INTRODUCTION

Epilepsy is a disorder characterized by recurrent seizures of cerebral origin, presenting with episodes of sensory, motor or autonomic phenomena with or without loss of consciousness. Epilepsy is the second most common chronic neurological condition seen by neurologists. It is estimated that there are 55, 00,000 persons with epilepsy in India, 20, 00,000 in USA and 3, 00,000 in UK. Three to five per cent of the populations have a seizure sometime in their life and half to one percent of the population have "active epilepsy". It is said that 60 out of 1, 00,000 children in the US and the UK are affected with juvenile rheumatoid arthritis. With as many as 12,000 children in Mumbai estimated with pediatric rheumatoid arthritis, the formation of Juvenile Arthritis Support group at Mumbai's Jaslok Hospital signifies an important milestone. Essential oils are used extensively in aromatherapy and various traditional medicinal systems. Anti-inflammatory are the agents, which reduce swelling and inflammation. Anticonvulsant Drugs are medicines used to prevent or treat convulsions (seizures), since the essential oils are noncorrosive and safe to take internally, the oil has been chosen. S C rotundus (Cr) showed multiple pharmacological activities like antidiarrhoeal, hepatoprotective, antimutagenic and radical scavengers. Traditionally these plants are also reported for its analgesic and anticonvulsant activities. Hence the present study is to investigate the Anti-inflammatory, anti-arthritis activities of Cyperus esculentus Linn. and Cyperus rotundus Linn.

MATERIALS AND METHODS

Essential oils of Cyperus rotundus (Cr) and Cyperus esculentus (Ce) were obtained from M/S Shanbag Ayur Products, Yallapur, Karnataka.

Animals

Swiss albino rats of either sex (200-250 g) were used for present study. Animal were kept under a 12 h light/ 12 h dark cycle, with free access to food and water. All experimental protocols were prepared and performed based on ethical guidance of Institutional Animal Ethical Committee.

Phytochemical studies

The essential oils were subjected for qualitative chemical estimation to assess major phytochemical entity and Flavonoids, sesquiterpenes, glycosides were found to be present.
was indicative of pain. The number of licksings from 0 to 5 min (first phase) and 15–30 min (second phase) were counted after injection of formalin. These phases represented neurogenic and inflammatory pain responses, respectively.

**Evaluation of anticonvulsant activity**

Maximal electroshock (MES) induced convulsion in rats**

The anticonvulsant property of the drug in this model was assessed by its ability to protect against MES induced convulsions. The animals were fasted and were selected for the experiment depending on weight. Rats of either sex were used. The rats were then divided into four groups of 6 rats each Group-1 received saline; Group-2 received 25mg/kg of Phenytoin. Group-3 received 250 mg/kg of oil. Groups-4, received 500 mg/kg of oil. Maximal electroshock (Inco Electroconvulsometer model# 100–3) of 150 mA current for 0.2 seconds administered through ear electrodes to induce convulsions in the control and drug treated animals. The drugs and chemicals were prepared fresh; the concentration, dose and duration before induction of convulsion.

**Statistical analysis**

The results are presented as Mean and ± S.E.M. The statistical significance of differences between the groups was obtained using analysis of variance (ANOVA) complemented by Dennett’s test. P< 0.05 and P< 0.01 considered to be significant. IC50 value was obtained by interpolation from linear regression analysis.

**RESULTS**

**Results of Phytochemical constituents**

The both essential oils contain Triterpenoids, Flavonoids, Proteins and Saponins as a major active constituents

Acute oral toxicity studies:

The LD50 cut off dose of oil was 5000mg/kg. Therefore, ED50 was selected as 1/10th and 1/20th of LD50 i.e. 500mg/kg and 250mg/kg

**Carrageenan induced paw edema**

When compared with the control, treatment with Cr and Ce, significantly (P<0.01) reduced the paw edema from 2nd hr after Carrageenan injection. Pretreatment with Cr and Ce doses (250,500 and 250,500 for both mg/kg) showed a dose dependent effect. There was significant activity showed by Cr-(500 mg/kg) and Ce-(500 mg/kg) than other Cr-(250 mg/kg) and Ce-(250 mg/kg). However, 10 mg/kg indomethacin significantly suppressed paw edema from 2nd hr and remains significant upto the 4th hr. The determination of inhibition percentage showed that administration of Cr-(500 mg/kg) produced a comparable effect with indomethacin (69.7% and 72.1% respectively) 4 hr after carrageenan injection. (Table.1, Fig.1)

**Formaldehyde induced arthritis**

The anti-arthritic activity was also evaluated by using formaldehyde induced arthritis model in Wistar albino rats. The assessment made on the 10th day showed that, treatment with Cr(500 mg/kg) and Ce (500 mg/kg) more significantly reduced (P<0.01) the swelling in the injected (left) hind paw as compared to Diclofenac sodium treated group. On the 10th day the % inhibition of paw edema exhibited by Cr(500 mg/kg) and Ce (500 mg/kg) were 75.54%, 76.58% respectively, while Diclofenac sodium treated animals showed maximum % of inhibition of paw edema 81.37 on 21st day. The results are shown in (Table 2).

