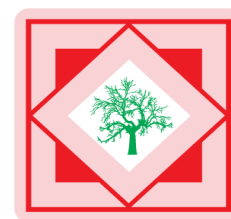




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Anti- histamine effect of hydroalcoholic extract of *Andrographis Paniculata* leaf (Burm. F)

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ABSTRACT

Andrographis paniculata has obtained a well renowned name as one of the best traditional remedies, owing to its multiple pharmacological activities. In this work, the anti- histamine effect of hydroalcoholic leaf extract of *Andrographis paniculata* (Burm.f), family Acanthaceae, was planned. The concentration response curve (CRC) of histamine was recorded and its modification by anti histamine drugs of pheniramine maleate and hydroalcoholic extract of *Andrographis paniculata* Leaf (1mg/ml) by using guinea pig ileum preparation. The histamine dose responses were reduced (* $P < 0.005$) after the incubation of hydroalcoholic extract of *Andrographis paniculata* Leaf (1mg/ml) when compared with normal CRC of histamine. The CRC of histamine was reduced (* $P < 0.05$) after the incubation of pheniramine maleate (100 μ g/ml) when compared with normal CRC of histamine. The pheniramine maleate has been highlighted more anti histamine activity when compared with *Andrographis paniculata* leaf extract (APLE). Hence our present study was aimed to justify that the traditional claim of the entire leaf has used against histamine induced disease condition.

Keywords: *Andrographis paniculata* (Burm.f), antihistaminic activity, pheniramine maleate.

INTRODUCTION

Most histamine in the body is generated in granules in mast cells or in white blood cells called basophils. Mast cells are especially numerous at sites of potential injury - the nose, mouth, and feet, internal body surfaces, and blood vessels. Histamine exerts its actions by combining with specific cellular histamine receptors. The four histamine receptors that have been discovered are designated H1 through H4, and are all G protein-coupled receptors [1, 2].

Allergens can bind to IgE-loaded mast cells in the nasal mucosa, which leads to three clinical responses: sneezing results from histamine-associated sensory neural stimulation; hypersecretion from glandular tissue occurs; nasal mucosal congestion results due to vascular engorgement associated with vasodilation and increased capillary permeability [3].

The clinical and pharmacological activities of H₁-receptor antagonists are need not be overemphasized. Antihistaminics are used in symptomatic treatment of rhinitis, sneezing, rhinorrhoea, basal itch etc [4]. However; many of them produce drowsiness and CNS depression [5]. Anti-histaminic principles are useful in the treatment of Asthma. Classically, antihistamines (H1 histamine receptor antagonists) produce sleep. As an integral part of the immune system, histamine may be involved in immune system disorders and allergies.

Scientific investigation into plants traditionally used to treat poisonous bites are showing results which indicate the plants may provide the source for individual compound or standardized extract which could be of benefit in many places where poisonous bite is a serious public health hazard.

Andrographis paniculata (Kalmegh) is a plant used extensively in the Indian traditional system of medicine as it exhibits more than 30 therapeutic activities [6]. *Andrographis paniculata* (Burm.f) is a medicinal herb or small shrub distributed in tropical Asia. It belongs to the family of Acanthaceae. Leaves linear, attenuated into a petiole; Pinkish white flowers; bracts-lanceolate, two bracteoles, calyx-five lobes, corolla- white pink, hairy glandular, deeply bifid; ovary oblong; capsule epicarp translucent and many seeded [7-9]. The earlier report says that the plant is composed of the active principles Andrographolide, andrographidin, andrographinin, andropanoside, γ -bisabolene, carvacrol, caffeic acid, myristic acid, α -sitosterol, stigmasterol and also flavanoids, terpenoids, alkaloids and alkanes [10-12].

