Evaluation of anti-inflammatory activity of the pods of Iklil-ul-Malik
(Astragalus hamosus Linn.)

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Received 13 October 2008; Accepted 3 November 2009

The effect of test drug Iklil-ul-Malik (Astragalus hamosus Linn.) was studied in healthy adult Wistar rats of either sex weighing 150-200 g; animals were divided into 4 groups of 6 animals each. Animals in Group I served as control and was administered with 2 ml/kg distilled water. In Group II standard drug Piroxicam was given in the dose of 2.8 mg/kg. Animals in Group III and IV were treated with the dose of 0.58 g/kg of aqueous and alcoholic extract of Iklil-ul-Malik, respectively. Inflammation was induced by Carrageenin injection in rat hind paw. The significant reduction (P<0.01) was observed after 3 hours of injection. The percentage inhibition in standard and test groups was found to be 59.43, 52.17 and 54.34 %, respectively.

Keywords: Acute inflammation, Anti-inflammatory activity, Astragalus hamosus, Carrageenin, Iklil-ul-Malik, Piroxicam, Unani medicine.

IPC code; Int. cl. — A61K 36/00, A61K 36/481, A61K 131/00, A61P 29/000

Introduction

Inflammation is an important feature of great number of diseases. It is a response of the tissue to an injury, infection, irritation or foreign substance. It is a part of host defence, but when the response becomes too great it may be far worse than the disease itself and in extreme conditions, it may be fatal. Anti-inflammatory drugs are considered important because of their wide therapeutic potential and their utility in a number of diseases such as arthritis, lupus erythematosus, pemphigus and rheumatic fever and in a number of other disorders associated with pain, pyrexia and inflammation. Now-a-days, the synthetic drugs are although dominating the market but the element of toxicity that these drugs entail, cannot be ruled out. Some of the common side effects of anti-inflammatory drugs are nausea, vomiting, gastric disorders, rashes, nervous disorders, emotional disturbances, blood dyscrasia, bleeding tendency, metabolic disorders and many more even cancers and death¹. Search for safe and effective anti-inflammatory agents has been given priority in scientific research in Unani system of medicine on account of several grounds. Firstly anti-inflammatory drugs are therapeutically very important and have wide application, secondly, Unani medicine claims to possess many effective and safe anti-inflammatory agents, which are used widely by Unani physician since long², 3.

Moreover, many single and compound Unani drugs when subjected to experimental and clinical studies for anti-inflammatory and associated effects have shown very promising results. For instance Sheere Zaqqum was demonstrated to possess anti-arthritic activity⁴, Buzidan was shown to produce significant analgesic and anti-inflammatory effect⁵. Many compound Unani formulations such as Majoon Seer Alwi Khan⁶, Majoon Suranján⁷, Majoon Azaraqi⁸ and Habbe Gule Aak⁹, etc. have been reported to possess striking anti-inflammatory activity. Besides, many non pharmacopeial preparations that are used by Unani physicians have been shown to produce significant anti-inflammatory, analgesic and anti-arthritic properties¹⁰, ¹¹. However, since most of the drugs, which have been described in Unani meteria medica and are widely used by the physicians of Unani medicine in the treatment of inflammation and arthritis, have still not been studied scientifically for
their claimed effects therefore, there is an element of doubt regarding their efficacy and safety that can only be removed by scientific validation.

*Iklil-ul-Malik* is described to possess anti-inflammatory effect and is used as an anti-inflammatory agent by Unani physicians in various inflammatory disorders. This drug however, has not been subjected to scientific study. Therefore, in the present study, *Iklil-ul-Malik* (*Astragalus hamosus* Linn.) was selected for evaluation of anti-inflammatory activity against carrageenin induced rat paw oedema test to find out the activity of the test drug against acute inflammation.

**Materials and Methods**

**Animals**

The study was carried out in Wistar rats of either sex weighing 150-200 g and 3-4 months of age. Rats were served from central animal house facility, National Institute of Mental Health and Neurosciences, Bangalore. Animals were housed in polypropylene cages at 25±2°C of temperature with 12 h light and 12 h dark cycle. They were given a standard pellet diet and water was allowed under strict hygienic conditions. The Institutional Animal Ethical Committee approved all the experimental protocols.

**Preparation of Extract of Test Drug**

The test drug *Iklil-ul-Malik* was procured for study from Dawakhana Tibbiya College, AMU, Aligarh. The drug sample of Dawakhana Tibbiya College was identified as the pods of *Astragalus hamosus* Linn. (Fig. 1). The drug was crushed by the electric grinder. The semi powdered plant material was extracted in 400 ml distilled water in 100 g of crude drug, and 400 ml of methanol in 100 g of crude drug in Soxhlet’s apparatus for 6 hours in continuous boiling point. The extract was filtered and evaporated on water bath till it dried.

