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Research Article **Siddha Medicine**

Anti-Inflammatory Activity of Arumuga Chendooram on Carrageenan Induced Inflammatory Rats

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ABSTRACT

Anti-inflammatory activities of Arumuga chendooram on carrageenan induced inflammatory rats were evaluated. Arumuga chendooram (AC) at the doses of 03, 06 and 10mg/kg of body weight in experimental animals. Anti inflammatory activity was evaluated by Carrageenan induced paw edema in rats. Indomethacin (3 mg/Kg body weight) was employed as standard drug. Animals were randomized into 4 group (n=6).Control group receives vehicle only. AC treated with high dose which produced significant inhibition of edema and pain. This study confirms that AC possesses significant Anti inflammatory activity.

Keywords: Anti inflammatory activity, Arumuga chendooram, Carrageenan, Indomethacin

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INTRODUCTION

Inflammation is the body's challenge in the form of immune response to produce self-protection against the damages like cell destruction, irritability, infection etc. and begin the healing process. The inflammatory response consists of several physiological processes, all of which are triggered by the release of pharmacologically active substances such as histamine and heparin and the chemical mediators released from injured tissues and migratory cells (Sembulingam and Prema Sembulingam, 2006). Overproduction of auto antigens by denaturation of tissue proteins as in case of arthritis may also be one of the main causes for inflammatory reactions. Whatever may be cause for inflammation, all are characterized by four cardinal signs viz. redness, swelling, heat and pain. So, the goal of treatment for inflammation is to reduce or prevent the production of inflammatory agents

that triggers the signs and symptoms of inflammation (Opie, 1962; Umapathy *et al*., 2010). Fortunately there are anti-inflammatory agents like cortisol naturally produced in the body and also available commercially. But these substances are known to produce some adverse side effects like suppression of natural immune system in the body (Sembulingam and Prema Sembulingam, 2006). So, search is in progress to find out some natural herbs which may render anti-inflammatory action without producing any secondary problems. The present venture is one among them. Non-steroidal anti-inflammatory drugs (NSAIDs) are commercially available and are commonly used for treating chronic health problems like rheumatoid arthritis, osteoarthritis etc. But long term use of NSAIDS is also associated with side effects like stomach bleeding, allergic reactions, kidney problems, heart problems etc., (American College of Rheumatology, 2011). According to Leopold, "There are natural alternatives to NSAIDs that have a similar mechanism; some of them include turmeric, green tea, ginger, rosemary, cat's claw, devil's claw, and willow bark" (Morgan, 2002). Thus, herbal medicines are maintaining their popularity not only for their historical and cultural reasons but also for their safety with minimum or nil side effects. Many safe, effective and challenging anti inflammatory and analgesic drugs are available in Siddha system of medicine (Velpandiyan *et al*. 2013). The present work, attempts to report the preliminary results of studies on anti-inflammatory activity of Arumuga chendooram on Carrageenan induced inflammatory rats.

MATERIALS AND METHODS

Animals

Male albino rats of Wistar strain approximately weighing 180-220 were used in this study. They were healthy animals procured from Sri Venkateswara enterprises, Bangalore, India. The animals were housed in spacious polypropylene cages bedded with rice husk. The animal room was well ventilated and maintained under standard experimental conditions (Temperature 27±2ºC and 12 hours light / dark cycle) throughout the experimental period. All the animals were fed with standard pellet diet (Gold Mohur, Mumbai, India) and water *ad libitum*. They were acclimatization to the environment for 1 week prior to experimental use. The experiment was carried out according to the guidelines of the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), New Delhi, India.

Preparation of Arumuga Chendooram

The Siddha medicine *Arumuga chendooram* was prepared as per the procedures of IMCOPS, Chennai. In the first stage of the preparation of *Arumuga chendooram*. Five parts of purified mercury (Suththi seitha rasam), nine parts of purified sulphur (Suththi seitha kanthakam), seven parts of purified lode stone (Suththi seitha kantham), twelve parts of purified iron filing (Suththi seitha ayapodi), four parts of rock salt (Induppu) and eight parts of desiccated borax (Poriththa venkaram) were ground with sufficient quantity of aloe juice (*Kumari charu* for five days continuously. This was then made into small cakes and dried. It was then sealed in discs and burnt for 24 hours. If the colour of the *chendooram* does not appear as dark purple the grinding and burning are usually repeated. Equal to pH and then attractive particle interactions predominate which may influence the drug delivery.

