



Evaluation of Anti-inflammatory activity of Pathyadi Lepa in Carrageenan induced paw oedema

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Abstract

Pathyadi Lepa is an Ayurvedic preparation widely used for the treatment of inflammation caused by skin diseases. Three laboratory batches (PL-I, PL-II & PL-III) of Pathyadi Lepa (PL) and one marketed formulation MF-PL were evaluated for anti-inflammatory activity using Carrageenan induced paw oedema in animal model. The results indicate that the PL and MF-PL found to have significant ($P < 0.01$) anti inflammatory activity in rats.

Key-words: Pathyadi Lepa, Anti-inflammatory activity, Paw Volume

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Introduction

India has a high prevalence of inflammatory condition with about 15% people i.e. over 180 million people affected by it. It is associated with joint inflammation with immune cell infiltration, pain, swelling and synovial hyperplasia. Chronic inflammation leads to joint deformity and compromises the activities of daily living. The treatment agents used for chronic inflammatory conditions like non-steroidal inflammatory agents and glucocorticosteroids are associated with serious adverse effects on prolonged use with unsatisfactory response [1-2].

Pathyadi Lepa is an Ayurvedic medicine, in the form of lepa, used for external application to treat inflammation caused by skin diseases like psoriasis, leucoderma etc. It is also used to control Vata and Kapha. The main ingredient is *Pathya* Chebulic Myrobalan fruit rind – *Terminalia chebula*. Literature search has revealed anti-inflammatory activities of herbs used in the formulation of Pathyadi Lepa but so

far no any documented evidences are there for anti-inflammatory activity of Pathyadi Lepa. Also, it has not been studied topically in chronic inflammatory models. Hence, this study was planned to evaluate the effect of Pathyadi Lepa in Carrageenan induced paw oedema in albino rats.

Material and Methods

Selection of poly herbal formulation

The selected polyherbal formulation i.e., Pathyadi Lepa is a well known formulation for the treatment of inflammation as mentioned in Ayurvedic pharmacopoeia. It comprises of some medicinally important plants, *Terminalia chebula* Retz. (fruits), *Pongamia pinnata* (L.) Pierre (seeds), *Brassica juncea* (L.) Czern (Seeds), *Curcuma longa* L. (rhizomes), *Psoralea cordifolia* L. (seeds), *Embelia ribes* Burm. f. (fruits), rock salt and cow urine. The Pathyadi Lepa was used from ancient in the treatment of inflammation as mentioned in folk lore, classical text and ayurvedic pharmacopoeia, therefore the present formulation was selected.



Collection and authentication of plant material

All the raw materials used in formulation were purchased from local market of Indore (M.P.) 452010, India and identified morphologically and compared with standard Pharmacopoeial Monograph. The sample of crude drug was also identified & authenticated by Dr. S.N. Dwivedi, Redt. Professor & Visiting Professor, APS University, Rewa (M.P.). Voucher Specimen no was allotted. J/Bot/PPPL-21.

Preparation of selected formulation

Medicines in the form of a paste used for external application are called lepas. The drugs are made into a fine powder. Before use on the body, it is mixed with some liquid or other medium indicated in each preparation and made into a soft paste. Water, Cow's urine, oil, and ghee are some of the media used for mixing. Three laboratory batches (PL-I, PL-II & PL-III) of Pathyadi Lepa (PL) were prepared in laboratory as per procedure mentioned in Ayurvedic Pharmacopoeia. [3]

Animals

Adult albino rats of both sex (200-250 gm) were procured from Veterinary College, Mhow, Indore, (M.P.) maintained under ideal feeding and management practices in the laboratory. The animals were fed with standard pellet diet (Hindustan lever Ltd. Bangalore) and water *ad libitum*. All the animals were housed in polypropylene cages. The animals were kept under alternate cycle of 12 hours of darkness and light. The animals were acclimatized to the laboratory condition for 1 week before starting the experiment. The experimental protocols were approved by Institutional Animal Ethics Committee, SVCP, Indore, (M.P.) after scrutinization.

Anti-inflammatory Activity by Carrageenan induced paw oedema

Pedal inflammation in animal was produced according to the method described by Winter et al (1962) [24-25]. Rats were divided in VI groups of six rats in each. [4-5]

Group I- was applied with gel base and served as control, Group II- standard (Diclofenac sodium Gel 0.5%) and served as reference,

Group III - application of 1 gm of 2% PL-I, Group IV - application of 1 gm of 2% PL-II, Group V - application of 1 gm of 2% PL-III and Group VI - application of 1 gm of 2% Marketed PL

The administration was 30 min prior to injection of 0.1 ml of 1% carrageenan in the right hind paw sub platar of each rat. The paw volume was measured plethysmometrically (model 7140, Ugo Basil, Italy). Prior to injection of carrageenan, the average volume of the right hind paw of each rat was calculated. At 1, 3 and 5hr after injection paw volume was measured. Reduction in the paw volume compared to the vehicle-treated control animals was considered as anti-inflammatory response.

