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ANTI-INFLAMMATORY EFFECT OF *AMOMUM SUBULATUM* ROXB. FRUITS EXTRACT

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ABSTRACT

Keywords:

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Inflammatory diseases including different types of rheumatic diseases are a major and worldwide problem. Now a day's, world population moves towards herbal remedies for treatment. Several edible plants parts are used in traditional medicine for the treatment of inflammatory conditions. *Amomum subulatum* Roxb (Zingiberaceae), commonly known as large cardamom, is traditionally used for several medicinal purpose in India. The present study assessed anti-inflammatory activity of its fruits extracts (methanolic and aqueous) at a dose of 250 mg/kg and 500 mg/kg against carrageenan induced paw edema in rats. Both the extracts were able to show a dose dependent anti-inflammatory activity with compared to ibuprofen as a standard.

INTRODUCTION: *Amomum subulatum* Roxb. (family Zingiberaceae) is commonly known as 'Badi Elaichi' or Greater Cardamom. It is a tall, perennial herb, evergreen, herbaceous monocot plant, native to Sikkim and from there it is spread to neighboring areas like Darjeeling, Assam, Bhutan and Nepal. Sikkim state of India alone contributes 50% of the world's production of large cardamom¹.

The fruit is antero-posteriorly flattened, having 15-20 irregular, dentate-undulate wings which extend from the apex to downward for two-thirds of its length, trilocular many-seeded capsule. It contains 1.95 to 3.23% of essential oil² having typical characteristic flavor and possesses stimulant, stomachic, alexipharmic and astringent effects^{3,4}.

The fruits are prescribed to treat indigestion, vomiting, biliousness, abdominal pains, rectal diseases, throat troubles, congestion of the lungs, inflammation of the eyelids, digestive disorders, pulmonary tuberculosis, loss of appetite, gastric troubles, and liver complaints^{5,6,7}.

Due to its pleasant aroma, it has been used as an essential ingredient in mixed spices. The aim of the present study is to evaluate anti-inflammatory activity of the fruits on the induced acute inflammation using carrageenan induced paw edema in rats.

EXPERIMENTAL:

Plant material: The fruits of *A. subulatum* were collected from the local market of Sikkim and identified by Prof. M. P. Sharma Department of Botany, Jamia Hamdard, New Delhi-110062.

Preparation of extract: The shade-dried fruits were powdered with a mechanical grinder. The fruits powder was extracted in a Soxhlet apparatus using methanol for about 48 hours. The solvent was removed from the extracts under reduced pressure by using rotary vacuum evaporator (12% yield). The powdered material (500 g) was percolated with cold water to get the aqueous extract (52 g).

The dried methanolic and aqueous extracts were stored in a desiccators to carry out phytochemical and pharmacological studies.

Animals:- Wistar albino rats (weighing 150-200 g) were used for the study. Animals were issued by The Central Animal House Facility of Jamia Hamdard and kept under standard laboratory conditions in 12 h light-dark cycle at $25\pm 2^{\circ}\text{C}$, relative humidity of 50% and allowed food and water ad libitum. Animals were provided with pellet diet (Lipton, India) and water. Approval from the institutional animal ethical committee for the usage of animals in the experiments was obtained.

Phytochemical screening: A preliminary phytochemical screening of methanolic extract of *A. subulatum* fruits was carried out⁸.

Acute Toxicity Studies:- There was no lethality observed up to dose of 3000mg/kg (Parmar et al 2008).

Drugs:

- a) Carrageenan: 1% w/v suspension was prepared and injected 0.1 ml subcutaneously.
- b) Test drugs (200 mg/ kg, 500 mg/kg):
 - i. 2 g of Methanolic /Aqueous extract, 200 mg of CMC was triturated with water and volume was made up to 10 ml.
 - ii. 5 g of Methanolic/Aqueous extract, 200 mg of CMC was triturated with water and volume was made up to 10 ml.
- c) Standard drug (Ibuprofen): 50 mg/kg orally.
- d) Normal saline solution 0.9% w/v solution was prepared. Normal saline and test drugs were given to the rats through the oral route.

