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Anti Inflammatory Activity of *Basella Alba* Linn. in Albino Rats

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ABSTRACT

The traditional medicinal plant *Basella alba* belongs to Basellaceae. Earlier folklore claims reports that the plant is used in inflammatory conditions. Inflammation is the complex biological response of vascular tissues to harmful stimuli, such as pathogens, damaged cells, or irritants. The present work was focused to evaluate anti inflammatory activity by cotton pellet granuloma method. The *Basella alba* leaves were subjected to cold maceration process by using solvent, 50% ethanol for 48hrs. The extract was obtained by filtration. The filtrate was freeze dried to get the powder product. The extract was mixed with 2% gum acacia to prepare suspension for oral dose. Sub acute inflammation was produced by cotton pellet granuloma. Sterile cotton (50+1mg) soaked in 0.2 ml of distilled water containing penicillin (0.1mg) and streptomycin (0.13mg) was implanted subcutaneously by incision on the back under ether anesthesia. Drugs were orally administered for 6days, the animal was sacrificed on seventh day and granuloma was dissected out, dried in oven for 24 hrs and weighed. The percentage inhibition was determined. To test the anti inflammatory activity phenyl butazone was taken as standard. Effect of different treatment (control, phenyl butazone, BLE-1, BLE-2) in sub acute inflammatory models in rats was studied and percentage inhibition of inflammation of standard and drug extract was compared in the present study. As the availability, cost and side effect of synthetic drugs impact on health as well as economy, mankind should go for natural treatment should go for natural treatment prior to synthetic drug.

Keywords: Pellet granuloma, BLE-1, BLE-2, phenyl butazone, freeze drying.

INTRODUCTION

Basella alba L., commonly has known as "Poi (Hindi), Potaki (Sanskrit) and Pasalakkirai (Tamil) (Nandkarni, 1976). Medicinal plants play a paramount role in new era of modern medicine. The traditional medicinal plant *Basella alba* belongs to Basellaceae. It was tested for anti inflammatory activity in albino rats. Inflammation is a normal protective response to tissue injury and it involves a complex array of enzyme activation, mediator release, fluid extravasations, cell migration, tissue breakdown and repair (Vane & Botting, 1995) which are aimed at host defense and usually activated in most disease condition. The critical role of inappropriate inflammation is becoming accepted in many diseases that affect man, including cardiovascular diseases, inflammatory and autoimmune disorders, neurodegenerative conditions, infection and cancer (Mariotti, 2004).

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In appreciating the inflammatory process, it is important to understand the role of chemical mediators. These are the substances that tend to direct the inflammatory response. These inflammatory mediators come from plasma proteins or cells including mast cells, platelets, neutrophils and monocytes/macrophages. They are triggered by bacterial products or host proteins. Chemical mediators bind to specific receptors on target cells and can increase vascular permeability and neutrophil chemotaxis, stimulate smooth muscle contraction, have direct enzymatic activity, induce pain or mediate oxidative damage. Most mediators are short-lived but cause harmful effects. Examples of chemical mediators include vasoactive amines (histamine, serotonin), arachadonic acids (prostaglandins, leukotrienes) and cytokines (tumor necrosis factor and interleukin-1) (Smith & Sotiris, 2004). *Basella alba* L. also known Indian spinach. The aerial part (leaves, stem) of the *plant* serve as edible plant (vegetable) in many parts of world (Kirtikar & Basu, 2000). These contain different components which have extensively used in constipation, as diuretic, in urticaria, as demulcent, antiulcer, and as cooling application for burn (Vaidratanams, 2002). India, due to its geographical and environmental positioning has traditionally been a good source for such products among the Asian countries. The Indian health care has inherited a large number of traditional practices, systems and medicines as a part of total health care scenario, some of them are 3000 years old.

