

Evaluation of the anti-inflammatory activity of extract of *Abrus precatorius*

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Abstract. The anti-inflammatory activity of the extract of *Abrus precatorius* was investigated. Inflammatory response was induced by topical application of croton oil dissolved in suitable vehicle on the rat ear. After 6 hrs, cutting out the ear quantitated the response. The cut ear is weighed and the increase in weight relative to controls evaluated. Extract of *A. precatorius* when co applied with croton oil to the rat ear produced a reduction in the inflammatory response produced when croton oil alone was applied to the rat ear. The extract produced 67.10 + 2% reduction of the inflammatory response produced by croton oil alone, this was however lower than the 71.1 + 2% reduction of the inflammatory response produced by acetyl salicylic acid. This finding suggests that extract of *A. precatorius* exhibits anti-inflammatory activity and may explain the usefulness of the leaves of this plant in the treatment of inflammatory disease conditions by traditional healers.

Key words: Inflammatory response, croton oil, acetyl salicylic acid, *Abrus precatorius*

1. Introduction

Abrus precatorius is of the family fabaceae belonging to the plant kingdom plantae. It is a vascular plant of the order fabales Figure next shows picture of the plant. Inflammation is characterized clinically by signs such as edema (swelling), tenderness and pain. Tissue degeneration and fibrosis occurs in chronic stages. Several researchers have examined the role of inflammatory cells at sites of inflammation. The recruitment of inflammatory cells to sites of injury involves the interactions of several types of soluble mediators (1,2). Responses induced during an inflammatory event includes induction of fever, sleep and anorexia (3). Physical, chemical or biological assault may produce injury to the body. Prostaglandins and histamine have been implicated in these inflammatory processes. (4). Croton oil induced inflammatory response represents a widely used model in assessing the topical anti-inflammatory activity of various substances (Toneli et al 1965).



The method is simple, rapid and repeatable. *A. precatorius* (leguminosae) is a perennial plant that grows in tropical and subtropical areas of the world. It has been used for the treatment of various diseases such as colds, cough, convulsion, fever, rheumatism, conjunctivitis and ulcers by traditional healers. Nath and Sethi 1992 (5) reported its abortifacient properties. Rain-Tree 2004 (6) reported its use in the treatment of diabetes and chronic nephritis. Various African tribes use powdered forms of the plant as oral contraceptives (7,8). This research therefore using the croton oil induced inflammatory model investigated these claims by traditional healers especially the anti-inflammatory activity of the extract of *A. precatorius*.

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Table 1. Percent reduction of inflammatory response following application of the extract of *A. precatorius* and acetylsalicylic acid to the right ear of rat.

Agent	Percentage Reduction of Inflammatory Response
<i>Abrus precatorius</i> extract	a67.10 + 2%
Acetylsalicylic acid	b71.1 + 2%

a Value is mean + S.E. of mean reduction of inflammatory response in 20 rats

b Value is mean + S.E. of mean reduction of inflammatory response in 20 rats

2. Materials and methods

Acetylsalicylic acid was purchased from Sigma Chemical Company, St. Louis, U.S.A. Croton oil was obtained from Serva Feinbiochemica, Heidelberg, Germany. Albino rats of both sexes weighing between 180-200g were obtained from the University Animal House. The animals were kept in large plastic cages and acclimatized for at least two weeks before the commencement of the experiments. The animals were fed with a standard diet of growers mash supplied by Gee Pee Nigeria Limited and had access to clean drinking water *ad libitum*.

