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Original article

Evaluation of anti-inflammatory activity of extract of Vernonia amygdalina

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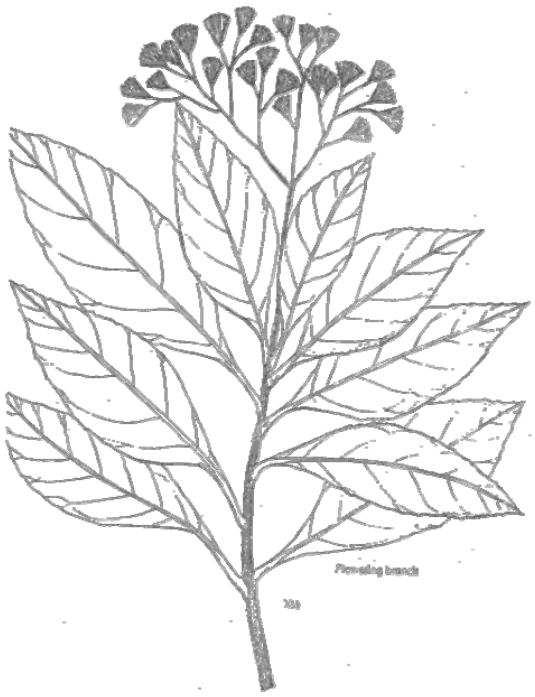
Abstract: The anti-inflammatory activity of the extract of *Vernonia amygdalina* was investigated. Inflammatory response was induced by topical application of croton oil dissolved in suitable vehicle on the rat ear. After 6 hrs, cutting out the ear quantitated the response. The cut ear is weighed and the increase in weight relative to controls evaluated. Extract of V.amygdalina 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 V. amygdalina 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, Vernonia amygdali

1. Introduction

Vernonia amygdalina is a shrub or small tree of 2-5 m with petiolate leaf of about 6 mm diameter and elliptic shape. The leaves are green with a characteristic odour and a bitter taste. It is shown in the next picture. It grows under a range of ecological zones in Africa and produces large mass of forage and is drought tolerant.There are about 200 species of Vernonia. The leaves are used for human consumption and washed before eating to get rid of the bitter taste. They are used as vegetable and stimulate the digestive system, as well as they reduce fever. Furthermore, are they used as local medicine against leech, which are transmitting bilharziose. *V. amygdalina* has been observed to be eaten by goats in Central Zone of Delta State, Nigeria.

Local vasodilatation and increase in capillary permeability contributes to the edema. 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 induce 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

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model in assessing the topical anti-inflammatory activity of various substances (5). The method is simple, rapid and repeatable. *V. amygdalina* (bitter leaf) is a small shrub with green leaves, a characteristic ordour and bitter taste. It contains alkaloids and flavinoids (6). The leaves soaked in water have been used to treat various diseases such as fever and to increase bowel movement. In folk medicine it has been used to treat malaria, diabetes and inflammatory diseases (7). 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 V. *amygdalina*.

2. Materials and methods

Acetylsalicylic acid was purchased from Sigma Chemical Company, St. Loius, 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 nsupplied by Gee Pee Nigeria Limited and had access to clean drinking water *ad libitum*. The fresh leaves of the plant V. *amygdalina* 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 USPXII to yield an extract of 4.0%w/v, which was used in the experiment. Inflammation was induced using the method (5) as modified by (8). 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 as (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

There was a 69.10% reduction of the inflammatory response following topical application to the right ear of the rat of the extract of the plant V. *amygdalina* and 71.1% reduction for acetylsalicylic acid in croton oil vehicles (inflammatory response measured as increased in weight of rat ear produced by croton oil taken as 100%).

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. Discussions

Acetylsalicylic acid is a very effective non-steroidal anti-inflammatory agent (9). 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 *V. amygdalina* possesses anti-inflammatory property and produced significant reduction in the croton oil treated rat ear (68.10 + 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.

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