

Short Communication

Anti-inflammatory and Analgesic activities of Methanolic Extracts of the Stem Bark of *Alstonia Boneei*, *Ficus Elastica* and *Xylopia Aethiopica* in Rodents

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ABSTRACT: The analgesic and anti-inflammatory properties of equimolar concentrations of the methanolic extracts of *Alstonia Boneei* (MEAB), *Ficus Elastica* (MEFE) and *Xylopia Aethiopica* (MEXA) were investigated in 0.1% acetic acid induced Pain (Writhing) in Mice, and 0.4ml of 0.1% carrageenan induced inflammation in rats as a model of acute inflammation and compared with Indomethacin. The MEAB and MEXA at concentrations used did not produce significant or marked inflammatory and analgesic effects while MEFE significantly ($p < 0.05$) inhibited carrageenan induced inflammation and acetic acid induced writhing.

Key Words: Analgesic, inflammation, *Alstonia Boneei*, *Ficus Elastica* and *Xylopia Aethiopica*, extracts

INTRODUCTION

Natural products account for more than 75% of health needs of people in rural communities in South West Nigeria. High cost of drugs, cultural affinity of the people close to nature and belief systems of our forefathers are among the factors which promote the use of herbal decoctions as a potent alternative to known drugs used in Orthodox practice, in these communities (Aziba *et al*, 2007)

The use of herbal decoctions to treat or manage illnesses has been widely accepted as potential steps into drug discovery and development globally. The decoctions are usually prepared from a combination of two or more plant products which contain active biological constituents which affect various physiological functions in the Body. The potential of the methanolic extracts of the stem bark of three medicinal plants- *Alstonia Boneei* (MEAB), *Ficus Elastica* (MEFE) and *Xylopia Aethiopica* (MEXA) - for analgesic

and anti-inflammatory properties are investigated in the present study.

MATERIALS AND METHODS

Phytochemical Analysis: Each of the extract was screened for the presence of biological active constituents, the results of the screening indicated positive tests for Alkaloids, flavonoids, Saponins and anthraquinones

Plant Material: Stem bark of *Alstonia boonie*, *Xylopia aethiopeca* and *Ficus elastica* were collected in September, 2008 in Falowo market in Sagamu. The botanical name and identification were authenticated by a taxonomist in the Department of Biological Sciences, Olabisi Onabanjo University, Ago Iwoye. A voucher specimen coded AT05008 was deposited in the university herbarium.

Extraction of Stem Bark: A known weight of dried stem bark of *Alstonia boonie*, *Xylopia aethiopeca* and *Ficus elastica* were collected and blended using industrial blender. The powdered sample were left to macerate in a known volume of 98% methanol for 1 week. The liquid extract obtained were filtered and

transferred into a pyrex glass container and concentrated using heater at 45°C to evaporate the semi-solid brown extract obtained were weighed and yield determined. The yield was reconstituted in water to give concentration used as 10mg/kg. Subsequent dilutions were carried out in this medium for use in the study.

Animals: Wistar Albino rats (180-220g) and albino mice (18-25g) of either sex were used, they were housed in clean polypropylene cages under standards condition of humidity temperature 37%±2% and light /dark cycle and fed with animal feeds. All animals were handled with humane care, experimental procedure was approved by the college animal use ethical committee.

Acetic acid writhing test: The technique elaborated by Whittle (1964) was used. The phenomenon of squirming takes place after intra peritoneal injection of 0.1% acetic acid a mild irritant into the mouse. The squirm was counted for twenty minutes observation period in this work. This was done using a stop watch. The reaction time was noted in all test experiments and control, in order to assess if it prolong the reaction time which was regarded in this study as test of analgesic property

Carrageenan induced oedema: The cotton thread method of Bamgbose and Noamesi (1981) as modified by Devi et al (2003) was used. 0.1ml of 0.1% w/v carrageenan was administered into the sub plantar of the hind paw. The linear paw circumference was measured before and after administration of the plant

extract. In control experiments, saline was used in place of extract in other experiments indomethacin 1mg/kg was used as a reference drug for comparative study.

Statistical analysis: Values are expressed as Mean± Standard Error of Mean. Data were analyzed using ANOVA and Duncan multiple range test at p=0.05

RESULTS

Preliminary phytochemical screening the extracts used shows the presence of alkaloids, flavonoids, saponins, tannins and anthraquinones.

MEFE at a concentration of 10mg/kg significantly reduced paw oedema formation (Table 1). The inhibitory effects of MEFE on squirming count was also significant (Table 2), comparable to those produced by the reference drug, indomethacin. On the other hand, the inhibitions produced by MEAB and MEXA were not significant when compared to the control. The reaction time to squirm was prolonged significantly with MEFE (16.5 min compared to indomethacin 18.9min respectively.

DISCUSSION

Oedema and pain are characteristic features associated with inflammatory disorders in vasculature of biological systems. Pain is a subjective experience, it is difficult to measure as to define. All measurements are therefore in terms of its relief.

Table 1

The linear paw circumference in control and extract treated rats after administration of carrageenan (n=10)

| Time min | Control in saline | MEXA | MEAB | MEFE |
|----------|-------------------|------------|------------|------------|
| 0 | 3.0 | 2.85±0.45 | 2.75±0.56 | 2.5±0.23 |
| 30 | 3.5 | 2.68 ±0.55 | 2.85 ±0.55 | 2.8 ±0.42* |
| 60 | 4.0 | 3.85 ±0.59 | 3.98±0.55 | 2.8 ±0.35* |
| 120 | 4.5 | 3.85 ±0.55 | 3.95±0.67 | 2.85±0.52* |

Values are mean ± SEM of 10 animals; *P <0.05

Table 2

Effects of equimolar concentrations of methanolic extracts 10mg/kg of *Alstonia Bornei* (MEAB), *Ficus Elastica* (MEFE) and *Xylopiia Aethiopica* (MEXA) on acetic acid induced squirming in rats

| n | Control | MEXA | MEAB | MEFE |
|-----------------------|-------------|---------------------------|----------------------------|--------------|
| 10 | 55.4 ± 0.55 | 42.0 ± 0.65 ^{NS} | 39.31 ± 0.35 ^{NS} | 22.5 ± 0.25* |
| Percentage inhibition | - | 23.9 ± 1.5 | 28.5 ± 0.55 | 68.5 ± 1.5 |

Inhibition is expressed and percentage. Values are mean ± SEM of 10 animals. *P <0.05

These measurements are carried out in a variety of experimental animals and in humans. In this study we have recorded a quantitative response to three medicinal plants used in rural communities in Southwest, Nigeria. Generally, analgesic and inflammatory testing in mice or rat, using narcotics were found to increase pain threshold and reaction time to pain, they work on both peripheral sensory pain neurons and also on the visceral pain neurons

With this background, inferences were drawn from this study on the fact that the reaction time to heat or chemical stimuli on the paws was appreciably increased after administration of the extracts. Also squirming which stimulate intense visceral pain was markedly reduced in experiments with methanolic extracts of *ficus elastica* more significantly than MEAB and MEXA. In summary, this study has established the scientific basis for the folkloric use of *ficus elastica* in the treatment of pain and inflammation. Further studies

may be necessary to isolate the active principles and exact mechanism of action.

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