Procedure:

- The Weighed animals were divided them into groups of six rats each, one group kept as control and one for standard (Ibuprofen).
- The initial paw volume of rats was noted by water displacement method after marking their hind paw just beyond tibiotarsal junction so as to ensure constant volume every time the paw was dipped in water column.
- To the test groups, suspension of test samples (Aqueous and methanolic extracts of test drugs) were administered orally, the standard group received Ibuprofen (50 mg/kg) orally and control received normal saline.
- Carrageenan (0.1 ml of 10 % w/v) was injected in the plantar region of hind paw of each rat one hour after administration of the drug. Paw volume was again measured at intervals of 2hr and 3 hr^{9,10}.
- The percent inhibition of inflammation was calculated for Ibuprofen and test samples using the formula given below and statistical analysis was done using student's t test:

Percent inhibition=

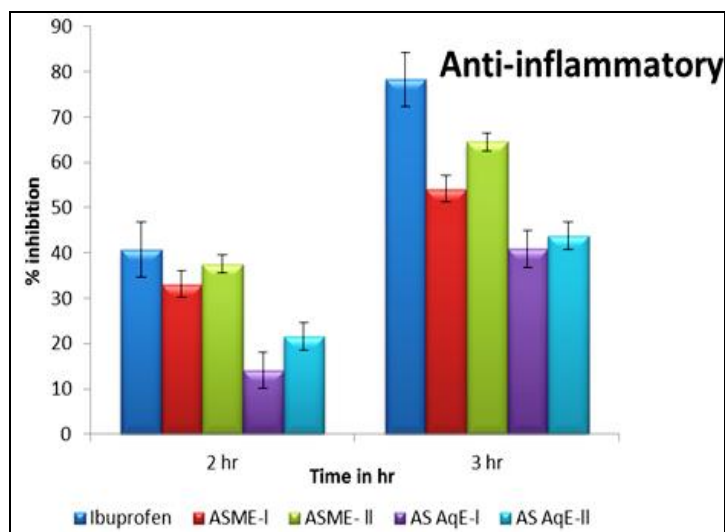
$$\frac{\text{Mean paw volume of control} - \text{Mean paw volume of test} \times 100}{\text{Mean paw volume of control}}$$

RESULTS: On the basis of experimental data, It was observed that there was significant and dose dependent anti-inflammatory activity of both the methanolic and aqueous fruits extract. The doses are administered orally both the extract at the dose of 250 mg/kg and 500 mg/kg of the body weight of the animals (see table 1 and graph 1).

TABLE 1: ANTI-INFLAMMATORY ACTIVITY OF AMOMUM SUBULATUM FRUIT EXTRACTS ON CARRAGEENAN INDUCED PAW EDEMA IN RATS (CALCULATED).

Group	Dose(mg/kg)	Mean \pm SEM		% Inhibition	
		2 hr	3 hr	2 hr	3 hr
Control	----	1.57 \pm 0.06	2.03 \pm 0.06	-----	-----
Ibuprofen	50	0.93 \pm 0.03	0.44 \pm 0.03	40.76	78.32
ASME-I	250	1.05 \pm 0.02	0.93 \pm 0.02	33.12	54.18
ASME-II	500	0.98 \pm 0.04	0.72 \pm 0.02	37.57	64.53
AS AqE-I	250	1.35 \pm 0.01	1.2 \pm 0.01	14.01	40.88
AS AqE-II	500	1.23 \pm 0.028	1.14 \pm 0.008	21.65	43.84

ASME: *A.subulatum* methanolic extract, ASAqE: *A.subulatum* aqueous extract



GRAPH 1: GRAPHIC REPRESENTATION OF ANTI-INFLAMMATORY ACTIVITY (% INHIBITION VS TIME).

After 2 hour ibuprofen produced 40.76%, methanolic extract 33.12%, 37.57% and aqueous extract 14.01%, 21.67% inhibition at a dose of 250,500 mg/kg, respectively. At the end of 3 hour methanolic and aqueous extract shows the inhibition 54.18% and 40.88% at a dose of 250 mg/kg, at the higher dose 500 mg/kg the both of extract produced 64.53 and 43.84% inhibition respectively as compared to ibuprofen (standard) 78.32%.

