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Evaluation of the Effects of *Myrianthus Arboreus* P. Beauv (Cecropiaceae) and *Eremomastax Speciosa* (Hochst.) Cufod (Acanthaceae) Leaf Extracts on Acetic Acid-Induced Pain in Swiss Strain Mice, Two Plants Used in the Treatment of Dysmenorrhoea in Manjo (Littoral-Cameroon)

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Abstract:

Objective: *The aim of this study was to evaluate the efficacy of Myrianthus arboreus and Eremomastax speciosa in the treatment of dysmenorrhoea in Manjo.*

Methodology and results: *The plant material used consisted of the leaves of M. arboreus and E. speciosa. These plants were obtained from an ethnobotanical survey carried out in the sub-Division of Manjo, in the Division of Moungo, Littoral Region. These plants were selected on the basis of the number of times they were cited by respondents. Aqueous extracts of M. arboreus and E. speciosa were prepared. Phytochemical tests were carried out using the standard procedures described by Brunetton (1999). The therapeutic doses used to assess analgesic activity and prepare the aqueous and methanolic extracts were 55 and 110 mg/kg/day for M. arboreus and 31.5 and 63 mg/kg/day for E. speciosa. Phytochemical tests revealed the presence of several chemical compounds in all the drugs. The most abundant were alkaloids, phenolic compounds, flavonoids, anthraquinones, coumarins and anthocyanins.*

Conclusion: *The analgesic activity of M. arboreus and E. speciosa is due to the presence of flavonoids and tannins, which showed anti-nociceptive effects against acetic acid-induced torsion. Aqueous plant extracts induced a partial reduction in pain in SWISS strain mice.*

Keywords: *Myrianthus arboreus, Eremomastax speciosa, Dysmenorrhoea, Analgesic activity, Manjo, Cameroon.*

1. INTRODUCTION

Dysmenorrhoea is all the pelvic and/or lumbar pain that precedes or accompanies menstruation (1). Dysmenorrhoea is a real public health problem because of its very high frequency and its psychological and socio-economic impact. Indeed, 40-90% of women worldwide complain of dysmenorrhoea, 5-14% of adolescent girls are said to be regularly absent from school and 13-51% of adult women are said to be absent from work at least once because of this condition (2). A study conducted in Yaoundé, Cameroon, in two secondary schools and one higher education establishment found a prevalence rate of 75.5% (3). The rate was 66.88% in the health district of Dschang (4) and 63.86% at the University of Dschang, with the main consequence being a 23.1% rate of absenteeism from academic activities (5).

Women use a variety of methods to combat this problem. Depending on the anamnesis and the absence of pelvic abnormalities on clinical examination, various treatments are used. Several drugs are available to alleviate the pain of dysmenorrhoea. These include synthetic drugs such as non-steroidal anti-inflammatories (diclofenac), analgesics (paracetamol), hormonal contraceptives, antispasmodics

(ploroglucinol) and dietary supplements (vitamins C and E) (6). Although these recommended drugs effectively relieve the symptoms of dysmenorrhoea, a number of adverse effects have been associated with their use. These include gastrointestinal disorders and fatigue, to which is added the difficult access to certain drugs (7), especially in developing countries (WHO, 2017). These limitations have generated growing interest in accessible alternatives that are effective and better tolerated than conventional therapies.

The World Health Organisation (WHO) estimates that in Africa, over 80% of the population still use medicinal plants to meet their primary health needs (WHO, 2002). This use of plants dates back to prehistoric times, when mankind used them to satisfy its nutritional and therapeutic needs, due to their richness in secondary metabolites (8); (9). This is also true of localities in Cameroon, such as Manjo on the coast, where there is a great diversity of medicinal plants used by both the general population and traditional practitioners in particular. Plants have always been an essential element in the lives of humans and animals, particularly certain primates. They provide food, energy, services and healthcare. Far from being presented as a banal remedy, plants are considered to be living beings in Africa (10).

With a view to making the most of Cameroon's plant biodiversity, an ethnobotanical survey was carried out in the Manjo locality (Littoral, Cameroon) in 2023 among women and traditional healers. It identified 22 plants. Two of these, the most frequently cited and widely used in the traditional treatment of dysmenorrhoea, were the subject of the present study. These are *Myrianthus arboreus* and *Eremomastax speciosa*.

2. MATERIAL AND METHODS

2.1. Study Site

This study was carried out in Manjo, which lies on either side of the Douala-Bafoussam No.5 road. It is the administrative centre of the district whose name it bears. It covers an area of 305 km² and is part of the Moungo Division, one of the departments of the Littoral region. The Manjo district is bordered to the north by the Nkongsamba 3e district and Mount Manengouba, to the south by the Loum district, to the west by the Koupe Manengouba department, and to the east by the Nlonako and Nkongsamba districts (11).