**Formalin induced writhing**

Analgesic effects on both first (0–5 min) and second phases (15–30 min) of formalin induced pain. These phases corresponded to neurogenic and inflammatory pain, respectively. Essential oil was inhibited both, neurogenic and inflammatory pain at P<0.01 at dose of 500mg/kg level whereas lower doses of essential oil significantly P<0.05 blocked the inflammatory pain. Indomethacin showed highest activity in blocking inflammatory pain and did not show significant activity in neurogenic pain. Ce (500 mg/kg) was found to inhibit the pain resulting from inflammation better than the neurogenic induced pain.

**Table 1: Percentage inhibitions of carrageen induced paw edema by essential oils and standard drug in injected (left) hind paw**

<table>
<thead>
<tr>
<th>Extracts</th>
<th>Change in paw edema</th>
<th>Inhibition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0th day</td>
<td>4th day</td>
</tr>
<tr>
<td>Normal control</td>
<td>0.831±0.023</td>
<td>0.833±0.056</td>
</tr>
<tr>
<td>Arthritic control</td>
<td>0.836±0.013</td>
<td>1.585±0.099</td>
</tr>
<tr>
<td>Diclofenac sod. (1.5mg/kg BW)</td>
<td>0.888±0.0268</td>
<td>1.485±0.017**</td>
</tr>
<tr>
<td>(Cyperus sculentus 250mg/kg)</td>
<td>0.890±0.0278</td>
<td>1.670±0.010**</td>
</tr>
<tr>
<td>(Cyperus sculentus 500mg/kg)</td>
<td>0.8850±0.0168</td>
<td>1.633±0.008*</td>
</tr>
<tr>
<td>(Cyperus rotundus 250mg/kg)</td>
<td>0.891±0.0401</td>
<td>1.598±0.010**</td>
</tr>
<tr>
<td>(Cyperus rotundus 500mg/kg)</td>
<td>0.835±0.0321</td>
<td>1.648±0.011 NS</td>
</tr>
</tbody>
</table>

Fig. 1: Column statistic of various extracts on 0th to 21st day in injected (left) hind paw
DISCUSSION

Carrageenan is the sulphated polysaccharide obtained from the seaweed, which is widely used phlogistic agent which shows signs and symptoms of inflammation, which can be assessed as increase in paw thickness in mouse as a result of increased inflammation, edema and increased vascular permeation. Inflammation produced by carrageenan is a triphasic response. In the first phase, different cytokines and kinins get released in response to the inflammation produced and the mediators already secreted at the localized site. In the third phase, the COX enzyme plays pivotal role and there is production of prostaglandins which induces pain. In the present study, CE showed inhibition of paw thickness at 3rd and 4th hour after carrageenan injection which probably suggested that CE inhibit the prostaglandin formation in the third phase of inflammation.11

All the essential oils under evaluation of anti-inflammatory action were subjected to phytochemical study and showed to contain triterpenoids, flavonoids and proteins. Triterpenoids are one of the most numerous and widespread groups of phenolic in plants, exhibiting a range of biological and pharmacological effects such as anti-inflammatory. In this study, essential oils were subjected for phytochemical screening and biological activity. The study indicated that essential oil has both peripheral and central analgesic properties. Its peripheral analgesic activity was deduced from its inhibitory effects on chemical induced nociceptive stimuli.7

Formalin test investigated both. Drugs that act primarily on the central nervous system inhibit both phases equally while peripherally acting drugs inhibit the late phase.11 The formalin test is a very useful method for not only assessing antiinflammatory activity but also helping in the elucidation of the action mechanism. The neurogenic phase is probably a direct result of stimulation in the paw and reflects centrally mediated pain with release of substance while the late phase is due to the release of histamine, serotonin, bradikynin and prostaglandins. Essential oil was able to block both phases of the formalin response but the effect was more prominent in the second phase. In the present study, Ce, Cr showed maximum protection against formalin induced writhing followed by other models probably explained the peripheral analgesic potential of Ce, Cr prostaglandin inhibitory activity.

MES induced tonic seizures can be prevented either by drugs that inhibit voltage dependent Na+ channels such as Phenytin, Valproate, Felbamate and Lamotrigine or by drugs that block glutaminergic excitation mediated by the n-methyl-D-aspartate (NMDA) receptor, such as Felbamate. Essential oil follows any one of the above mechanism.11

CONCLUSION

The Ce and Cr were found to be more active in both anticonvulsant and anti-inflammatory activities. The study confirms the anticonvulsant and anti-inflammatory activities of Ce and Cr in dose dependent manner.
REFERENCES

1. R. Sridharan Epidemiology of epilepsy Special section: recent advances in epilepsy Current science, 2002;82 Suppl 6:664