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Anti-Inflammatory Activity in *Urginea wightii*, (Lakxmin) Kunth, Hyacinthaceae

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ABSTRACT

In the present study antiinflammatory activity of methanolic extract of Urginea wightii in vivo were made. The anti inflammatory action of methanolic extract of the bulbs of Urginea wightii was evaluated in male Wistar rats against Carrageenan induced paw edema . The effect of the extract were compared with the classical anti- inflammatory marketed product pyrox gel. A significant anti-inflammatory effect was produced with the methanolic extact of the bulb of U. wightii on external application at different concentration.

Key words: *Anti-inflammatory activity, Carrageenan, Pyrox gel, Urginea wightii.*

INTRODUCTION

Great interest in herbal medicine as a potential source of phytopharmaceuticals has created the need to review common factors responsible for major diseases and body disorders. The present study shows one such common factor in inflammation and the role herbal medicine can play.

Our herbal wealth constitutes more than 8000 species and accounts for around 50 per cent of all higher flowering plant species of India. About 1800 species are used in classical Indian systems of medicines.

Traditional medicinal herbal remedies in India have long been used to treat various pain- or inflammation-related symptoms. Although the precise mechanisms of action of many herbal drugs have yet to be determined, some of them have been shown to exert anti-inflammatory and antioxidant effects in a variety of cells in the human and animal bodies[7]. Without inflammation, wounds and infections would never heal. Similarly, progressive destruction of the tissue would compromise the survival of the organism . The plants are one of the most important sources of medicines.

In a medicinal plant its parts contains substances that can be used for therapeutic purposes or which are precursors for the synthesis of direct therapeutic agents. Use of medicinal plant is increasing in many countries where 35% of drugs contain natural products.India is known due to availability of several thousands of medicinal plants in the different bioclimatic zones[4].

Some of the important bioactive food components are polyphenols,anthocyanidins,carotenoids, flavonoids, glucosinolates, isoflavonoids, limonoids, lycopenes, omega3 and 6 fatty acids, phytoestrogens, polyphenols terpenoids.They play specific pharmacological effects in human health as anti-inflammatory, antiallergic,antibacterial, antifungal and antidiabetic[3].

Some of these naturally occurring bioactive substances with antioxidant properties, such as plant phenols, vitamins, carotenoids, and terpernoids have also been shown to have anti-inflammatory activity and are thought to play an important role in disease prevention and health promotion, especially in chronic inflammatory diseases[6].

Animal studies have also shown biological effects of several naturally occurring substances from foods,

herbs and other natural sources being implicated in chronic diseases. Some of these naturally occurring bioactive substances with antioxidant properties, such as plant phenols, vitamins, carotenoids, phytoestrogens and terpernoids also have been shown to have anti-inflammatory activity and may play an important role in disease prevention and immune promotion, especially in chronic inflammatory diseases.

Inflammation is a complex process initiated by several factors ranging from bacterial infection and chemical injury to environmental pollution that result in cell injury or death[8]. The levels of phenolic and flavonoid compounds were correlated with the antioxidant and anti-inflammatory activities of the herb extracts[14].

Other constituents of bulbs are mucilaginous and saccharine matter, including a peculiar mucilaginous carbohydrate named Sinistrin, an Inulin-like substance. The bulb has several medicinal properties .

Fig 1: *Urginea wightii* Reproductive phase

Fig: 1. a

Fig: 1. b

Inflammation is a localized protective reaction of cells/ tissues of the body to allergic or chemical irritation, injury and/or infections. The symptoms of inflammation are characterized by pain, heat, redness, swelling and loss of function that result from dilation of the blood vessels leading to an increased blood supply and from increased intercellular spaces resulting in the movement of leukocytes, protein and fluids into the inflamed regions. Diseases and disorders are manifested through inflammatory responses as the body recognises the injury and prepare to repair the damage. To appreciate the inflammatory process it is important to understand the role of chemical mediators. These mediators are the substances released as plasma proteins, or that come from cells like mast cells, platelets, neutrophils and monocytes/macrophages.

In recent years, the scientific community has agreed to focus its attention on a class of secondary metabolites extensively present in a wide range of plant foods: the flavonoids, suggested as having different biological roles. The anti-inflammatory actions of flavonoids in vitro or in cellular models involve the inhibition of the synthesis and activities of different pro-inflammatory mediators such as eicosanoids, cytokines, adhesion molecules and C-reactive protein[2].

Ethnopharmacological relevance *Urginea wightii* is used to treat several inflammatory diseases and arthritis in Indian traditional system and folk medicine. The aim of the present study was to evaluate the scientific basis of antiinflammatory activity of *Urginea wightii* and to evaluate the active crude extract.

MATERIALS AND METHODS

Carragenan, Histamine and Methanolic extracts of the bulbs were used.

Urginea wightii was obtained from hilly area of Yedeyur, near Bangalore, Karnataka, India; the bulbs were cut into small pieces and shade dried at room temperature. The plant bulbs were powdered and then subjected for alcoholic extraction process with 95% v/v methanol for 18 hour, using Soxhlet apparatus. The methanolic extract was prepared by taking 100 g of powder in a round bottom flask and macerated with 500 ml of distilled water with 10 ml of chloroform (preservative) for 7 days with shaking for every hour in a closed vessel.

Male Wistar rats were selected for the *in vivo* study with a weight range of 200-250g. Animals were housed in polypropylene cages (4-6 animals per cage) with adequate arrangement for water and feed.