An ethnobotanical study of this plant reveals its use in the various disorders like snake bite, liver disorders, diabetes, anaemia, antipruritic, infective hepatitis, inhibiting platelet aggregation, diarrhea, scabies and showing cytotoxic, cardiac depressant and nicotinic agonist activity[13-15]. The plant is very useful in general debility, dysentery, dyspepsia; roots and leaves are febrifuge, stomachic, tonic, alterative and anthelmintic; the fresh juice of the leaves is mixed with spices such as cardamom, cloves, cinnamon and used as a household remedy for the minor digestive ailments of children[16-19]. *Andrographis paniculata* was used as an antidote to snake bite by ancient Ayurvedic physicians also.

The present work 'Anti-histaminic effect of *Andrographis paniculata*' was planned to develop a remedy from the traditional system of medicine. *Andrographis paniculata* is chosen as the choice

because of its easy bioavailability and economical importance; a single solvent is sufficient enough to get the extract; source of histamine, both natural and synthetic are available at ease; the experimental model can easily be sensitized so as to get a sharp Drug Response Curve; A single dose pretreatment of the plant (20 / 50 mg per Kg) is sufficient enough to correct various ailments. In spite of the voluminous literature on the subject, the treatment of toxic effects continues to be far from satisfactory. All these foregoing informations generated our interest to undertake a study with the plant for screening its anti-histaminic activity.

MATERIALS AND METHOD

The whole plant was collected locally and was duly authenticated by the Botanical survey of India, Tamilnadu Agricultural University Campus, Coimbatore and a voucher specimen (BSI/SC/5/23/09-10/Tech-1354 dated 12/01/10) was deposited in the herbarium of our institute. The leaves were separated from the shoot system and then air dried. The dried material was extracted with hydroalcohol using soxhlet apparatus. *Andrographis paniculata* leaf extract (APLE) was used for the study.

Chemicals

Histamine procured from Sigma Chemicals, Chennai. All other chemicals and reagents were procured from Hi-Media Laboratories limited, Mumbai.

Animals

Guinea pigs (400-600 g) of either sex are procured from Agricultural University, Mannuthy, Kerala. They are maintained under standard conditions (temperature $22 \pm 2^\circ \text{C}$, relative humidity $60 \pm 5\%$ and 12 h light/dark cycle). The animals were housed in sanitized polypropylene cages containing sterile paddy husk as bedding. They had free access to standard pellet diet and water *ad libitum*. The Institutional Animal Ethics Committee approved (IAEC No: Ph4\2002) the experimental protocol. All the animals received humane care according to the criteria outlined in the "Guide for the Care and Use of Laboratory Animals" prepared by the "National Academy of Sciences" and published by the "National Institute of Health".

Experimental method [20]

The animal, Guinea pig (400- 600 g) fasted for duration of 48 h was sacrificed for the experimentation. The luman of ileum was then isolated and placed in Tyrode solution. After washing the contents (2-3 cm long) was taken and mounted in the organ bath containing Tyrode solution at $32-35^\circ \text{C}$, which is bubbled with air. A tension of 0.5 g was applied and the tissue was allowed to equilibrate for 30 minutes before adding drugs to the organ bath. Concentration dependent responses due to histamine were recorded using frontal writing lever. Contact time of 30 seconds and 5 minutes time cycle are kept for proper recording of the responses. Added *Andrographis Paniculata* Leaf Extract (1mg/ ml) to the reservoir containing Tyrode solution kept aside for 30 minutes. Repeated the response curve (CRC) of histamine in presence of APLE labeled and fixed the tracing.

