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NOTE

Indian Medicinal Plants Used in the Antiinflammatory Ayurvedic Formulations

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In present work the use of some Indian medicinal plants in antiinflammatory ayurvedic formulations have been discussed.

Key Words: Indian medicinal plants, Antiinflammatory, Ayurvedic formulations.

Antiinflammatory diseases including different types of rheumatic diseases are very common throughout the world, although rheumatism is one of the oldest known diseases of mankind and affects a large population of the world and no substantial progress has been made in achieving a permanent cure. The disadvantage in the presently available potent synthetic drugs lies in their toxicity and reappearance of symptoms after discontinuation. Therefore, the search for screening and development of drugs for their antiinflammatory activity is an unending problem and there is much hope of finding antirheumatic drugs from indigenous plant.

The roots and leaves of *Plumbago zeylanica* and *Lawsonia alba* were collected from the local market, Pune and authenticated by Dr. Kumbojkar, Maharashtra Association of Cultivation Sciences, Pune. The air-dried and powdered parts of *Plumbago zeylanica* and *Lawsonia alba* were successively extracted with pet. ether (60-80ºC) in a soxhlet. The extract obtained was made free of any sovlent by distillation. Then it was purified by silica gel chromatography[1]. In the pet. ether and ethyl acetate eluents the plumbagin (5-hydroxy-2-methyl-1,4-naphthoquinone) and lawsone (2-hydroxy-1,4-naphthoquinone), yellowish crystalline needles from pet. ether and ethyl acetate (7:3) was obtained. The structure of plumbagin and lawsone was confirmed by spectral analysis (UV and IR). The test drug plumbagin and lawsone were used as an emulsion in 5 % suspension with gum acacia and administered orally at the dose of 1 mg/100 g and 50 mg/100 g, respectively.

In vivo antiinflammatory effect of plumbagin and lawsone, isolated from *Plumbago zeylanica* and *Lawsonia alba* was assessed using adult male albino

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rats of Wistar strain procured from National Institution of Nutrition, Hyderabad (body weight 180-200 g). The animals were grouped in cages in an room temperature with 12 h light and dark cycle. The animals were maintained with rat pellets diet (Lipton India Ltd. Banglore) and water *ad libitum*. The animals were divided in to 4 groups, each group consisting of 6 rats. They were marked properly for the purpose of identification. Food was withdrawn 12 h before the experimentation and only water was provided.

Carrageenan induced oedema in rat: Animals were divided into 4 groups comprising 6 animals in each group. In all groups, acute inflammation was produced by sub plantar injection of 0.1 mL of freshly prepared 1 % suspension of carrageenan in normal saline in the right hind paw of the rats and paw volume was measured plethysmometrically at 0 to 3 h after carrageenan injection[2]. Animals were premedicated either with vehicle (5 % gum acacia), plumbagin (1 mg/100 g), lawsone (50 mg/100 g) and acetylsalicylic acid (10 mg/100 g) orally 2 h before injection. Mean increase in paw volume was measured and percentage inhibition was calculated.

Phytochemical analysis of *Plumbago zeylanica* and *Lawsonia alba* extracts revealed the presence of 5-hydroxy, 2-methyl-1,4-naphthoquinone and 2-hydroxy-1,4-naphthoquinone, respetively, that significantly reduce the oedema in rat paw induced by carrageenan injection. This oedema inhibition was found to be time dependent. Maximum activity was found at 3 h intervals observed at 1 mg/100 g plumbagin and 50 mg/100 g of lawsone, respectively. During the entire experiment it was observed that the dose was tolerated and no alterations in activity were seen during 3 h. Plumbagin showed an antiinflammatory activity 52.7 % was found at 1 mg/100 g, while lawsone showed an antiinflammatory activity 70 % at 50 mg/100 g, respectively, which was comparable to that shown by the reference compound acetyl salicylic acid at a dose 10 mg/100 g. It was observed that the percentage of the oedema inhibition increased with time and was found to be maximum at 3 h after carrageenan injection as shown in Table-1.

Although, plumbagin and lawsone have been suggested to act as inhibitors of prostaglindin synthatase. The primary objective of these investigations was to study antiinflammatory activity of plumbagin and lawsone. They were found significantly effective against carrageenan induced inflammation of the rat paw.

Similar type of observation have been recorded by Chattopadhyay[3] where he claimed that the alcoholic extract of *Azadirachta indica* exerted significant antiinflammatory activity in the cotton pellet granuloma assay in rats. Singh and Mujumdar[4] also found levels of various biochemical parameters studied such as the oil of *Ocimum sanctum* (Tulsi), offered higher protection against carrageenan induced paw edema in rats and acetic acid induced writhing in mice. *Ocimum sanctum* was found to possess significant antiinflammatory activity.

Chaurasia *et al.*[5], recorded the antiinflammatory activity of Sandhika ayurvedic drug against carrageenan induced paw edema in rats. In addition, Chatterjee and Das[6], found that the antiinflammatory activity of polyhedral formulation against carrageenin induced paw edema in rats. Here in Poul *et al.*[7] showed antimicrobial activities of plumbagin in periodontal diseases as well this studies indicated the role and significance of this plant antibiotics in human oral hygiene programs.

Plumbagin and lawsone showed maximum antiinflammatory activity as compared to that of reference compound acetyl salicylic acid. It was also observed that the percentage of edema inhibition increased with time and was found to be maximum at 5 h after carrageenan injection as shown in Table-1.

TABLE-3
EFFECTS OF PLUMBAGIN AND LAWSONE ON CARRAGEENAN-INDUCED OEDEMA IN ALBINO RATS

Group	Dose mg/kg p.o.	Paw volume (mL) SE					Inhibition (%)
		0.5 h	1 h	1.5 h	2 h	3 h	
Control	Vehicle	0.33 ± 0.05	0.46 ± 0.01	0.59 ± 0.1	0.61 ± 0.01	0.56 ± 0.09	–
Standard	10mg/100g	0.24 ± 0.04	0.26 ± 0.03	0.23 ± 0.04	0.21 ± 0.06	0.19 ± 0.06	65.4
Plumbagin	1mg/100g	0.28 ± 0.07	0.34 ± 0.09	0.33 ± 0.07	0.28 ± 0.07	0.26 ± 0.07	52.7
Lawsone	50mg/100g	0.23 ± 0.10	0.26 ± 0.10	0.25 ± 0.09	0.21 ± 0.09	0.16 ± 0.10	70.0

Standard = Acetyl salicylic acid

The observations of the present study reveal that both plumbagin and lawsone are able to delay and prevent inhibition of prostaglindin synthesis similar to acetyl salicylic acid. The advantage of above herbal is being no irritant as an agent compared to NAISD in GIT. Singh and Pandey[8] have shown that maximum antiinflammatory effect of *Pongmmia pinnata* (Karanja) against carrageeenan induced inflammation. The possible mechanism of action could be inhibition of prostaglandin synthesis and decreased capillary permeability.

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