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EVALUATION OF ANTI-INFLAMMATORY ACTIVITY OF *KANDANGKATHIRI KIRUTHAM* IN ANIMAL MODEL

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ABSTRACT: *Kandangkathiri Kirutham* (ghee of *Solanum xanthocarpum*) is a Siddha herbal formulation mentioned in Siddha textbook for the treatment of Ullnaakku Azharchi (Tonsillitis). It contains leaf juice of *Kandangkathiri* (*Solanum xanthocarpum*), cow's ghee, the paste of raw drugs namely Sittrarathai (*Alpinia officinarum*), Sittramutti (*Sida cordifolia*), Nerunjil ver (*Tribulus terrestris*), Chukku (*Zingiber officinale*), Milagu (*Piper nigrum*), Thippili (*Piper longum*) respectively. In the present study, the anti-inflammatory activity of *Kandangkathiri Kirutham* is evaluated by carrageenan-induced paw edema in rats using Diclofenac sodium as the standard drug. The animals were divided into 4 groups, of which, Group I (Negative control) is injected with carrageenan into the sub-plantar region of the hind paw of rats, Group II & Group III are injected with carrageenan + *Kandangkathiri Kirutham* (100 mg/kg) & (200 mg/kg) respectively. Group IV is injected with carrageenan + Standard Diclofenac sodium (50 mg/kg). The change in hind paw volume was measured using plethysmometer and expressed as mean paw volume of the rats. The formulation showed significant reduction of paw volume in rats. The results suggest that *Kandangkathiri Kirutham* has anti-inflammatory activity in rats.

INTRODUCTION: Siddha medicine is claimed to revitalize & rejuvenate dysfunctional organs that cause the disease & to maintain the ratio of dosha namely vatham, pitham & kabam. Practically 50-60% of the cases that undergo treatment are children. One of the common illnesses in childhood is Ullnaakku Azharchi (Tonsillitis). Nearly all children becoming infected with Ullnaakku Azharchi (Tonsillitis) at least once in their lifetime. Ullnaakku Azharchi (Tonsillitis) is inflammation of tonsils causing redness, pain, swelling, and fever.

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Kandangkathiri Kirutham is a Siddha herbal formulation indicated for Ullnaakku Azharchi (Tonsillitis). It consists of *Kandangkathiri* leaf juice-1.3 litre (*Solanum xanthocarpum*) and cow's ghee-650 ml along with the paste of raw drugs namely Sittrarathai-9 gm (*Alpinia officinarum*), Sittramutti -9 gm (*Sida cordifolia*), Nerunjil ver -9 gm (*Tribulus terrestris*), Chukku-9 gm (*Zingiber officinale)*, Milagu-9 gm (*Piper nigrum*), Thippili-9 gm (*Piper longum*) respectively.

Kandangkathiri is one of the *dasamoola* and a commonly used drug in Siddha. The plant is bitter, acrid, thermogenic, anthelmintic, antiinflammatory, digestive, carminative, appetizer, stomachic, febrifuge, expectorant, laxative, stimulant, diuretic, rejuvenating, emmenagogue and aphrodisiac. The plant contains alkaloids, sterols, saponins, flavonoids, and their glycosides and also

carbohydrates, fatty acids amino acids, *etc.* According to the literature review, there is a paucity of scientific data for the anti-inflammatory activity of this herbal formulation. The present research work therefore was initiated to investigate the anti-inflammatory activity of *Kandangkathiri Kirutham* in laboratory animals.

MATERIALS AND METHODS:

Preparation: First the *Kandangkathiri* leaves are washed well, then crushed using mixer grinder, and the leaf juice is extracted. Next, the raw drugs are purified and grounded into a fine powder. Then it is mixed along with water into a thick paste. Now the leaf juice, ghee, and the paste are mixed well in a container and heated. It is allowed to boil in a low flame and stirred well until sand-like consistency is obtained. Then it is allowed to cooled down and filtered and preserved in a clean container.

Species: Wistar rats of age 6-8 weeks old weighed between 200-250 gm were used for the experimental study. The animals were obtained from The King Institute of preventive medicine, Alanthur Road, SIDCO Industrial estate, Chennai-600032, Tamil Nadu.