The fresh leaves of the plant *A. precatorius* were dried in the open air in a shade for a period of about four weeks prior to extraction process. The water extract of the plant was obtained by decoloration in accordance with the general process described in the USP XII (10) to yield an extract of 4.0%w/v, which was used in the experiment. Inflammation was induced using the method of Toneli et al (1965) (9) as modified by Branbaifaa and Georgewill (1987) (12). Croton oil vehicle containing 4 parts pyridine, 1 part distilled water, 5 parts diethyl ether and 10 parts croton oil in diethyl ether (V/V) was selected as the inflammatory agent. The croton oil vehicle was applied to the right ear of four rats via curved felt forceps until the ear surfaces appear uniformly moist. Six hours later, each animal was lightly etherized and both ears were removed uniformly by a sharp scissors and individually weighed on a sensitive balance. The inflammatory response was quantitated by the increase in weight of the treated ear expressed as percentage to the weight of the contra-lateral ear. To determine the anti-inflammatory activity of the extract and acetylsalicylic acid, the extract and ASA were separately applied topically to the right ear together with the croton oil. The anti-inflammatory response was quantitated by expressing the increase in weight of the treated ear as a percentage of the weight of the contra-lateral ear (which had only croton oil applied).

Results are reported as mean + S.E. of mean of 20 rats for each agent.

Student t-test was utilized to test for statistical significance.

3. Results

Table 1 shows percent reduction of the inflammatory response following topical application to the right ear of the rat of the extract of the plant *A. precatorius* and acetylsalicylic acid in croton oil vehicles (inflammatory response measured as increased in weight of rat ear produced by croton oil taken as 100%).

From table 1 the average of the inflammatory response induced by croton oil was taken as 100%. Percentage reduction was calculated as difference in weight of treated ear in the presence of the extract or ASA and the weight of the contra-lateral croton oil alone treated ear.

4. Discussion

Acetylsalicylic acid is a very effective non-steroidal anti-inflammatory agent (Monceda et al 1979)(10). Decreases in weight of the croton oil treated ears of the rats provided an adequate index of anti-inflammatory response and thus allows for assessment of many substances for topical anti-inflammatory activity. The results of this present study shows that extract of the plant *A. precatorius* possesses anti-inflammatory property and produced significant reduction in the croton oil treated rat ear (67.10 + 2%) thus exhibiting potent anti-inflammatory activity though lesser than that produced by acetylsalicylic acid (71.1 + 2%).

This finding therefore may justify the use of the plant in the treatment of inflammatory disease conditions by traditional healers. Further study is required to investigate the toxicity of this plant as well as possible extraction of the active ingredient for future therapeutic use.

Original Article

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References

1. Vane I, Botting R. Inflammation and the mechanism of action of anti-inflammatory drugs. *FASEB J* 1987; 1: 89-96.
2. Serhan CN, Takano T, Maddox JF. Aspirin triggered lipoxin A4 and stable analogs of lipoxin A4 are potent inhibitors of acute inflammation. Receptors and pathways. *Adv Exp Med Biol* 1999; 447: 133-149.
3. Rao BN, Anderson MB, Mussea JH, Gilbert JH. Sialyl Lewis X mimic derived from a pharmacophore search are selective inhibitors with anti-inflammatory activity. *J Biol Chem.* 1994; 269: 19663 – 19666.
4. Famaey JP. Phospholipases, Eicosanoid production and inflammation (Review). *Clin Rheumatol* 1982; 1: 84-91.
5. Nath D, Sethi N. Commonly used abortifacient plants with special reference to their teratologic effects. *Ethnopharmacol* 1992; 36: 147-154.
6. Rain-Tree (2004): <http://www.rain-tree.com/abrus.htm>.
7. Chopra, R.N., (1958): *Indigenous drugs of India*. UN Dhar & Sons Pvt Ltd., Calcutta.
8. Chopra, R.N., Nayar, S.L. & Chopra, I.C., (1956) : *Glossary of Medicinal Plants*, CSIR, New Delhi
9. Toneli G, Thuboult L, Rinler I. A bioassay for the concomitant assessment of antiphlogistic and thymolytic activities of topically applied corticosteroids. *Endocrinol* 1965; 77: 625-634.
10. "Guidance document on acute oral toxicity testing "series on testing and assessment No. 24, Origination for economic operation and development OECD Environment, health and safety publication, Paris 2001.
11. Monceda S, Viane, JR. Mode of action of Aspirin like drugs. *Adv Intern Med* 1970; 24: 1-22.
12. Branbaifa N, Georgewill OA. A quantitative assessment of topical antiphlogistic potencies of corticosteroids and non steroids. *Medipharm Med Journal* 1987; 1: 10-13.