Figure-1: CRC of anti histaminic effect of Pheniramine maleate

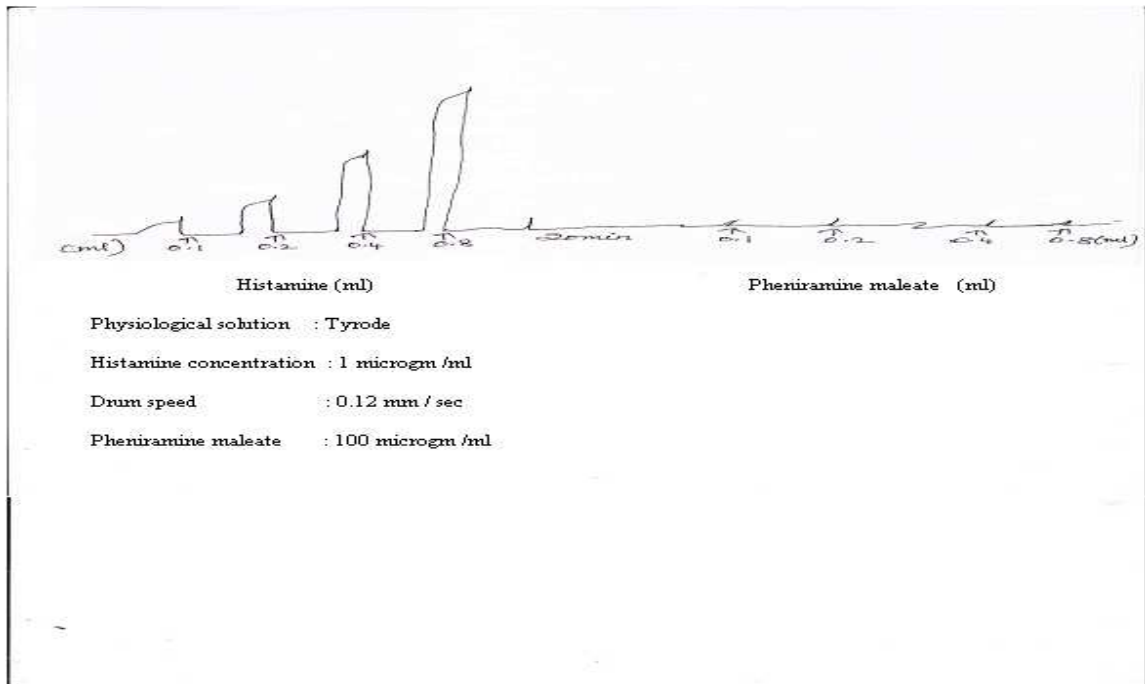


Figure-2: CRC of anti histaminic effect of APLE

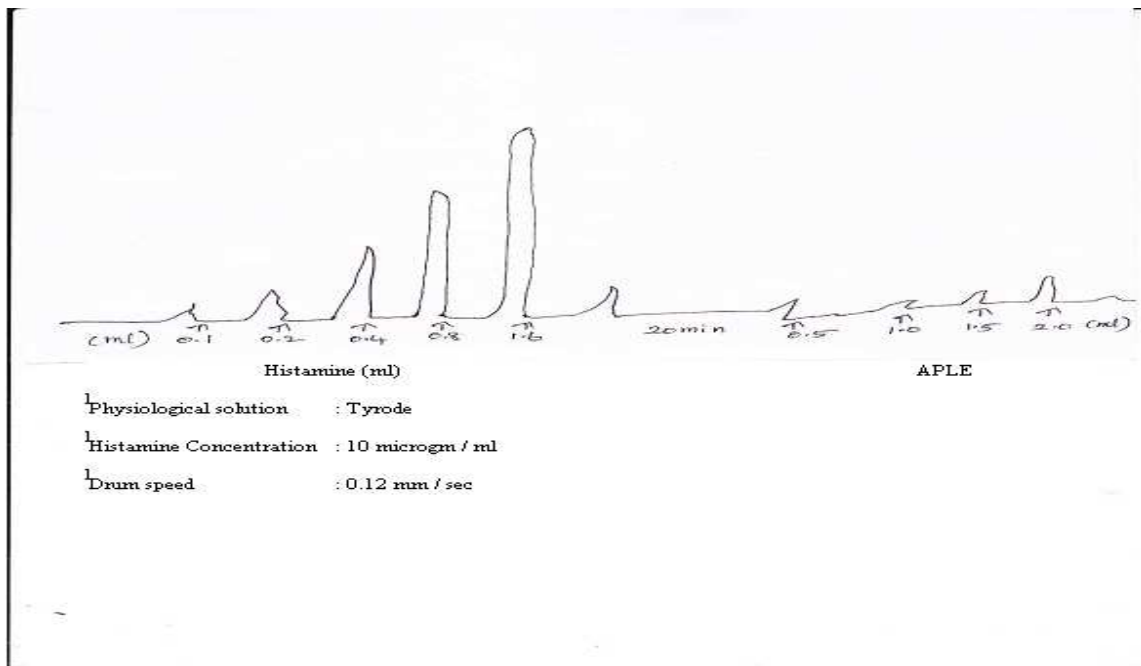
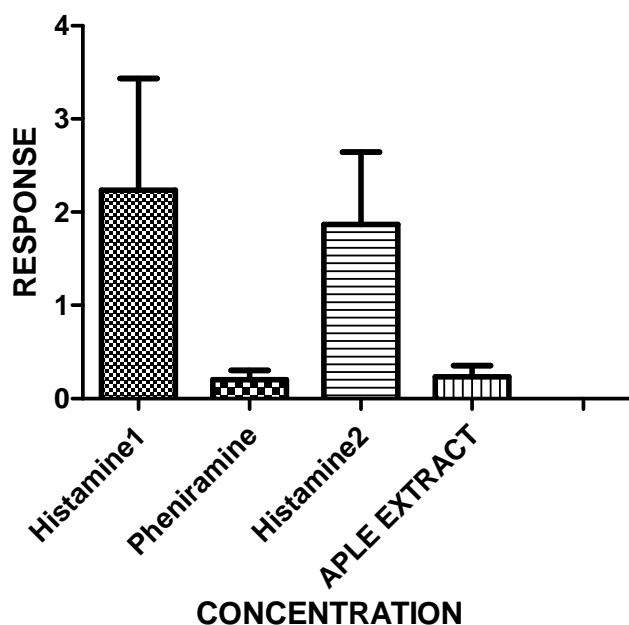