Experimental Design:

Anti-inflammatory activity

Anti-inflammatory activity was evaluated using the carrageenan induced rat paw oedema according to the technique of Winter *et al*. (1962). After 12hrs fast rats were divided into five groups of six each. Each animal was marked for identification and regularly monitoring. Group I served as control group received Carrageenan only. Group II, III and IV animals received Arumuga Chendooram at a dose of 03, 06 and 10mg/kg orally. Group V was orally administered compound indomethacin (3 mg/Kg body weight) as a standard drug. The animals were pretreated with the extract half an hour before the administration of carrageenan. Acute inflammation was produced by the subplantar administration of 0.1 ml of 1% carrageenan in normal saline in the right paw of the control and experimental rats. The paw was marked with in at the level of lateral malleous and immersed in mercury up to the mark and measured by mercury volume displacement methods. The paw volume was measured ½, 1, 1½ and 2 hours after injection of carrageenan to each group. The difference between the readings was taken as the volume of oedema and the percentage of anti-inflammatory activity was calculated (Winter *et al*. 1962). The RA factor was assessed by use the blood sample in lab.

$$\% \text{ of inhibition rate} = \frac{V_c - V_t}{V_c} \times 100$$

Where V_c is the oedema value of the control group and V_t is the oedema value of treated groups.

RESULTS AND DISCUSSION

Carrageenan induced inflammation is a biphasic phenomenon and is a useful model to detect oral actions of anti-inflammatory agents. In the present study, the effect of Arumuga Chendooram on carrageenan induced paw oedema was investigated. The rats foot pad become oedemateous after injection of carrageenan. Administration of Arumuga Chendooram reduces the paw oedema to inflammatory rats at a dose of 3, 6 and 10mg (kg body weight). The dose dependent a significant decrease of paw oedema and the reference drug indomethacin (3mg/kg body weight) exhibited significant decrease (Table 1). Among the various doses, the 500mg/kg (body weight) of Arumuga Chendooram possess potential anti-inflammatory activity at 2 hrs as compared to other doses and nearest to the standard.

Table 1 Effect of Arumuga Chendooram on paw oedema in Carrageenan induced inflammatory rats

Concentrations (mg/100 g b.wt)	Grouping	½ hrs	1 hrs	1½hrs	2 hrs
N	Group I	--	--	--	--
3 mg	Group II	21.6	45.1	63.4	73.4
6 mg	Group III	35	56.1	74.5	81.9
10 mg	Group IV	42.42	66.2	82.9	89.8
Std. (Indomethacin 3mg/kg)	Group V	45.3	69.4	84.1	92.1

Inflammation has been identified as a reaction of living tissues to damage and it is known to include a complex variety of enzyme activation, mediator release and extravasations of fluid, cell migration, tissue breakdown and repair (Vane and Bolting, 1995). The most extensively utilized primary test to display novel anti-inflammatory agents calculate the capability of a compound to decrease local oedema induced in the right paw by injection of an irritant agent (Hernández-Perez and Rabanal-Gallego, 2002). Carrageenan-induced paw oedema in rats is a classical model of acute inflammation and commonly used in screening of drugs (Morris, 2003). Growth of oedema in the paw of the rats after injection of carrageenan is a biphasic event. The early phase (1-2h) of the carrageenan model is thought to be mostly mediated by histamine, serotonin and improved synthesis of prostaglandin in the injured tissue surroundings. The late phase (3-4h) has been demonstrated to be sustained by prostaglandin release and mediated by bradykinins, leukotrienes, polymorphonuclear cells and prostaglandins produced by tissue macrophages (Brito, 1998; Gupta et al., 2006). Cyclooxygenase plays a significant role in conversion of arachidonic acid into prostaglandins in the later inflammation phase in the carrageenan-induced oedema model which enzyme is considered to be a recognized target for a number of NSAIDs like aspirin (Khan et al., 2011).

The anti-inflammatory activity of Arumuga Chendooram against carrageenan-induced paw oedema in rat revealed time and dose-dependent inhibition. The results showed that the extract at 25mg/kg exhibited statistical significant activity comparable to control. The maximum inhibition of oedema volume was observed with 10mg/kg of crude extract at 2h. The results indicated that Arumuga Chendooram displayed relatively high anti-inflammatory effect by carrageenan. The data obtained from the present study indicate that Arumuga Chendooram produced a dose dependent anti-inflammatory effect on carrageenan-induced paw oedema. At the dose of 10mg/kg, this effect was similar to that produced by the standard anti-inflammatory drug indomethacin. Our result agrees with the earlier report (Akila and Manickavasakam, 2013).

Jayabharathi and Mohamed Musthafa (2014) reported that Analgesic and Anti inflammatory efficacy of Rasa Chendooram (RC) at the doses of 50 mg/kg and 100 mg/kg of body weight in experimental animals. Analgesic activity was evaluated by Chemical induction method and Anti inflammatory activity was evaluated by Carrageenan induced paw edema in rats. Diclofenac sodium 50 mg/kg of body weight was employed as standard drug for both studies. Animals were randomized into 4 group (n=6).Control group receives vehicle only. RC treated with low and high dose which produced significant inhibition of edema and pain. This study confirms RC possesses significant Analgesic and Anti inflammatory efficacy.

The present study on Arumuga Chendooram has significant anti- inflammatory properties and it justifies the traditional use of this Chendooram in the treatment of various types of inflammation. This suggests that Arumuga Chendooram can be potentially used as a source of natural anti-inflammatory agent.

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