EXPERIMENTAL METHODS

Plant material

Basella alba Linn var. *alba* leaves for the proposed study were collected from vegetable market of Nellore (India) and authenticated by Dr. C. Venkataramaiah, Reader in botany, V R College, Nellore S.P.S.R. Nellore District of Andhra Pradesh, India and the same has been deposited as a voucher specimen (VCHS No. 1503) for future reference in the department of botany, VR College, Nellore, S.P.S.R. Nellore District, Andhra Pradesh, India. The fresh collected leaves of *Basella alba* Linn. were shade dried and used for this study. The coarse powder was subjected to cold maceration process by using solvent, 50% ethanol for 48hrs. The extract was obtained by filtration. The filtrate was freeze dried to get the powder product.

Acute toxicity study

Acute toxicity study was performed according to OECD guideline 423. Animals were fasted prior to dosing, food but not water should be withheld overnight. Following the period of fasting, the animals were weighed and extract was administered. Three animals are used for each step. The dose level of extract to be used as the starting dose is selected from one of the four fixed levels 500, 1000, 1500 and 2000mg/kg body weight. The starting dose level should be that which is most likely to produce mortality in some of the dose animals. After administration of test sample, the animals were observed continuously for first 4 hrs for behavioral changes and at the end of 24 hr for mortality rate if any.

Method

The extract was mixed with 2% gum acacia to prepare suspension for oral dose. Sub acute inflammation was produced by cotton pellet granuloma. Sterile cotton (50+1mg) soaked in 0.2 ml of distilled water containing penicillin(0.1mg) and streptomycin(0.13mg) was implanted bilaterally in axilla under ether anesthesia. Rats are divided into four groups six rats in each. Group –I stands as control which receives vehicle i.e. 2% gum acacia. Group –II receive the standard drug Phenyl butazone 100 mg/Kg orally. Group –III receive *Basella alba* leaves extract 250 mg/Kg orally. Group-IV receives *Basella alba* leaves extract 500 mg/Kg orally. Autoclaved cotton pellets 50±1 mg was implanted subcutaneously by incision on the back under ether anesthesia. Drugs were administered daily orally for 7 days. Animals were killed on 7th day and granuloma was dissected out, dried in the oven in 60^o C for 24 hours and weighed. The percentage of inhibition of granuloma was determined. The percentage of inhibition calculated by using following formula

$$\text{C-T \% inhibition} = \frac{\text{C-T} \times 100}{\text{C}}$$

Where, C = Dry weight of the cotton of control group animal

T = Dry weight of the cotton in the test group animals. The results were tabulated as percentage inhibition of granuloma (Olumayokun et al., 2000; Dhara et al., 2000; Amresha et al., 2007) .

Statistical Analysis

All the data was expressed as Mean ± SEM. Statistical significance between more than two groups was tested using one way ANOVA followed by the Dennett's test using computer based fitting program (Prism graph pad version 5.0). Statistical significance was set accordingly. Drugs were orally administered for 6days, the animal was sacrificed on seventh day and granuloma was dissected out, dried in oven for 24 hrs and weighed. (Prism graph pad version 5.0). Statistical significance was set accordingly.

RESULTS

Extraction

About 3.45% w/w of the yield was obtained from the maceration of the *Basella alba* leaves.

Acute toxicity study

In acute toxicity study there was no behavioral changes up to 4 hours and no mortality was observed up to the end of 48 hours even at the maximum tested dose level of 2000mg/kg per oral as a result an effective dose of 250mg/kg and 500mg/kg body weight is taken for the present study.

Cotton pellet induced inflammation

In the cotton pellet granuloma technique, the animals treated with the plant extract have been shown a significant activity at 500 mg/kg dose (p<0.001) which was comparable with the standard drug.

Table 1: Effect of different treatments in sub acute inflammatory model in rats.

Group	Control	Standard	Test 1	Test 2
Dose	2% gum acacia	Phenyl butazone 100mg/kg orally	BLE 250mg/kg	BLE 500mg/kg
1.	78.82	23.86	37.98	30.91
2.	78.91	23.45	38.86	32.09
3.	79.12	22.98	39.64	31.86
4.	80.64	24.01	40.56	32.89
Weight of dry cotton pellet granuloma	79.33	23.57	39.26	31.93
Mean + error weight	79.33 ± 0.42	23.57±0.23	39.26±0.55	31.93± 0.40

Table 2: Percentage inhibition of inflammation of different treatments in sub acute inflammatory model in rats.