Manjo was founded in the 19th century by one of Ewang's descendants, who settled in a place called Manewang (Child of Ewang in the Mbo'o language). This was the very first quarter of the town. The name Manjo means baby elephant in Mbo'o. It has a population of 40,250, 132 inhabitants/km², 70% of whom are young, with an average age of 24. There are 02 indigenous ethnic groups: Manehas and Mouamenam. The population is spread over two cantons and 33 villages. The Manehas chiefdom is in Namba, while the Mouamenam chiefdom is in Nsoung. The cantons are administered by two 2nd degree chiefs and 31 villages by 3rd degree chiefs. In the centre of Manjo, the non-natives are governed by family chiefs. The main non-indigenous ethnic groups are: Bamileke, Mbo'o, Haoussa, Bakaka, Bamenda, Bassa, Diboum, Ewondo, Bororo and Yabassi (11).

Manjo has an equatorial climate with two seasons. Two distinct climatic zones characterise the district: the southern part is warmer and the northern part colder. Manjo's relief is at an altitude of 450 m in the south and 1,200 m in the north. It is surrounded by mountain ranges, the most important of which are Manengouba at 2,400 m, Koupe at 2,070 m and Nlonako at 1,800 m. The vegetation consists of virgin forest, with natural vegetation in full regression, replaced by vast industrial banana and pineapple plantations, small coffee and cocoa farms and food and fruit crops. The fauna is characterised by the presence of birds, small rodents (rats, squirrels, partridges, hedgehogs, etc.), and large game in the Mantem 1 and 2, Abang-Ngol, Mouandong, Njoumbeng, Badjoungue and Mouakoumel forests, as well as endangered protected species such as the Goliath frog. In the commune of Manjo, there are savannahs and forests. The forests are rich in timber and non-timber products, and the trees are abusively cut for timber and firewood (11).

Economic activity is essentially based on agriculture and small-scale livestock farming. These include food crops (maize, cassava, macabo, plantain banana, beans, etc.), cash crops (coffee, cocoa, oil palm) and fruit crops (11) (Fig. 1).

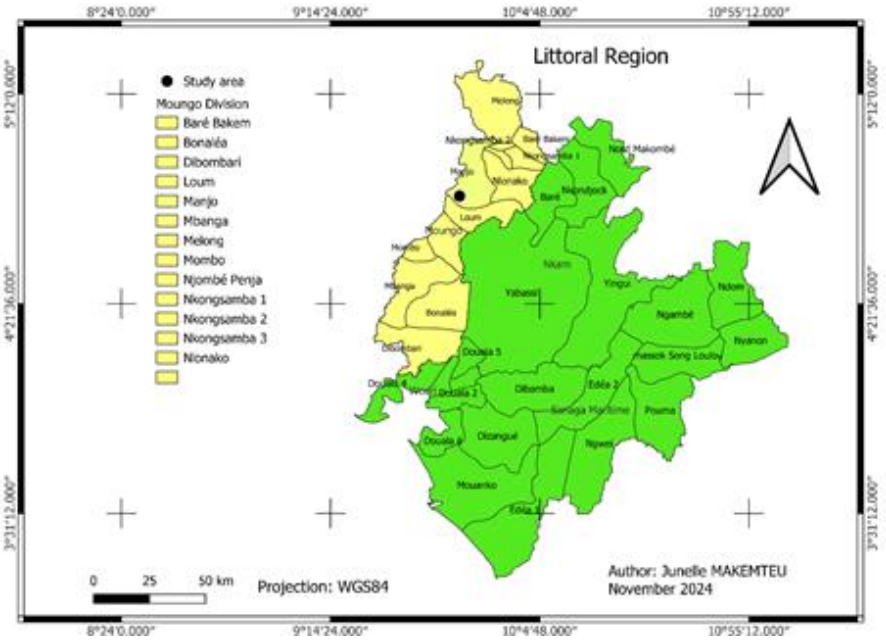

Figure 1. *Location of the study area Plant material*

2.2. Material

The plant material used consisted of the leaves of *Myrianthus arboreus* P. Beauv (Cecropiaceae) and *Eremomastax speciosa* (Hochst.) Cufod (Acanthaceae). These plants come from an ethnobotanical survey carried out in the Arrondissement of Manjo, in the Département of Moungo, Littoral Region. These plants were selected on the basis of the number of times they were cited by respondents. Fresh leaves of *M. arboreus* and *E. speciosa* were collected in December 2023, between 6 and 8 am. The plants were identified and authenticated at the Cameroon National Herbarium in Yaoundé under numbers HNC/34045 and HNC/136984 respectively.

