

**ANTI- ARTHRITIC ACTIVITY PROFILE OF VATAGHNI (*JUSTICIA GENDARUSSA*
BURM F.) ON WISTAR ALBINO RATS**

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ABSTRACT

About: *Vataghni*(*Justicia gendarussa* Burm. F.) a perennial shrub the leaves of which are used by folklore practitioners in the treatment of arthritis through various dosage forms. Though many drugs are used in arthritis the whole world is looking for safe herbal drug. **Materials and method:** Leaves of test drug collected and decoction prepared. Anti-arthritic experimental activity evaluated using Freund's adjuvant induced arthritis model in Wistar albino rats. The rats were selected randomly and grouped into 4 group of 6 rats each. The first group was vehicle control whereas, second group with ibuprofen 100mg/kg. The third group was administered with Freund's Adjuvant + along with VPK orally, whereas fourth group administered with Freund's Adjuvant, VPK *Dhara*(pouring over joint region) externally. The reduction of inflammation was measured on 24hour, 48hour, 72hour, 5th day, 21st day, 30th day respectively and the results were compared with that of the standard drug induced. After 30 days all rats were sacrificed. Histopathological observations of right and left synovial joint recorded. **Results:** The result strongly support anti-arthritic potential of leaf of *Vataghni*(*Justicia gendarussa* Burm F.) and its traditional use in medicine. Test drug *Kasaya Pana* is more effective as compared to *Patra Kasaya dhara*. **Conclusion:** The leaf of *Vataghni* (*Justicia gendarussa* Burm F.) is found to be safe and effective in management of arthritis.

KEYWORDS: *Vataghni*(*Justicia gendarussa* Burm. F.), Anti-arthritic, Freund's adjuvant)

INTRODUCTION

India a country with rich natural resources blended with wide utility in therapeutics by traditional healers.^[1] Traditional medical practitioners are recognized by community to provide primary health care by using the natural resources having extensive knowledge on these aspects.^[2] Ayurveda prescribes many drugs of herbal origin in various diseases, still there are many herbs which are not mentioned in Ayurveda texts, but used by folklore practitioner which is coined as extra pharmacopeial drugs or *Anukta dravya* in Ayurveda.^[3] *Vataghni*(*Justicia gendarussa* Burm. F.) leaves of which are used by folklore practitioners in the treatment of arthritis through various dosage forms.^[4] Arthritis is a musculoskeletal system disorder following mechanical and biological events that destabilize normal coupling between degradation and synthesis with in articular cartilage.^[5] Arthritis can affect individual at any age but is more seen in the age of 30-50 years. There are about 100 types of arthritis of which most commonly occurring arthritis is include osteoarthritis, rheumatoid arthritis, ankylosing spondylitis and juvenile arthritis.^[6] It is

estimated that highest number of incidences of arthritis are found in India followed by America.^[7] The joints most commonly effected in arthritis are weight bearing joints such as feet, knee, hips, spine which finally results in pain, inflammation, joint stiffness, and loss of mobility.^[8] Traditionally herbs were used both externally as well as internally for the treatment of inflammatory condition like arthritis. Still world is looking for safe, effective, curative leads from natural resources to cure such ailments. Hence with all this background it is planned to evaluate the efficacy of *Vataghni* (*Justicia gendarussa* Burm F.) in arthritis by means of experimental models.

MATERIALS AND METHODS

Test drug

Matured leaves of *Vataghni* (*Justicia gendarussa* Burm F.) were collected from Udupi district, washed thoroughly, taxonomically named, using floras, sample deposited at SDM center for Research in Ayurveda and Allied sciences (Voucher specimen No. 17032101). Leaves shade dried and coarse powder prepared and kept

in air tight container. One part of powder boiled with 16 part of water on slow flame until it reduces to 1/8th of its original quantity.^[9] Then it was filtered and used for study, named *Vataghni Patra Kashaya*(VPK) for oral administration as well as *Dhara*(pouring over joint region) externally.

Experimental animals

Study carried out on Wistar albino rats of either sex received from SDM Centre for Research in Ayurveda and Allied Sciences, Udupi, maintained under prevailing husbandry conditions. Rats were fed with rat pellet and tap water, exposed to natural day and night cycles and maintained at standard laboratory conditions.^[10] (Ethical clearance no.)

Animal grouping

The rats were selected randomly and grouped into 4 group of 6 rats each. The first group was vehicle control without any pre and post processing. The second group was administered with ibuprofen 100mg/kg. The third group was administered with Freund's Adjuvant + along with VPK orally, whereas fourth group administered with Freund's Adjuvant, VPK Dhara(pouring over joint region) externally.^[11]

Statistical analysis

ANOVA with suitable post hoc test (Dunnet's multiple 't' test) and students 't' test for paired and unpaired data.

