

TO STUDY VARIOUS NEUROLOGICAL ACTION OF FRE AS ANALGESIC USING WRITHING METHOD (CHEMICAL INDUCED PAIN) IN ALBINO MICE

Dr. Jitendra Gupta¹

Assistant Professor, Dept. of Pharmacology, Sri Aurobindo Institute of Medical Sciences & Research Centre, Indore¹

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Corresponding author: Dr. Jitendra Gupta

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Abstract

Method: For the preparation of extract 100 gm of dried coarse powdered leaves were charged in to the soxhlet's apparatus (hot extraction) and extracted successively with chloroform. The successive chloroform extract (deep brown colour) was filtered & dried under reduced pressure to get a solid mass free from the solvent. The crude extract thus obtained was further fractionated. The solvent fractionation was done with alcohol and acetone.

Result: FRE at a dose of 50mg/kg did not show a significant analgesic activity as compared to control group (P< 0.05). At the dose of 100mg/kg it showed a highly significant analgesic activity as compare to control group (P< 0.01). At the dose of 200 mg/kg it showed a highly significant decrease in number of writhes as compared to control as well as diclofenac treated group (P<0.01). FRE at a dose of 200mg/kg showed 66.21 % inhibition in number of writhes as compared to 50.02 % inhibition by diclofenac.

Conclusion: The present study was conducted at Dept. of Pharmacology, Sri Aurobindo Institute of Medical Sciences & Research Centre, Indore FRE endowed with both central and peripheral analgesic properties in dose dependent manner. It also enhances the analgesic effect of the standard drugs.

Study Designed: Observational Study.

Keywords: FRE, Analgesic, Albino mice, Neurological & Writhing Method.

Introduction

Pain has been defined as an unpleasant sensory and emotional Experience associated with actual or potential tissue damage. Pain acts as a warning signal against disturbances of the body and has a proactive function. Pain is ill defined, disabling accompaniment of many medical conditions[1]. It is often evoked by external or internal stimulus. Analgesics are the drugs which possess significant pain relieving properties by acting in the CNS or on peripheral pain receptors without significantly affecting consciousness. Analgesics are divided into two groups:

NSAIDs are most popular and most commonly used analgesics for mild to moderate pain. These are widely used for the treatment of pain, fever and inflammation, particularly arthritis[2]. But chronic use of NSAIDs may elicit appreciable GI irritation, bleeding and ulceration [3]. The incidences of clinically significant GI side effects due to long term use of NSAIDs is very high (30%) and causes some patients to abandon NSAID therapy [4].

Opioid analgesics - Like NSAIDs, these drugs are also very effective in relieving pain. But the adverse effect produced by opioids are very severe and life threatening like behavioral restlessness, tremulousness, hyperactivity, respiratory depression, nausea, vomiting, increased intracranial pressure, postural hypotension accentuated by hypovolemia, constipation, urinary retention, itching

around nose and urticaria. So pain, which is one of the most common problem occurring amongst human population, still requires some better drugs with high efficacy and less side effects[5].

Material & Method

The present study was conducted at Dept. of Pharmacology, Sri Aurobindo Institute of Medical Sciences & Research Centre, Indore from duration of Jan 2019 to Dec 2019.

Identification - Leaves of *F. racemosa* were collected from local area near Indore [M.P.], India. After identification of, in the month of August fresh leaves of almost same size were collected in bulk, washed under running tap water to remove dust and adhering material, dried under shade and pulverized in a mechanical grinder. The coarse powder was passed through sieve no. 40 and taken for further studies.

Preparation of FRE- For the preparation of extract 100gm of dried coarse powdered leaves were charged in to the soxhlet's apparatus (hot extraction) and extracted successively with chloroform. The successive chloroform extract (deep brown colour) was filtered & dried under reduced pressure to get a solid mass free from the solvent. The crude extract thus obtained was further fractionated. The solvent fractionation was done with alcohol and acetone. The insoluble fraction of alcohol and acetone fractionation was dried and passed through

column chromatography. The mobile phase was consisting of chloroform and the stationary phase was consisting of silica gel (200-400 mesh). The eluent was collected and dried to obtain whitish powder (FRE) [111]. The yield was 0.21% with respect to dry starting material.

Experimental animals-Swiss albino mice weighing 18-25 g of either sex were used for the study. The animals were procured and housed in the central animal house, Sri Aurobindo Institute of Medical Sciences & Research Centre, Indore. They were kept under standard hygienic conditions, at 20 ± 2 °C temperature, relative humidity ($60 \pm 10\%$) with 12 hour day and night cycle, with food and water ad libitum. The animals were allowed to acclimatize to laboratory conditions 5 days before the start of the experiment.