A **B**

Figure 2. *Plant material used. A: leaves and fruit of Myrianthus arboreus P. Beauv; B: leaves of Eremomastax speciosa (Hochst.) Cufod (DEMAZE DIFFO Nidele, December 2023).*

2.3. Methods

2.3.1. Preparation of plant extracts

The parts of the plants harvested and identified were dried in the laboratory, at room temperature and protected from light. Once dried, the plant leaves were ground to a powder using a commercial ARMOR Waring-R type grinder. The aqueous extract of *M. arboreus* was obtained by decoction of 211 g of powder in 2000 ml of distilled water for 15 min according to the procedure indicated by the respondents. The solution obtained was filtered using a fine cloth, then cotton followed by Whatman No. 4 coffee filter paper. The filtrate was dried in an oven at a temperature of around 40°C. The aqueous extract of

E. speciosa was obtained by triturating a handful of the plant in 250 ml of distilled water as indicated by the respondents. The solution obtained was filtered using a fine cloth, then cotton, followed by Whatman No. 4 coffee filter paper. The filtrate was dried in an oven at a temperature of around 40°C.

The methanolic extract of *M. arboreus* and *E. speciosa* was obtained by maceration of 220 g and 141 g of powder in 881 ml and 580 ml of methanol respectively for 48 hours. The solution obtained was filtered using a fine cloth, then cotton followed by Whatman No. 4 coffee filter paper. The macerate was evaporated using a rotary evaporator at 70°C. The extract obtained was dried in an oven at a temperature of 40°C. After drying, the extract obtained was weighed and the extraction yield was determined using the following formula:

$$\text{Extraction yield (\%)} = \frac{\text{Mass of extract (g)}}{\text{Mass of powder (g)}} \times 100$$

2.3.2. Phytochemical tests

This test consists of investigating the main chemical groups (alkaloids, tannins, flavonoids, saponins, coumarins, sterols and triterpenes) using tube reactions. Using the standard procedures described by Brunetton (1999) (12). The aim of these tests is to identify chemical groups with pharmacological properties.

a. Shinoda test: Identification of flavonoids

A few drops of concentrated hydrochloric acid (HCl) and a few magnesium chips were added to a methanolic solution of the plant extract. The presence of flavonoids was indicated by the appearance of a purple colour.

b. Polyphenol Test

Approximately 1 mg of product was solubilised in ethanol and a few drops of FeCl3 were added to this solution. The presence of phenolic compounds led to the formation of [Fe(OAr) 6]3- type complexes, which were blue or violet in colour.

c. Molisch test: Identification of Sugars

In a test tube, a few milligrams of the product were dissolved in ethanol and an ethanolic solution of 1% α-naphthol was added. After homogenisation, a few drops of concentrated H2SO4 were slowly dripped onto the wall of the test tube. The presence of sugars can be seen by the appearance of a purplish-red ring at the interface.

d. Liebermann-Buchard Test: Identification of Triterpenes and Steroids

A few milligrams of the product were dissolved in 1 ml of chloroform, then a few drops of acetic anhydride were added to the solution obtained, followed by concentrated sulphuric acid and the mixture was shaken. The presence of triterpenes is indicated by the appearance of a purplish-red colour and that of steroids by the appearance of a greenish-blue colour.

e. Dragendorff Test: Identification of Alkaloids

Alkaloids were identified using Mayer's reagent. The addition of a few drops of this reagent to 2 ml of the plant extract solution resulted in the formation of an orange-red precipitate in the presence of alkaloids. 10 mg of extract was dissolved in 5 ml of 1% ethanolic HCl and 5 drops of Dragendoff's reagent were added. The formation of an orange precipitate indicates the presence of alkaloids.

f. Komarowski Test: Identification of Triterpene Saponins

This involved dissolving a few milligrams of product in a suitable solvent, preparing a TLC plate onto which a small quantity of extract was deposited, developing the plate in a suitable system and revealing the plate with the previously prepared Komarowski reagent. The presence of triterpene saponins will be indicated by the appearance of purple spots. Coumarin test Dissolve a drop of extract in methanol and place on a silica plate cast on a glass plate. The spots were then covered with 10% NaOH and the plate heated. The appearance of fluorescence indicates the presence of coumarins in the extract.

