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# In-vivo Anti- Inflammatory and Anti-Analgesic Studies on a Topical Siddha Herbal formulation for reducing Fever

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## ABSTRACT

Fever is documented as a separate disease as per Traditional Siddha Indian Medicine. There are 64 types of fever among which 52 types occur due to intrinsic causes and 12 types occur due to Extrinsic factors. Intrinsic causes are due to the disturbances in the Vatha, Pitha and Kapha equilibrium. Some of the extrinsic factors include fever arising out of God's wrath, excessive sexual desire, due to black magic, curse, trauma, phobia etc. Fever as a symptom arises due to various aetiologies. It is also a main factor for complications such as Febrile fits, Shock, Dehydration and Hallucinations (apparent perception of something not present). Infants and children are more vulnerable for the after effects of fever. This usually happens due to delayed medical attention, Lack of Transport facilities and Manpower especially in rural areas. While thinking of designing a topical application for the effective management and control of fever, the Authors of this work, based upon their wide clinical and theoretical knowledge and experience came out with a formula. This formula, which is having ingredients from Herbal origin, was subjected to pre-clinical studies and the research findings show the superiority of the formula when used through a new drug (Topical application) delivery system.

## Keywords

Herbal medicine, Suram, Topical application, Novel drug delivery, tepid sponging for fever.

## INTRODUCTION

According to the Siddha system, Fever is considered as a Disease and not as a symptom as stated by Modern Allopathic medicine. There are 64 types of fever among which 52 types occur due to intrinsic causes and 12 types occur due to Extrinsic factors. Intrinsic causes are due to the disturbances in the Vatha, Pitha and Kapha equilibrium. Some of the extrinsic factors include fever arising out of God's wrath, excessive sexual desire, due to black magic, curse, trauma, phobia etc.

***Table 1.1 Prodromal Symptoms, Symptoms, and Aetiology for fever as per Siddha Literature.***

| *Prodromal Symptoms* | *Symptoms* | *Etiology* |
|---|---|---|
| 1. Lack of sense of well being<br>2. Body pain<br>3. Thirst<br>4. Loss of appetite<br>5. Yawning<br>6. Excessive lacrimation<br>7. Chills<br>8. Giddiness<br>9. Loss of taste sensation<br>10. Irrelevant speech, delirium<br>11. Goose flesh<br>12. Easy irritability etc. | 1. Chills, Goose flesh<br>2. Yawning and irritation of the eyes<br>3. Nausea and Vomiting<br>4. Cold and rigor<br>5. Elevated body temperature<br>6. Head ache, Excessive lacrimation<br>7. Giddiness & vomiting (due to excessive Pitha – one of the three humors of body)<br>8. Fever occurs on alternate days with above features.<br>9. In some types of fever, the pattern of occurrence of fever changes from alternate days to three days, four days and nine days. | 1. Constipation<br>2. Chronic cold (phlegm)<br>3. Toxins from diet<br>4. Excessive indulgence in sex<br>5. Toxins<br>6. Sleeplessness<br>7. Physical exhaustion<br>8. Anger / irritability<br>9. Suppressing vital functions such as urine, hiccough, appetite, stools, thirst, sleep etc.<br>10. Consuming very cold water<br>11. Change of place/country<br>12. Variations of the mind and<br>13. Indigestion. |

**Patho-physiology of fever in Siddha**

➲ Differences in food, unusual habits
↓

➲ Change in the equilibrium of Vatha or Pitha or Kapha
↓

➲ Altered Vatha, Pitha, Kapha
↓

➲ Resides in Stomach, causes Seetham (Kapha) & Indigestion
↓

➲ Affects the Intestines, Sadarakkini involved
↓

➲ Disseminates throughout the body, spreads heat
↓

➲ FEVER.

## MATERIALS AND METHODS

This is a formula which was created by the rich theoretical and clinical knowledge of the Authors. It is a Poly herbal formula, with pure herbal based composition. Authors decided to evaluate the efficacy of this test drug through the following studies.