Results

Table 1: Effect of FRE in acetic acid induced writhing in Mice

Drug treatment	Dose (p.o.)	Number of writhes in 20 minutes	Percentage inhibition with respect to control
Control (2% GumAcacia)	10 ml/kg	36.50 \pm 1.60	-
Diclofenac	5 mg/kg	18.17 \pm 1.47 *	50.02
FRE 50	50 mg/kg	31.67 \pm 1.28	13.23
FRE 100	100 mg/kg	13.00 \pm 1.15 *	64.38
FRE 200	200 mg/kg	12.33 \pm 0.80 **†	66.21

One way ANOVA followed by multiple tukey's comparison test.

Values are mean \pm SEM, n= 6 in each group, df = 4, 25

* P< 0.05 as compared to control

†P< 0.05 as compared to diclofenac group.

FRE at a dose of 50mg/kg did not show a significant analgesic activity as compared to control group (P< 0.05). At the dose of 100mg/kg it showed a highly significant analgesic activity as compare to control group (P< 0.01). At the dose of 200 mg/kg it showed a highly significant decrease in number of writhes as compared to control as well as diclofenac treated group (P<0.01). FRE at a dose of 200mg/kg showed 66.21 % inhibition in number of writhes as compared to 50.02 % inhibition by diclofenac.

Table 2: Effect of FRE in acetic acid induced writhing in Mice

Drug treatment	Dose (p.o.)	Number of writhes in 20 minutes	Percentage inhibition with respect to control
Control (2% GumAcacia)	10 ml/kg	33.33 \pm 1.229	-
Diclofenac	5 mg/kg	18.17 \pm 1.47*	45.48
FRE 50	50 mg/kg	28.83 \pm 1.04	13.50
Diclofenac + FRE 50	5 + 50 mg/kg	11.17 \pm 0.79*†	66.48

One way ANOVA F **75.17**
P **< 0.001**

One way ANOVA followed by multiple tukey's comparison test.

Values are mean \pm SEM, n= 6 in each group, df = 3, 20

* P< 0.05 as compared to control

†P< 0.05 as compared to diclofenac group.

Diclofenac sodium showed significant decrease in number of writhes (45.48%) as compared to control group (P<0.05). FRE at a dose of 50 mg/kg did not show any significant decrease in the number of writhes (P<0.05). Diclofenac sodium in combination with FRE 50 produced highly significant decrease in number of writhes (66.48%) when compared to control value or either of the treatment alone (P<0.01).

Statistical Analysis

Data are expressed as mean \pm SEM. Statistical evaluation was carried out by one-way analysis of variance (ANOVA test). Statistical significance is expressed as P < .05, P < .01,

Discussion

Ficus racemosa is a moderate sized avenue tree found throughout India. It is popular in indigenous system of medicine like ayurveda, siddha, unani and homoeopathy. In the traditional system of medicine various plant parts such as bark, root, leaves, fruits and latex are used in dysentery, diarrhea, diabetes, stomachache, piles and as carminative and astringent and also as antioxidant and anticancer agent[6]. After an extensive literature search, it has been observed that, a lot of work has been done on the crude extract of bark of F. racemosa while research work on its leaves is scarcely available. We therefore, planned to explore the presence of any CNS activity in the leaf extract. We obtained crude chloroform extract of leaves of F. racemosa using soxhlet apparatus and subjected to fractionation. The isolated fraction of chloroform extract of F. racemosa leaves (FRE) was used for our studies. Pain, being the most unpleasant sensory and emotional experience worldwide, needs utmost attention for treatment and research purpose. Amongst all modalities available for the pain management, Non-Steroidal Anti-inflammatory Drugs (NSAIDs) are the most widely used drugs – although effective but associated with dreadful adverse effects of severe gastritis, peptic ulcer, nausea, vomiting, idiosyncrasy, etc.

The anti-inflammatory and antinociceptive activities of nonsteroidal anti-inflammatory drugs (NSAIDs) are attributed to inhibition of the cyclooxygenase (COX) enzymes, thus blocking the synthesis of prostaglandins that promote inflammatory responses and enhanced sensitivity to pain at the peripheral site of tissue injury. In

order to evaluate any acute effect of FRE for presence of analgesic activity, we selected two models i.e. acetic acid induced writhing model for peripheral activity and hot plate model for central activity using mice[7].

The study for analgesic effect using acetic acid induced writhing method reveals that FRE showed significant analgesic action ($P < 0.01$) at two dose levels i.e. 100 and 200 mg/kg b. wt as compare to control group (table no. 01). Acetic acid induced writhing in mice attributed visceral pain finds much attention of screening analgesic drugs [8].

Conclusion

The present study was conducted at Dept. of Pharmacology, Sri Aurobindo Institute of Medical Sciences & Research Centre, Indore FRE endowed with both central and peripheral analgesic properties in dose dependent manner. It also enhances the analgesic effect of the standard drugs.

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