Dose fixation

Test drug (VPK): Human dose for Kashaya is 2 pala (96 ml) which was converted into rat dose by using standard dose (Barnes and Paget-1964).

Formula = Human dose \times Body surface area constant of the rats $\times 5 = 96 \times 0.018 \times 5 = \text{kg body wt}$.
This work to be = 8.64 ml/kg body weight.^[12]

Mode of administration

Prepared drug was administered orally according to body weight of animal by the help of suitable sized gastric catheter number 6 sleeved into a syringe and in *Dhara*(Pouring) form on both legs of affected experimental rats. VPK was given daily in interval of 24hr orally and Dhara (pouring decoction) was given minimum for 5 min in same interval.

Methodology

In this study Anti-arthritis experimental model used was, Freund's adjuvant induced arthritis.^[13] The study was screened by inducing inflammation using freshly prepared Freund's adjuvant complete solution which contain Mycobacterium lyophilized cell powder injected 0.1 ml to the sub-planter aponeurosis of the left hind limb and 0.5ml to sensitization. Diclofenac was used as standard drug the dose of 5mg/ml which was prepared by adding Diclofenac, distilled water and CMC (Carboxymethyl cellulose sodium salt medium viscosity) and was given orally to the rats. *VPK dhara* was poured at the site of inflammation to the respective groups from the 6th hour up to 30th day wherein *VPK pana* was also administered. The reduction of inflammation was observed and was compared with standard group. The reduction of inflammation was measured on 24 hour, 48 hour, 72 hour, 5th day, 21st day, 30th day respectively and the results were compared with that of the standard drug induced. After 30 days all rats were sacrificed and dissected out left and right synovial joints were collected and studied in the laboratory for histopathological slide.^[14]

RESULTS

Table 1: Effect of VPK pana and VPK dhara in anti-arthritis model using Freund's adjuvant.

Group	24 th hr	48 hr	72 hr	5 th day	21 st day	30 th day
Control	256.34±17.28	224.61±20.18	203.20±18.20	167.23±20.48	79.28±7.14	153.80±24.19
Standard	58.14±5.02**	61.13±4.73**	61.45±5.57**	58.88±4.48**	61.72±3.77	28.76±4.33**
Test drug 1 (<i>vataghni kasaya pana</i>)	60.28±9.04**	67.29±12.35**	94.78±25.20* *	81.11±10.87**	12.82±6.41**	68.44±9.42**
Test drug 2 (<i>vataghni kasaya dhara</i>)	255.80±34.10	165.47±26.81	168.72±18.68	140.36±12.23	34.88±12.98**	100.08±17.21

Data: MEAN \pm SEM, **P<0.01

Result of experimental study have been depicted in Table 1. After 24th hour, 48th hour, 72 hour, 5th day, 21st day, 30th day results have shown very significant decrease in paw volume in both standard group and test drug2 (VPK) when compared to the control group. Non-significant decrease in paw volume was observed in test 2(*vataghni kasaya dhara*) when compared to the control group. Non-significant decrease in paw volume was observed in all groups when compared to control.

Histopathology

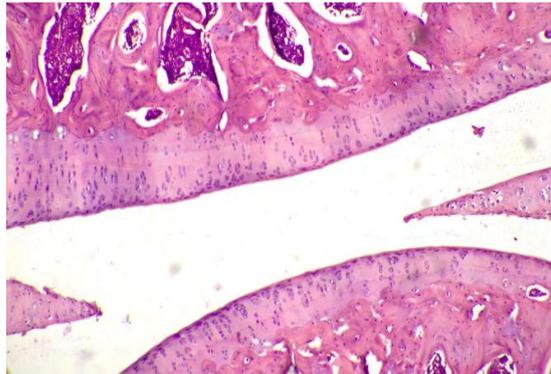
In Group 1-*Vataghni* (*Justicia gendarussa* Burm. f.) *kashaya pana* knee joints (KJ) showed increased eosinophils in bone marrow. Cartilage was hyperplastic with disorderly arranged cells. Synovial proliferation seen in some areas with tissues extending in between the joint space. Joint space narrowed in 1 section. No inflammation seen- Moderate degenerative changes without inflammation. Ankle joints (AJ) Compared with

normal there was slight synovial hyperplasia and narrowing of joint space in 2 sections- Mild degenerative