2.3.3. Evaluation of the effects of plant extracts on acetic acid-induced pain

2.3.3.1. Animal material

The work was carried out on female mice (*Mus musculus*) of mass varying between 20 and 30 g of SWISS strain, supplied by the animal house of the Institute of Medical Research and Medicinal Plants

studies. The animals were given drinking water and feed ad libitum. Plant material Aqueous extracts of *Myrianthus arboreus* P. Beauv and *Eremomastax speciosa* (Hochst.) Cufod were prepared as previously described. After mimicking the words of the traditional healer, the therapeutic doses used to assess analgesic activity and prepare the aqueous and methanolic extracts were 55 and 110 mg/kg/day for *Myrianthus arboreus*; 31.5 and 63 mg/kg/day for *Eremomastax speciosa*.

2.3.3.2. Preparation of solutions

For this study, the evaluation was carried out for a range of concentrations of the *M. arboreus* and *E. speciosa* aqueous extracts. Stock solutions with concentrations of 11 mg/ml and 3.15 mg/ml respectively were prepared. For the final volume of 10 ml of solution, 0.11 g and 0.06 g of extracts were solubilised in distilled water. For the ibuprofen 400 mg solution, the stock solution with a concentration of 20 mg/ml was prepared. For a final volume of 20 ml, 400mg was ground and then solubilised in distilled water. For the 0.6% acetic acid solution, the 0.6% solution marketed at a dose of 0.1ml/10g was used.

2.3.3.3. Animal allocation

Forty female mice ranging in mass from 18-30g were used and divided into 8 groups of 5 animals each according to the following protocol:

- Group 1: which was the neutral control and received distilled water by gavage (10ml/kg);
- Group 2: which was the sham control and received an injection of 0.9% NaCl;
- Group 3: which was the negative control and received acetic acid (0.1ml/10g) intraperitoneally;
- Group 4: which was the positive control and received acetic acid (0.1ml/10g) intraperitoneally) and ibuprofen 200mg/kg by gavage;
- Groups 5 and 6 Aqueous extract of *M. arbroreus*: who received the extract of *M. abroreus* at 55mg/kg and 110mg/kg respectively by gavage and an intraperitoneal injection of acetic acid;
- Group 7 and 8 aqueous extract of E. speciosa: who received the extract of E. speciosa at 31.5 mg/kg and 63mg/kg respectively by gavage and an intraperitoneal injection of acetic acid.

- **Experimental Protocol**

The animals used for this work were acclimatised for 2 weeks in the behavioural test room. One day before the start of the test, the animals were fasted for 18 hours. They were then randomised on the basis of mass and treated with different plant extracts by gavage. One hour later, all the animals (except those in groups 1 and 2) were given a peritoneal injection of acetic acid to induce visceral pain. A writting test was then performed to study the manifestations of pain. In addition, locomotion and anxiety were assessed using the Open field test.

- **Principle of the Writing Test**

It consists of verifying the inhibitory action of extracts on pain induced in mice by intraperitoneal (IP) injection of a dilute solution of acetic acid (Writhing test).

- **Principle of the Open Field**

This test is a pharmacological test that evaluates exploratory behaviour and general activity in mice. The experimental set-up for the mice was a 100cm ×100cm square arena whose base surface is subdivided into 10cm squares and open at the top. The box was covered with Plexiglas to facilitate cleaning each time the animal was removed, and to avoid interference between the animals. Above the cage, a camera connected to a computer was placed to film and record all the movements of each mouse. At the end of the test, the Any-Maze version 7.3 software was used to collect various parameters such as the total distance covered, the average speed of movements, the time taken to move and the number of lines crossed.

2.3.4. Analysis of experimental data

Data were entered and analysed using Excel 2013 and Graph Pad Prism (version 8.0.2). The results obtained, expressed as mean ± standard deviation (SD), were compared by analysis of variance

(ANOVA) using the Dunnett' statistical test with an α 5% risk. When the p-value was less than 0.05 ($p<0.05$), the difference observed was significant.

3. RESULTS

3.1. Phytochemical screening of plants

Phytochemical screening revealed the presence of the main chemical groups in the two hydroalcoholic extracts of *M. arboureus* and *E. speciosa*. The results are given in Table I.

Table I. *Phytochemical composition of methanolic extracts of M. arboureus and E. speciosa leaves.*

Test	*Myrianthus arboreus* P Beauv.	*Eremomastax speciosa* (Hochst.) Cufod
Alkaloids	+++	+++
Phenolic compounds	++	+++
Flavonoids	++	-
Terpenoids	ND	ND
Sterols	ND	ND
Tannins	+	+
Saponins	-	-
Anthraquinone	++	++
Coumarins	++	-
Anthocyanins	++	++
Molish	+	+

+++: Strongly positive; ++: moderately positive; +: weakly positive; -: negative; ND: not determined

Alkaloids, phenolic compounds, anthraquinones, anthocyanins and molish are present in each of the plant extracts. Saponins were absent in both extracts. The qualitative composition of these metabolites in the aqueous plant extracts showed slight differences depending on the plant. Thus, we note an abundance of alkaloids, phenolic compounds, anthraquinones and anthocyanins in the two plant species involved in this study. However, the aqueous extract of E. speciosa is very rich in phenolic compounds, whereas these metabolites are in the medium range in the *M. arboureus* extract. The results also highlight the presence of flavonoids and couramins in the aqueous extract of *M. arboureus*, in contrast to *E. speciosa* where these compounds are absent.