Table - 1. Effect of APLE against histamine response

TREATMENT	RESPONSE
Histamine	2.44 ± 1.448
Pheniramine maleate	0.26± 0.103*
Histamine2	2.22± 0.88
APLE	0.27± 0.130*

Figure - 3. Effect of APLE against histamine response

RESULTS

The preliminary phytochemical studies revealed the presence of flavonoids, terpenes, steroids and terpenoids. In this study, the guinea pig ileum showed the allergic sensitivity towards the administration of histamine (1 mg / ml). This sensitivity has been observed as a marked elevation, owing to the vibration rendered by subsequent contraction and relaxation of the tissue.

The Fig. I was showing the CRC of anti histaminic effect of Pheniramine maleate (100 µg) against the histamine concentration (1 mg / ml). The Fig. II was showing the different CRC of APLE antagonizing the histamine effect. From the above stated figures, it was generalized that 1 mg / ml of APLE was showing the anti-histaminic activity nearly equivalent to 100 µg of the standard drug, pheniramine maleate.

The results of histamine dose responses were expressed as Mean ± Standard Error, (P<0.05) and (P<0.001) when compared to control with normal CRC (Table-1) and evaluated by using one way ANOVA followed by Dunn's Multiple Comparison Test (Fig.3).

DISCUSSION

In the body, histamine is present in various biological fluids, platelets, leucocytes, basophills and mast cells. Generally, histamine acts on three types of receptors such as H₁, H₂ and H₃ receptors⁵. Besides the triple responses caused by histamine, it has spasmogenic response on intestinal smooth muscle. By acting on H₁ receptors, it causes the contraction of intestinal smooth muscle. The present study indicates that APLE acts as the H₁ receptors antagonist. From the results, it is also evident that the plant shows anti-snake bite activity due to its anti-histaminic activity.

Being an anti-histaminic, this herb was found to be suitable in the treatment of snake bite, scorpion sting bite, insect bite, bee bite, red ant bites and anaphylactic shock, since the mechanism that lies behind all these ailments is owing to the release of histamine, whose action can be blocked by this sub shrub *Andrographis paniculata*. This may be suggestive of an anti-poisonous effect following the treatment with *Andrographis paniculata* extract.

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