Statistical analysis

All the values were statistically analyzed by one-way analysis of variance (ANOVA) followed by Dunnett's test. Comparison between control and drug treated groups were considered to be significant (* $P < 0.01$). All values are expressed as mean $\pm$ SEM.

Results and Conclusion

Inflammation is a local response of living mammalian tissues to the injury. It is a body defense reaction in order to eliminate or limit the spread of injurious agents. There are various components to an inflammatory reaction that can contribute to the associated symptoms and tissue injury. Oedema formation, leukocyte infiltration and granuloma formation represent such components of inflammation. Oedema formation in the paw is the result of a synergism between various inflammatory mediators that increase vascular permeability and/or the mediators that increase blood flow. Several experimental models of paw oedema have been described. Carrageenan-induced paw oedema is widely used for determining the acute phase of inflammation. Histamine, 5-hydroxytryptamine and bradykinin are the first detectable mediators in the early phase of carrageenan-induced inflammation whereas prostaglandins are detectable in the late phase of inflammation. [6-10]

Anti-inflammatory Activity of developed formulation PL-I, PL-II & PL-III and marketed formulation (MF-PL) was determined by



Carrageenan induced paw oedema. The result obtained indicates that the prepared formulation and marketed formulation have produced significant anti-inflammatory activity. (Table 1). The result obtained indicates that the

MF-PL showed more and significant ($P < 0.01$) anti inflammatory activity in rats when compared with PL-I, PL-II & PL-III at the concentration of 2% reduced the oedema induced by at 5 h (Graph 1).

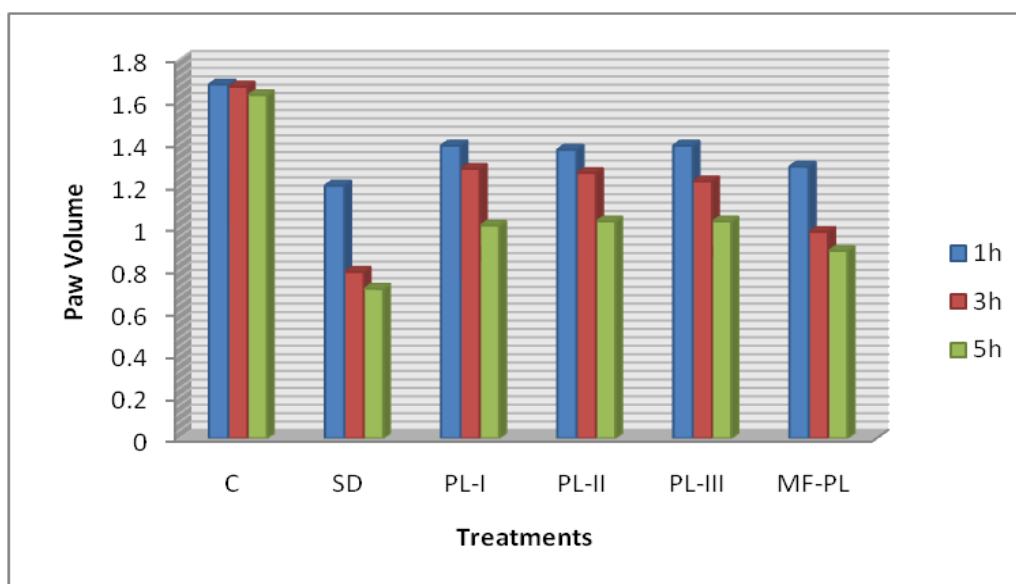
Table 1: Anti-inflammatory activity of Pathyadi Lepa

Treatment	Dose	Right hind paw volume (mL)		
		1 h	3h	5h
C	-	1.68±0.02	1.67±0.04	1.63±0.02
SD	10 mg	1.20±0.03	0.79±0.03	0.71±0.02
PL-I	1 gm of 2%	1.39±0.06	1.28±0.01	1.01±0.03
PL-II	1 gm of 2%	1.37±0.04	1.26±0.01	1.03±0.02
PL-III	1 gm of 2%	1.39±0.04	1.22±0.01	1.03±0.04
MF-PL	1 gm of 2%	1.29±0.02	0.98±0.03	0.89±0.04

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Values are expressed as X (Mean) ±SEM, n=6. (One way ANOVA followed by Dunnett Multiple Comparison Test). Statistically significance * $P < 0.01$ in comparison to control.

Abbr.: C=Control, SD=Standard drug (Indomethacine)



Graph 1: Measurement of Paw Volume of Pathyadi Lepa

Conclusion

From the above studies it is quite apparent that the laboratory batches (PL-I, PL-II & PL-III) of

Pathyadi Lepa (PL) and MF-PL possesses significant anti-inflammatory activity.

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