3.2. Effects of *Myrianthus arboreus* and *Eremomastax speciosa* extracts on an experimental model of pain induced in mice

3.2.1. Variation in animal body mass

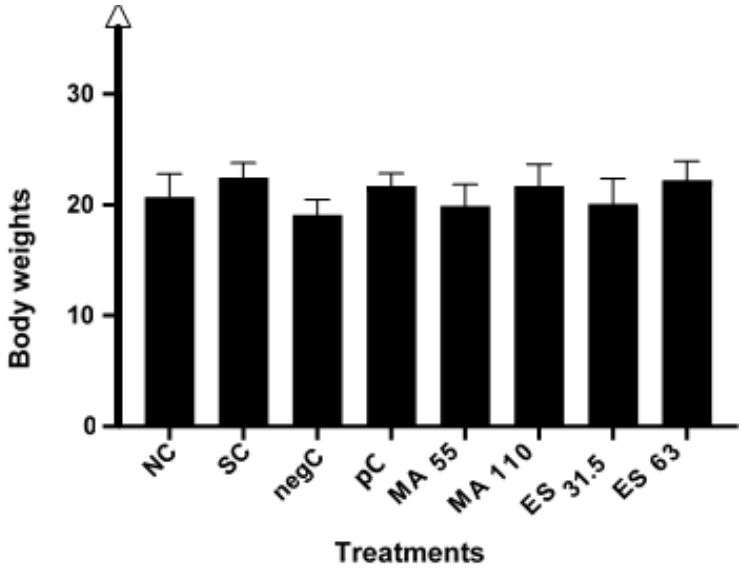

Figure 3. *Distribution of animal body weights according to the different treatments. Values represent the mean ± MSE. NC: Neutral control; TS: Sham control; NegC: Negative control, PC: Positive control; MA: Myrianthus arboreus; ES: Eremomastax speciosa.*

According to figure 3 on the variation in body mass of the mice at the end of the experiment, no significant variation ($p>0.05$) was recorded between the different groups.

3.2.2. Effects of different plant extracts on reaction time

Figure 4 shows that acetic acid administered at a concentration of 0.1ml/10g induced a significant ($p<0.001$) increase in reaction time compared with the neutral group. In contrast, pre-administration of ibuprofen significantly ($p<0.001$) prevented this effect. Like ibuprofen, extracts of both plants significantly ($p<0.001$-0.01) prevented the increase in reaction time. For each plant, the maximum effect was obtained at the lowest doses (MA55 and ES63).

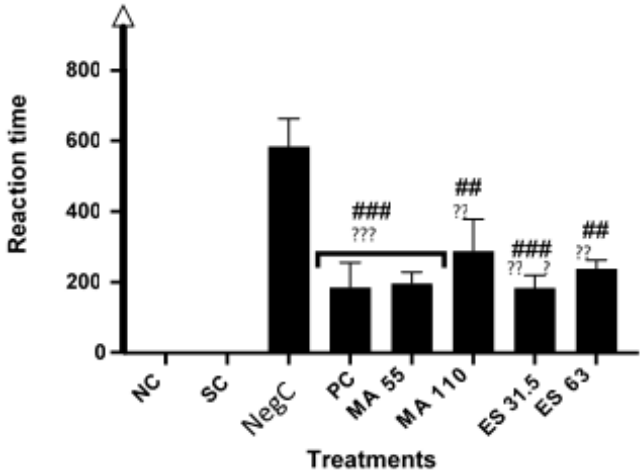

Figure 4. *Effects of different extract doses on reaction time. Values are means ± MSE, *: p<0.05; **: p< 0.01; ***: p< 0.001: Significantly different compared to the neutral control group. This histogram also represents the mean ± MSE, #: p>0.05; ##: p<0.01; ### p<0.001: Significantly different compared to the negative group. NC: negative control; SC: sham control; NegC: negative control; PC: positive control; MA: M. arboreus (55, 110mg/kg); ES: E. speciosa (31.5, 63mg/kg).*

3.2.3. Effects of the different plant extracts on the number of twists

Figure 5 shows that the administration of acetic acid induced a significant increase ($p<0.001$) in the number of twists compared with the neutral group. On the other hand, ibuprofen administered before induction prevented the increase in the number of twists. With the exception of *E. speciosa* (63 mg/kg), plant extracts also prevented the effect of acetic acid, with the strongest effect observed with *M. arboreus* (55 mg/kg).