DISCUSSION: Carrageenan-induced rat paw edema is a suitable test, for evaluating anti-inflammatory drugs, which has frequently used to assess the antiedematous effect of natural products. On the basis of the study the data showed that both methanolic and aqueous fruits extract gave the significant anti-inflammatory activity. The methanolic extract is more effective than the aqueous extract. There is dose dependent inhibition of paw edema in rats Prostaglandins and bradykinins were suggested to play important role in carrageenan induced edema^{11, 12}. Both steroidal and non steroidal anti-inflammatory drugs can be tested by the carrageenan-induced paw inflammation test. The carrageenan induced paw edema model in rats is known to be sensitive to cyclo-oxygenase (COX) inhibitors and has been used to evaluate the effect of non-steroidal anti-inflammatory agents^{13, 14}.

Amomum subulatum shows a significant inhibition of inflammation, which is comparable to the standard drug ibuprofen. As Phytochemical tests showed the presence of glycosides, carbohydrates, flavonoids, steroids and resin in both the methanolic and aqueous extract, they might suppress the formation of prostaglandins and bradykinins or antagonize their action and exert its activity.

REFERENCES:

- Sharma R., Sharma G., Sharma E. Energy efficiency of large cardamom grown under Himalayan alder and natural forest. *Agroforestry Systems* 2002, 56(3), 233–239.
- Gupta P.N. Studies on capsule morphology of large cardamom cultivars (*Amomum subulatum* Roxb), *J. Plantation Crops* 1986, 16: 371-375.
- Anonymous. Reviews of Indian Medicinal plants; Indian Council of Medical Research, New Delhi Vol-2 2004; 215-19.
- Anonymous. Wealth of India; a dictionary of Indian raw materials and industrial research. Publication and Information Directorate, CSIR; New Delhi, Revised Edition 2006, 1: 226-29.
- Nadkarni A.K. Indian materia medica, 3rd Edn. Popular Prakashan, Bombay 1976, 1: 93.
- Jafri M.A., Farah K.J., Singh S. Evaluation of the gastric antiulcerogenic effect of large cardamom (fruits of *Amomum subulatum* Roxb.). *J. Ethnopharmacol.* 2001, 75: 89-94.
- Verma S.K., Rajeevan V., Bordia A., Jain V. Greater cardamom (*Amomum subulatum* Roxb.) – A cardio-adaptogen against physical stress. *J. Herb. Med. Toxicol.* 2010, 4(2): 55-58.
- Pandey, S., Mahalaxmi, R. Identification and determination of protocatechuic acid present in Greater cardamom fruit extracts by HPTLC technique. *International Journal of Pharmaceutical Sciences Review and Research* 2010. Vol-1; 27-31.
- Winter, C.A., Risley, E.A., Nuss, G.W. Proceedings of the Society for Experimental Biology and Medicine 1962. 111 (10); 544.
- Schapoval, E.E.S., Silveira, S.M., Miranda, M.L., Alice, C.B., Henriques, A.T. Evaluation of some pharmacological activities of *Eugenia uniflora* L., *J. Ethnopharmacol* 1994. 44; 137-142.
- Vinegar, R., Scheriber, M., Hugo, R. Biophasic development of carrageenan odema on rats, *J Pharmacol Exp Ther* 1969. 166; 96- 103.
- Dray, A., Perkin, M. Bradykinin and inflammatory pain. *Trends Neurosci* 1993. 16; 99-104.
- Rao, C.V., Kartik, R., Ojha, S.K., Rao, A.G. Anti-inflammatory and antinociceptive activity of stem juice powder of *Tinospora cordifolia* Miers. in experimental animals. *Hamdard Medicus* 2005. 48; 102-106.
- Ghule, B.V., Ghante, M.H., Upaganlawar, A.B., Yeole, P.G. Analgesic and Anti-inflammatory activities of *Lagenaria siceraria* Stand. Fruit juice extract in rats and mice. *Phcog Mag* 2006. 2(8); 232-238.

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