**Dose**

The dose of the drugs for the rats was determined by multiplying the human dose used clinically by conversion factor of 7 (Ref. 19). According to such a multiple would make the rat dose equivalent to human dose. Thus the dosage of the test drug used also corresponds to their Unani dosage and found to be 0.58 g/kg. The aqueous and alcoholic extracts of test drug were administered by oral route with the help of a gastric canula. All the suspensions were freshly prepared before each administration. Piroxicam was used as a standard referral agent to make the study comparable. Carrageenin type I Commercial Grade (C1013) was procured from Sigma Aldrich Chemicals Private Limited, Bangalore and Piroxicam (Pirox-20) from Cipla LTD, Bangalore.

**Experimental Study**

*Carrageenin induced rat paw oedema test*

The effect of test drug on Carrageenin induced edema in rat paw was studied by the method of Winter *et al* (1962) (Ref. 20). Wistar rats of either sex, weighing 150-200 g, were divided into 4 groups of 6 animals each. The thickness of right hind paw was measured by micrometer. Animals in Group I served as control were administered with 2 ml/kg distilled water. In Group II standard drug Piroxicam was given in the dose of 2.8 mg/kg orally. Animals in Group III and IV were treated with the dose of 0.58 g/kg of aqueous and alcoholic extract of *Iklil-ul-Malik* orally, respectively. One hour after the drug/vehicle treatment, animals were injected 0.1 ml of 1% suspension of commercial grade, type I of Carrageenin (C1013) in distilled water under the plantar aponeurosis of right hind paw, intradermally. The thickness of paw was again measured at 3 hours after the injection of Carrageenin. The percentage inhibition of inflammatory oedema in test and standard animals was calculated by the formula described by Newbould (1963) (Ref. 21).

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i = 100 \left\{1 - \frac{(a - x)}{(b - y)}\right\}; \quad i = \text{Percentage inhibition; } a = \text{Mean right hind paw volume of test/standard animals after carrageenin injection; } b = \text{Mean right hind paw volume of control animals after carrageenin injection; } x = \text{Mean right hind paw volume of test/standard animals before carrageenin injection.}
\]
injection; y = Mean right hind paw volume of control animals before carrageenin injection].

The mean paw thickness of test/standard group was also analyzed statistically in comparison with control group by ANOVA Test followed by post hoc multiple comparison test.

Results and Discussion

At 3rd hour the percentage inhibition of oedema was found to be 59.43 % in Standard group treated with Piroxicam (2.8 mg/kg), 52.17 % with 0.58 g/kg of aqueous extract and 54.34 % with 0.58 g/kg of alcoholic extract of Iklil-ul-Malik. The increase in paw thickness was found to be 2.30±0.20 mm in the Control group while it was significantly reduced to 0.933±0.18 mm (P<0.01) with standard drug, 1.10±0.28 mm (P<0.01) and 1.05±0.18 mm (P<0.01) with 0.58 g/kg of aqueous and alcoholic extract of Iklil-ul-Malik, respectively (Table 1).

The present study showed that the test drug possessed significant effect against acute inflammation in comparison to control group. The test drug however, produced a bit less effect as compared to the standard drug, which is evident from the difference in percentage inhibition diminished by two. As far as the aqueous and alcoholic extracts are concerned both produced almost same degree of effect.

Inhibition of Carrageenin induced inflammation in rats is one of the most suitable test procedures to screen anti-inflammatory activity. The development of Carrageenin induced oedema is biphasic. In this test it was observed that the test drug produced a significant inhibition of oedema after 3 hours of Carrageenin injection. It provided a lead regarding the mechanism of anti-inflammatory activity of test drug i.e. by blocking the prostaglandin synthesis that is the mediator of the late phase of inflammation induced by Carrageenin.22-24

Piroxicam is one of the oxicam derivatives, a class of anolic acid that produces analgesic, anti-inflammatory and antipyretic activity mainly by the inhibition of prostaglandin synthesis.1 In all the experimental models the test drug showed anti-inflammatory activity similar to Piroxicam, which further confirmed the mechanism of action of test drug.

One of the important symptoms of acute inflammation is pain, and Iklil-ul-Malik is also reported to be Musakkin (sedative)25, so it also suffices for symptomatic relief as well.

Considering the results it may be inferred that the test drug is effective in acute inflammation. The percentage inhibition of inflammatory response was found to be more pronounced in animals treated with standard drug in comparison to test drug, but the efficacy level is same (P<0.01). The results indicated that the test drug has highly significant anti-inflammatory effect, which is equal to the effect of Piroxicam.

Conclusion

On the basis of above discussion and the findings in our experiments it can easily be concluded that the test drug Iklil-ul-Malik is effective in experimentally induced inflammation; and its use by Unani Physicians in certain acute inflammatory conditions is substantiated.
References
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