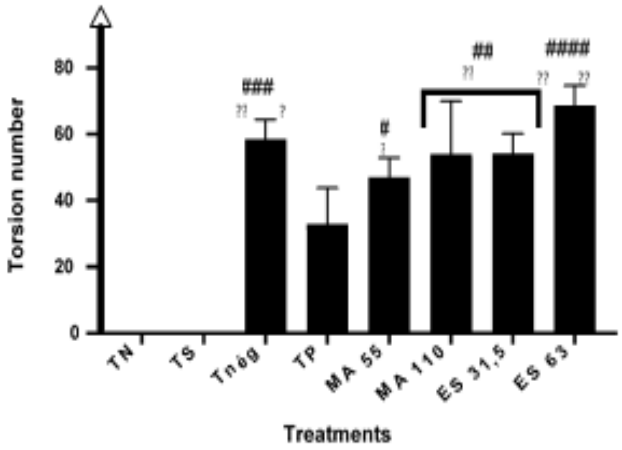

Figure 5. *Effects of different extract doses on twist number. Values are mean ± MSE, *: p<0.05; **: p< 0.01; ***: p< 0.001: Significantly different compared to the neutral control group. This histogram also represents the mean ± MSE, #: p>0.05; ##: p<0.01; ### p<0.001: Significantly different compared to the negative group. NC: negative control; SC: sham control; NegC: negative control; PC: positive control; MA: M. arboreus (55, 110mg/kg); ES: E. speciosa (31.5, 63mg/kg)*

3.2.4. Effects of the different plant extracts on the average speed of movement of the animals

Figure 6 shows that the administration of acetic acid (0.1ml/10g) significantly ($p<0.01$) reduced the average speed of movement compared with the neutral control. Administration of ibuprofen and plant extracts prior to pain induction did not prevent the decrease in mean displacement velocity ($p>0.05$).

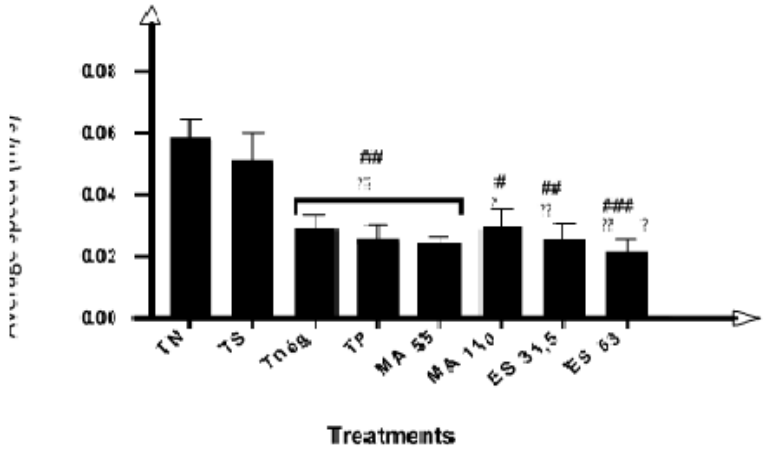

Figure 6. *Effects of different extract doses on mean velocity. Values represent means ± MSE, * : p<0.05; ** : p< 0.01; *** : p< 0.001: Significantly different compared to the neutral control group. #: p>0.05; ##: p<0.01; ### p<0.001: Significantly different compared to the negative group. NC: negative control; SC: sham control; NegC: negative control; PC: positive control; MA: M. arboreus (55, 110mg/kg); ES: E. speciosa (31.5, 63mg/kg).*

3.2.5. Effects of different plant extracts on distance travelled

According to Figure 7, acetic acid induced a significant ($p<0.01$) decrease in distance travelled compared with the neutral control. The prior administration of ibuprofen and plant extracts did not prevent the decrease in distance travelled.