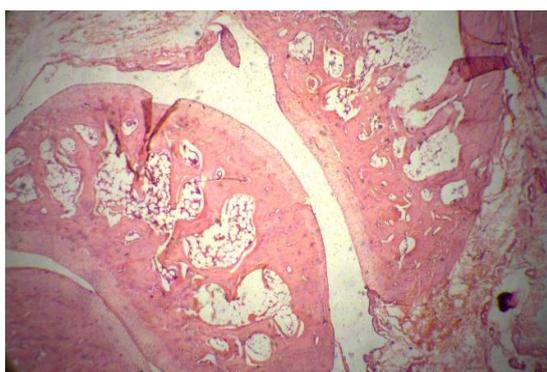
changes without inflammation.



Ankle joint Normal group.



Knee joint Normal group.



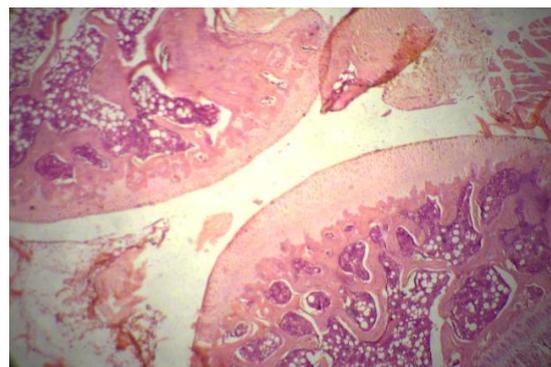
Ankle joint Group 1.



Knee joint Group 1.



Ankle joint Group 3.



Knee joint Group 3.

Figure 1. Histopathology photomicrographs of Ankle and Knee joint of experimental rats.

In Group 3- *Vataghni* (*Justicia gendarussa* Burm. f.) *kashaya Dhara* knee joints (KJ) showed increased eosinophils and vacuoles in bone marrow. Cartilage was hyperplastic with disorderly arranged cells in 2 tissue sections. Synovial proliferation seen in 2 sections. No inflammation seen- Mild to moderate degenerative changes without inflammation. Ankle joint (AJ) Compared with normal there was slight synovial hyperplasia in all sections- Mild degenerative changes without inflammation. Inflammation, peculiar for arthritis not seen in any groups. There was no much histological difference between the groups. Ankle joint of all groups showed less degenerative changes than knee joint. (Figure 1)

DISCUSSION

Justicia gendarussa Burm f. belonging to *Acanthaceae* family is easily available in Western Ghats of south India and used by folklore practitioners in treatment of joint pain, earache, colic pain in children, asthma, hepatic injuries, etc. Even biological screening is necessary to provide a scientific basic for validating the traditional utilization of medicinal plants.^[15] Arthritis is a disease that stands for inflammation of the joints which is characterized by pain, stiffness, swelling, joint damage deformity. Experimental study was carried out using the Freund's adjuvant-induced arthritis in albino rats wherein the leaf of *Vataghni* (*Justicia gendarussa* Burm

F.) was evaluated in arthritis both in the form of Pana(orally) as well as Dhara(pouring over joint).

The result strongly support anti-arthritic potential of leaf of *Vataghni*(*Justicia gendarussa* Burm F.) and its traditional use in medicine. As mentioned previously presence of flavonoids and beta-sitosterols are well known for their anti-inflammatory activates.^[16] The presence of these compound in leaf of *Justicia gendarussa* Burm F.) may explain the anti-arthritic properties of this plant.

Ankle joint (AJ) Compared with normal there was slight synovial hyperplasia in all sections- Mild degenerative changes without inflammation. Inflammation, peculiar for arthritis not seen in any groups. There was no much histological difference between the groups. Ankle joint of all groups showed less degenerative changes than knee joint. Experimental study of this drug concluded that all the groups effective in different stage of arthritis. *Vataghni* (*Justicia gendarussa* Burm F.) *Patra Kasaya Pana* is more effective as compared to *Vataghni* (*Justicia gendarussa* Burm F.) *Patra Kasaya dhara*. The leaf of *Vataghni* (*Justicia gendarussa* Burm F.) is found to be safe and effective in management of arthritis.

CONCLUSION

Traditional claim suggests *Vataghni* (*Justicia gendarussa* Burm F.) to be beneficial in arthritis. Experimental study was carried out using the Freund's adjuvant-induced arthritis in albino rats wherein the leaf of *Vataghni* (*Justicia gendarussa* Burm F.) was evaluated, results showed it as promising drug in arthritis, in different modes of administration.

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