.09458	**0.000**	-0.9480	-0.4186
	Standard	-0.16667	0.09458	0.320	-0.4314	0.0980
Standard	Swarasa	-0.75000*	0.09458	**0.000**	-1.0147	-0.4853
	Kwatha	-0.51667*	0.09458	**0.000**	-0.7814	-0.2520
	Control	0.16667	0.09458	0.320	-0.0980	0.4314
***The mean difference is significant at the 0.05 level**						

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