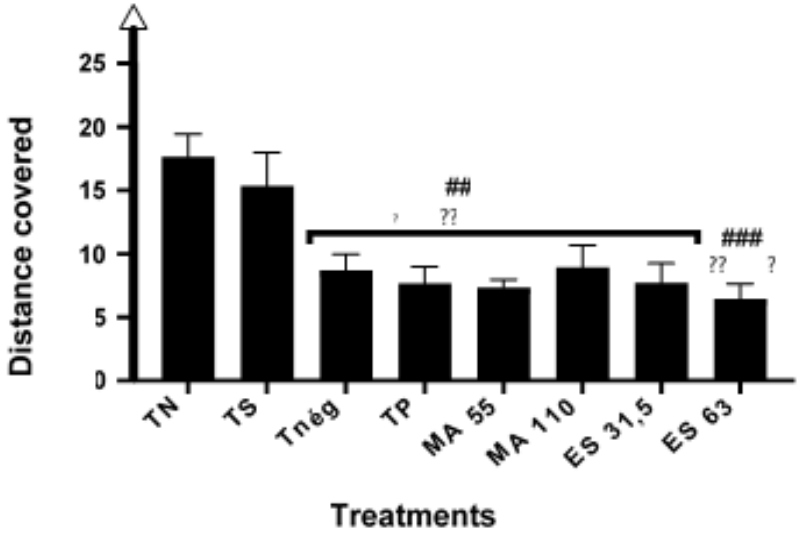

Figure 7. *Effects of different extract doses on distance travelled. Data are as mean ± MSE, *: p<0.05; ** : p< 0.01; *** : p< 0.001: Significantly different compared to the neutral control group. #: p>0.05; ##: p<0.01; ### p<0.001: Significantly different compared to the negative group. NC: negative control; SC: sham control; NegC: negative control; PC: positive control; MA: M. arboreus (55, 110mg/kg); ES: E. speciosa (31.5, 63mg/kg).*

3.2.6. Effects of the different plant extracts on the line crossed

According to figure 8, acetic acid induced a significant decrease ($p<0.01$) in the number of lines crossed compared with the neutral group. In contrast, ibuprofen administered before pain induction did not prevent the decrease in the number of lines crossed. Like ibuprofen, extracts of the two plants did not prevent this reduction.

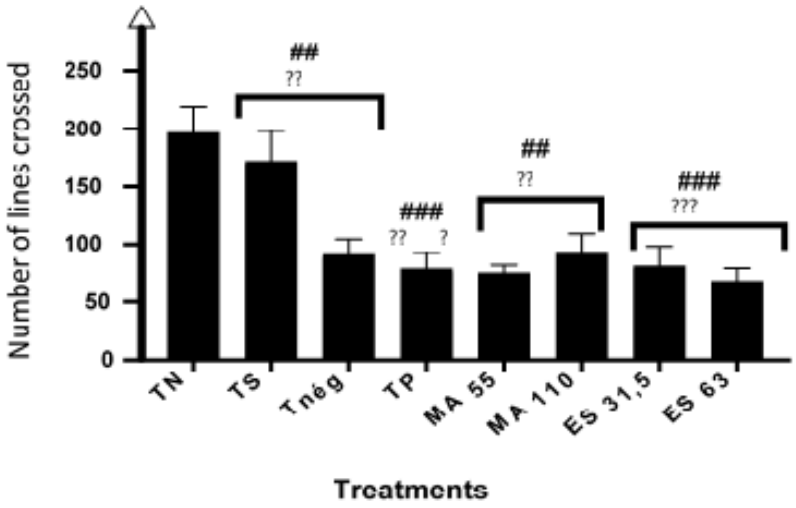

Figure 8. *Effects of different extract doses on the number of lines crossed. Values are expressed as mean ± MSE, * : p<0.05; ** : p< 0.01; *** : p< 0.001: Significantly different compared to the neutral control group.This histogram also represents the mean ± MSE, # : p>0.05; ## : p<0.01; ### p<0.001: significantly different compared to the negative group. NC: negative control; SC: sham control; NegC: negative control; PC: positive control; MA: M. arboreus (55, 110mg/kg); ES: E. speciosa (31.5, 63mg/kg).*

3.2.7. Effects of different plant extracts on motility time

The administration of acetic acid (0.1ml/10g) induced a decrease in the motility time of the animals although not significantly (p>0.05) compared to the neutral group. Administration of ibuprofen prior to induction did not prevent this decrease. Like ibuprofen, the 55mg/kg and 63mg/kg doses of *M. arboreus* and *E. speciosa* respectively did not prevent this decline. On the other hand, although not significantly (p>0.05), a slight inhibition of the effects of acetic acid was recorded in the group receiving *E. speciosa* (31.5, 63mg/kg) compared with the negative control (Figure 9).