### Preparation of extracts

They were dried, powdered and extracted in soxhlet with Acetone and Ethanol (2 lit each) and the concentrated Extracts Such as Acetone, Ethanolic extract yield were tested for anti-inflammatory and analgesic activity.

**Evaluation of Anti-inflammatory activity**

The anti-inflammatory activity was assessed by the method suggested by Winter et al (Winter, 1962). Using carrageen an as phlogiston agent of adult wistar albino rats of either sex weighing between 150-200g. The selected albino rats were housed in groups of six. They were fasted over night and during the experiment but had free access to water. The extracts (100 mg/kg, 200 mg/kg) were suspended in 0.5% w/v Sodium carboxy methyl cellulose and administered orally 30 min before injection of carrageen an (0.1 ml of 1% w/v solution) in normal saline into sub planter region of left hind paw of each rat. The contalateral paw was injected with an equal volume of saline.

The control group received 0.5 w/v sodium carboxy methyl cellulose (2ml/kg), standard group Ibuprofen (10 mg/kg) and the test group received the Acetone and Ethanolic extracts of FP powder(100 mg/kg, 200 mg/kg) respectively. The paw volumes were measured Plethysmo graphically at each hour, for 4 hr after carageenan and compared with the standard treated group.

**Evaluation of Analgesic Activity**

**Tail flick Method**

The analgesic activity was tested using analgesio meter (kulakarni, 1997) Albino rats (125-150gm) were randomly distributed in control and test groups of four animals each. The Acetone and Ethanolic extracts (100 mg/kg and 200 mg/kg) were administered to each test group orally after 12 hr fast and standard drug pentazocin (30mg/kg) was administered to the standard group orally. The basal reaction time was noted at 15min, 30min, 45min, and 60min. After administration the tip of the rat was placed in the radiant heat of analgesio meter at $55^0$ c $\pm$ $0.5^0$ c. The actual tail flick response of rats was calculated and compared with control group.

## RESULTS AND DISCUSSION

Anti-inflammatory activity of FP powder extract on carrageen induced paw oedema in albino rats

*Table. 1. Anti-inflammatory result of FP Powder.*

| Group | TREATMENT | DOSE | VOLUME OF MERCURY DISPLACED (ml) | | | | PERCENTAGE INHIBITION OF PAW OEDEMA AT 4 hr |
|---|---|---|---|---|---|---|---|
| | | | 0 hr | 1 hr | 2 hr | 4 hr | |
| 1. | Control(0.5%sodium cmc) | 2ml/kg | 0.963 ±0.017 | 1.278 ±0.027 | 1.38± 0.019 | 1.455±0.020 | - |
| 2. | Ibuprofen | 10mg/kg | 0.987 ±0.196 | 1.29± 0.015 | 1.327 ±0.019 | 1.29±0.018 ** | 41.101 |
| 3. | Acetone extract of FP powder | 100mg/kg | 0.99± 0.016 | 1.324 ±0.022 | 1.37± 0.016 | 1.38±0.010 * | 26.154 |
| 4. | Acetone extract of FP powder | 200mg/kg | 0.99± 0.08 | 1.30± 0.016 | 1.33± 0.016 | 1.35±0.016 * | 28.161 |
| 5. | Ethanolic extract of FP powder | 100mg/kg | 0.992 ±0.003 | 1.295 ±0.010 | 1.332 ±0.012 | 1.346±0.016 * | 29.505 |
| 6. | Ethanolic extract of FP powder | 200mg/kg | 1.015 ±0.03 | 1.295 ±0.011 | 1.328 ±0.03 | 1.3332±0.014 ** | 36.603 |