Inducing inflammation in the sub-plantar region by (local) administration of carrageenan.

Application of patch of drug to the thigh region of animal (shaved) (2cm×2cm).

Measurement of paw edema at regular intervals (0h, 4th, and 10^{th} hrs) using digital vernier caliper.

Three groups of animals (Positive control), Pyrox gel treated (Standard group) and plant extract treated (Test group) with 6 animals in a group were used for the anti-inflammatory activity. The animals of the standard group and plant alcoholic extract group were treated with the drug one hour before the study while no such treatment procedure was adopted for the control group.

About 1 g of (0.5%w/w) Pyrox gel and test group containing *Urginea wightii* methanolic extract was applied as a patch on to the right thigh region of the albino wistar rats. One hour after gel patch / the Plant extract to the thigh region, Delta-carrageenan solution (0.05ml of 1% solution prepared in normal saline) was injected into the sub-plantar region of the right hind paw for all the animals. The thicknesses of swollen paw of all the animals were measured using digital vernier caliper at predetermined time points of 0, 4 and 10 hrs respectively. The average paw thicknesses in the three groups (control, active drug treated and methanolic extract plant extract treated) were compared and the percentage inhibition of paw thickness was measured and tabulated.

Table – 1: Antiinflammatory effect of methanolic extract of *Urginea wightii*

Time (hours)	**0 hrs**	**4 hrs**	**10 hrs**
Control	4.33mm	7.46mm	7.99mm
Pirox-cream (0.5%w/w,of piroxicam)	4.87mm	6.36mm	6.0mm
methanolic extract of plant	4.46mm	6.75mm	5.74mm

RESULTS AND DISCUSISONS

The Methanolic extract of dried powder of *Urginea wightii* have shown positive results for flavonoids such as flavonoid glycosides,

- 5, 6-dimethyoxy- 3', 4"- dioxymethylene- 7- O- (6"- beta- D-glucopyranosyl-beta-D-glucopyranosyl) flavanone,
- 5, 4'-dihydroxy-3-O-alpha-L-rhamnopyranosyl- 6- C- gluco pyranosyl-7-O-(6"- para- coumaroyl-beta- D- gluco pyranosyl) flavone and
- 5, 4'-dihydroxy-3-O-(2""-beta-glucopyranosyl- alpha- L- rhamnopyranosyl) - 6- C- glucopyranosyl-7-O-(6"-para-coumaroyl-beta-D-gluco pyranosyl) flavone

The methanolic extract of the bulbs inhibited the edema formation at diffrent time intervals, 0, 4 and 10 hrs. Methanolic extract of the plant *Urginea wightii* showed the inhibition of inflammation similar to reference drug Pirox-gel . Similar studies have been made by Rahman *et al*.,[11] in *Urginea indica,* Prakash

babu[10] in *Clerodendron phlomidis*. The similar study has shown by the ethanol extract and fractions of *L. cyanescens* root caused anti-inflammatory and analgesic effects which may partly be related to its chemical constituents such as flavonoids, tannins, saponins etc. and these effects are comparable to that of Aspirin in *Asparagus pubescent* roots.

Urginea wightii bulbs were sequentially extracted with Ethanol, Methanol and Chloroform solvents. The Methanolic extract showed significant anti inflammatory activity when compaired to other two extracts.

Inflammation induced by carrageenan, originally described by Winter, is acute, nonimmune, well-researched, and highly reproducible. Cardinal signs of inflammation—edema, hyperalgesia, and erythema—develop immediately following subcutaneous injection, resulting from action of proinflammatory agents—bradykinin, histamine, tachykinins, complement and reactive oxygen, and nitrogen species[1].

The Carrageenan induced inflammatory process involves three phases , First phase, second phase and third phase. During theis application the test animal releases Histamine, Serotonin, Bradykinin and Prostaglandins respectively.

In the present study the antiinflammatory activity of the three solvents extracts of *U. wightii* was assessed with the use of Carrageenan induced paw edema. The Methanolic extract of U. wightii was able to significantly reduce the paw edema at 4^{th} hour of the experiment. This may be due to the release of cyclooxygenase enzyme that are incolved in the formulation of Prostaglandins.

The net percentage of inhibition in paw volume after 4^{th} hour in Pyrox gel and plant extract was found to be 6.36 mms and 6.75 mms respectively. At the 10^{th} hour it was found to be 6.0 mms and 5.74 mms indicating not much variation in the percentage of paw volume.

CONCLUSION

Our results suggest that *U.wightii* displays considerable potency in antiinflammatoury action. Plants *Urginea wightii* is rich in flavonoids and bio flavonoids that are known for their anti inflammatory and antioxidant activities. Further research is in progress to identify the biomolecules responsible for the anti-inflammatory and antioxidant activities. These results are similar to the report of Hyun Pyo Kim *et.al* 2004, that describe plant flavonoids show anti-inflammatory activity in vitro and in vivo. Although not fully understood, several action mechanisms are proposed to explain in vivo anti-inflammatory action. Recent studies have also shown that certain flavonoids, especially flavone derivatives, express their anti-inflammatory activity.

Presence of Novel flavonoid glycosides from the bulbs of *Urginea indica* Kunth, was prooved by Nasim Sultana , Kaisarun Akter Natural Product Research Volume 24, Issue 11, 2010 .

The present study confirms the fact that the anti inflammatory activity is due to the presence of flavonoid glycosides isolated from *U. wightii* and analysed by GCMS.

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