Environmental Conditions: Air - conditioned rooms; temperature was between 22 ± 2° C and the illumination cycle set to 12 h light and 12 h dark. Animals were housed in groups of three animals per cage.

Accommodation: Standard polypropylene rat cages with stainless steel top grill. Cleaned paddy husk was used as the bedding material.

Sanitation: Bedding material and water bottles were changed daily.

Diet and Water: Standard pellet feed was provided. Potable water *ad libitum* passed through rat feeding bottles with stainless steel sipper tubes.

Principle: Carrageenan-induced paw edema in rats as an in vivo model of inflammation has been frequently used to assess the anti-edematous effect of natural products. Carrageenan-induced paw edema is a useful model in assessing the contribution of mediators involved in vascular changes associated with acute inflammation. Edema formation in the carrageenan-induced paw edema model is a biphasic response. After carrageenan injection, there is a release of histamine, serotonin, and bradykinin affecting vascular permeability. The edema induced by carrageenan is characterized by the presence of prostaglandins and other compounds of slow reaction. Injection of carrageenan into the rat paw induced the liberation of bradykinin, and then further induced the biosynthesis of prostaglandin and other autacoids. However, in the carrageenan-induced rat paw edema model, the production of prostanoids has been through the serum expression of COX-2 by a positive feedback mechanism

Procedure: Acute inflammation was induced in all groups by injecting 0.1 ml of 1% w/v carrageenan into the subplantar region of the right hind paw of rats. Test drug *(Kandangkathiri Kirutham)* was administered one hour before the carrageenan injection, and paw volume was measure before and after injection of carrageenan at a fixed interval of 0, 30, 60, 120 and 180 min. Standard Diclofenac sodium (50 mg/kg) p.o were used as a standard drug and administered as CMC suspension by the oral route. The change in hind paw volume was measured using plethysmometer and expressed as mean paw volume of the rats. The change in paw volume was measured as the difference between the final and initial paw volume.

Animal Grouping:

Group I: Negative control – injected with 0.1 ml of 1% w/v carrageenan into the subplantar region of the hind paw of rats.

Group II: Carrageenan + 100 mg/kg of test drug (*Kandangkathiri Kirutham)*

Group III: Carrageenan + 200 mg/kg of test drug (*Kandangkathiri Kirutham)*

Group IV: Carrageenan + Standard Diclofenac sodium (50 mg/kg) p.o.

RESULTS AND DISCUSSION: Observation of results predicts that carrageenan-induced group shows increased displacement value ranges from 0.33 to 1.482 ml. Treatment with test drug (*Kandangkathiri Kirutham)* at the dose of 100mg/kg shown displacement value ranges from 0.331 to 1.287 ml.

Treatment with test drug (*Kandangkathiri Kirutham)* at the dose of 200 mg/kg shown displacement value ranges from 0.355 to 1.237 ml. Treatment with standard drug Diclofenac at the dose of the drug at 50 mg/kg shown displacement value ranges from 0.325 to 1.168 ml.

TABLE 1: TREATMENT WITH TEST DRUG (*KANDANGKATHIRI KIRUTHAM*)

Treatment	0 min	30 min	60 min	120 min	180 min
Carrageenan,	0.33 ±	0.935±	1.15 ±	1.245±	1.482±
0.1 ml	0.01095	0.01057	0.01265	0.007638	0.009457
Test Drug	0.331 ±	0.7983±	0.8617±	1.163±	1.287±
100 mg/kg,p.o	0.00703	0.007032	0.01078	0.01282	0.009888
Test Drug	0.355±	0.7333±	0.825±	1.117±	1.237±
200 mg/kg,p.o	0.01118	0.01174	0.004282	0.03127	0.005578
Diclofenac sodium	0.325±	0.54±	0.68±	0.795±	1.168±
(50 mg/kg) ,p.o	0.006708	0.009661	0.01183	0.02029	0.007491

Paw volume (ml) was measured on days /Mean Displacement Value (ml) (mean ± SEM)

CONCLUSION: From the observation, it was concluded that the test drug (*Kandangkathiri Kirutham)* at both the dose level significantly reduced the paw edema induced by carrageenan. Thus, the present study supports the recommendation of *Kandangkathiri Kirutham* for the treatment of Ullnaakku Azharchi (Tonsillitis).

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