Groups of treatment	Control	Standard	Test 1	Test 2
Dose /kg body weight of rat	2% gum acacia	Phenyl butazone 100mg/kg orally	BLE 250mg/kg	BLE 500mg/kg
Weight of dry cotton pellet granuloma (mg)	79.33	23.57	39.26	31.93
Percentage of inhibition	-	70.7	50.6	60.7

Table 1 depicts the effect of different treatments in sub acute inflammatory model of four individual animals after 7 days of different treatments in sub acute cotton pellet granuloma model. The weight of dry cotton pellet granuloma of control (2% gum acacia orally), standard (phenyl butazone 100mg/kg, oral), Test-I (BLE = 250mg/kg orally), Test-II (BLE = 500mg/kg orally) is 79.33, 23.57, 39.26, 31.93. In this model of sub acute inflammation, the weight of the granulation tissue was significantly reduced by treatment with two test group (BLE) and phenylbutazone when compared to control.

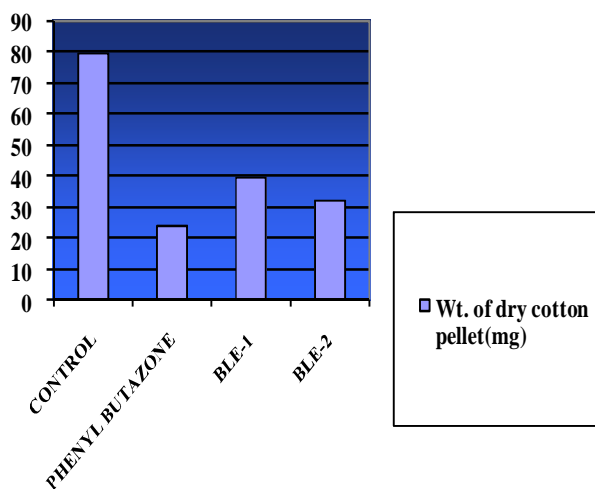
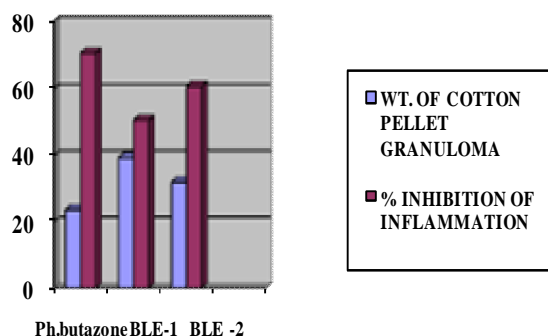
**Fig. 1** Effect of Different Treatment Group in Sub Acute Inflammatory Model in Rat.**Fig. 2** Comparison between Cotton Pellet Granuloma & % Inhibition of Inflammation.

Table 2 depicts the Percentage inhibition of inflammation of dry cotton pellet granuloma of four individual animals after 7 days of different treatments in sub acute cotton pellet granuloma model. The Percentage inhibition of inflammation standard (phenyl butazone 100mg/kg, oral), Test-I (BLE = 250mg/kg orally), Test-II (BLE = 500mg/kg orally) is 70.7, 50.6, 60.7. In this model of sub acute inflammation, the weight of the granulation tissue was significantly reduced by treatment with two test group (BLE) and phenylbutazone when compared to control.

DISCUSSIONS

In cotton pellet induced granuloma, the test drugs were found to be less potent than phenyl butazone. In the present investigation the drugs are effective in sub acute or chronic inflammation. In cotton pellet induced granuloma, the test drugs were found to be less potent than phenyl butazone. In the present investigation, the test drugs are 50 % (BLE 250mg/kg) and 60 % (BLE 500mg/kg) as effective as standard group 70% sub acute or chronic inflammation. As the availability, cost and side effect of synthetic drugs impact on health as well as economy, mankind should go for natural treatment should go for natural treatment prior to synthetic one.

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