Results expressed as mean ± SEM from six observation *p<0.01, **p<0.001

*Figure. 1. Inhibition % on Hind-paw Oedema Method*

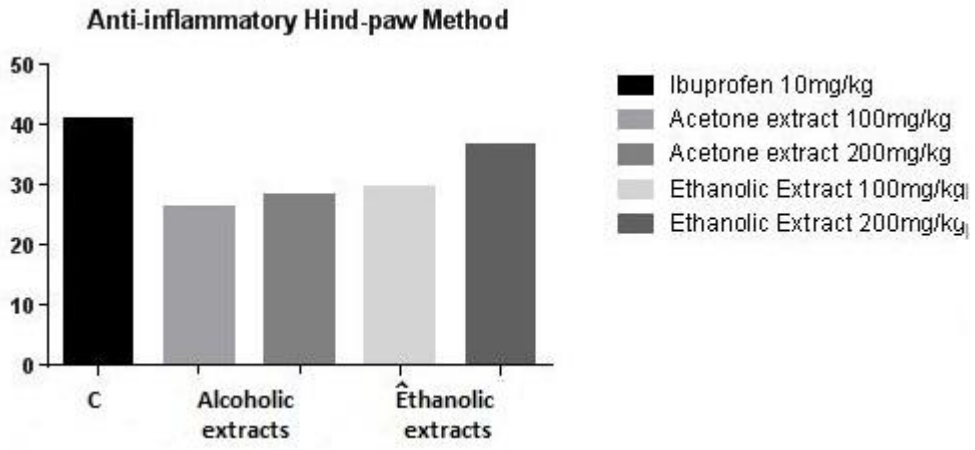

Table. 2. Analgesic activity of FP powder Part* extract - Tail flick method.

| Group | TREATMENT | DOSE | | REACTION TIME ( sec) | | | |
|---|---|---|---|---|---|---|---|
| | | | Basal reaction time sec | 1 5min | 30min | 45min | 60min |
| 1. | Control(0.5% sodium cmc) | 2ml/kg | 2.18±0.282 | 2.7±0.206 | 2.69±0.193 | 2.69±0.11 | 2.69±0.193 |
| 2. | Pentazocine | 30mg/kg | 2.35±0.194 | 3.2±0.410 | 4.68±0.357 | 6.34±0.36 | 8.69±0.454 |
| 3. | Acetone extract of FP powder | 100mg/kg | 2.17±0.283 | 3.17±0.29 | 3.5±0.205 | 4.5±0.310 | 5.5±0.314 |
| 4. | Acetone extract of FP powder | 200mg/kg | 2.68±0.194 | 3.34±0.193 | 4.84±0.437 | 5.84±0.60 * | 6.85±0.683 ** |
| 5. | Ethanolic extract of FP powder | 100mg/kg | 1.85±0.30 | 2.34±0.194 | 4.2±0.34 | 5.2±0.237 | 6.69±0.305 ** |
| 6. | Ethanolic extract of FP powder | 200mg/kg | 2.35±0.193 | 3.84±0.30 | 4.84±0.436 | 6.7±0.457 | 7.85±0.460 |

Results expressed as mean ± SEM from six observation *p<0.01, **p<0.001

The Acetone and Ethanolic extract of FP powder showed significant anti-inflammatory and analgesic activity at both the dose levels (100 mg/kg and 200 mg/kg). The percentage inhibition of paw oedema by the Ethanolic extract is found to be higher than the acetone extract. The degree of analgesia observed with Ethanolic extract revealed a higher degree of analgesic activity than the Acetone extract. The Ethanolic extract of FP powder showed significant anti-inflammatory and analgesic activity (at 200 mg/kg).

## CONCLUSION

While Traditional Siddha Medicine is often falsely propagated as a system not having the answers for handling emergencies and lacking in new drug delivery systems, this effort by the Authors is certainly an answer to dispel such intentional, false propagations. The drug delivery systems of Siddha system are certainly thriving through the newer heights in order to tackle emergencies in day-to-day clinical practice. In that way, the pre-clinical studies being carried out on the above mentioned trail drug as a topical application for fevers will pave the path for more up gradation and effective usage of new drug delivery systems in the Siddha Pharmacology.

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