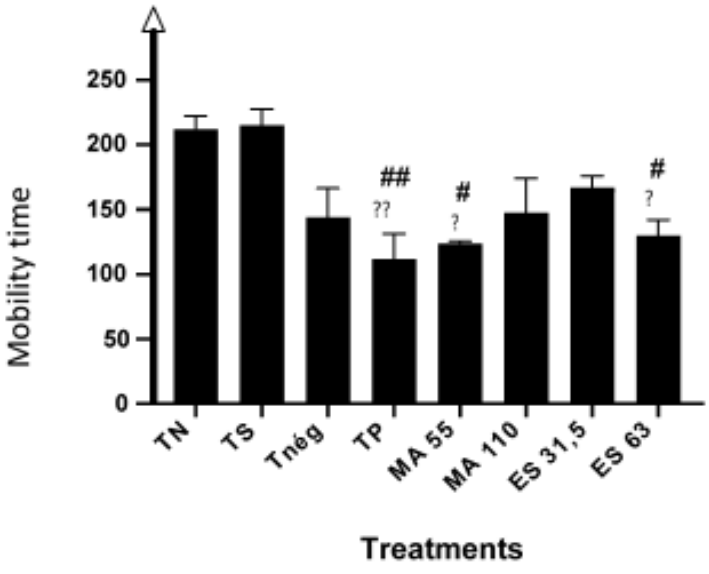

Figure 9. *Effects of different extract doses on mobility time. Values are expressed as mean ± MSE, *: p<0.05; **: p< 0.01; ***: p< 0.001: Significantly different compared to the neutral control group.This histogram also represents the mean ± MSE, #: p>0.05; ##: p<0.01; ###p<0.001: significantly different compared to the negative group. NC: negative control; SC: sham control; NegC: negative control; PC: positive control; MA: M. arboreus (55, 110mg/kg); ES: E. speciosa (31.5, 63mg/kg).*

4. DISCUSSION

The aim of our work was to evaluate the efficacy of aqueous macerates of the leaves of *M. arboreus* and *E. speciosa* used in the treatment of dysmenorrhoea in Manjo. Phytochemical tests and evaluation

of analgesic activity were carried out on aqueous macerates of *M. arboreus* and *E. speciosa* leaves. The characterisation reactions revealed the presence of several chemical compounds in all the drugs. The most abundant were alkaloids, phenolic compounds, flavonoids, anthraquinones, coumarins and anthocyanins. These molecules are secondary metabolites that give plants their antibacterial, antifungal, antiparasitic, antiviral and antioxidant activities (13). The analgesic activity of *M. arboreus* and *E. speciosa* was due to the presence of flavonoids and tannins, which showed anti-nociceptive effects against acetic acid-induced torsion.

To assess the analgesic activity of *M. arboreus* and *E. speciosa* extracts, pain was induced experimentally by chemical and thermal stimuli (12). Intraperitoneal injection of acetic acid in mice induced abdominal contortions involving peritoneal receptors. Acetic acid induces pain by stimulating chemoreceptors leading to the release of numerous chemical mediators involved in pain, such as histamine, prostaglandins (PGE 2), serotonin and bradykinin (14). These cramps are due to the production of prostaglandins, synthesised from arachidonic acid by the enzyme cyclooxygenase or "COX" (15). In addition, peripheral analgesics such as ibuprofen inhibit cyclooxygenase (16).

In the present study, the solution of *Myrianthus arboreus* and *Eremomastax speciosa* extracts significantly prevented the number of contortions. In the first period, the reference molecule (ibuprofen 200mg/kg bw) reduced pain. Extracts of *Myrianthus arboreus* and *Eremomastax speciosa* reduced pain. The active substances in these pain-relieving plants interfered with pain mediators or acted on the central nervous system (CNS) to block transmission of the pain signal (17). The effects observed in the present study suggest that the extracts may relieve peripheral pain either by blocking ASIC channels or by inhibiting the synthesis of prostaglandins and other pain mediators (18). This suggests that the peripheral analgesic effect of extracts is due to COX inhibition. Indeed, the presence of flavonoids and alkaloids in *Myrianthus arboreus* and *Eremomastax speciosa* extracts could be responsible for the analgesic effect observed. These substances have been shown to have powerful analgesic effects (19). Flavonoids inhibit the synthesis of pain mediators by blocking the specific enzymes involved in the generation of nociception (20)

5. Conclusion

The aim of this study was to evaluate the efficacy of *M. arboreus* and *E. speciosa* in the treatment of dysmenorrhoea in Manjo. Phytochemical testing of macerates of these plants showed an abundance of secondary metabolites: alkaloids, phenolic compounds, flavonoids, anthraquinones, coumarins and anthocyanins. These molecules are secondary metabolites that give plants their antibacterial, antifungal, antiparasitic, antiviral, antioxidant and analgesic activities. The analgesic activity of *M. arboreus* and *E. speciosa* is due to the presence of flavonoids and tannins, which have been shown to have anti-nociceptive effects against acetic acid-induced torsion. Aqueous plant extracts induced a partial reduction in pain in SWISS strain mice. Although encouraging, our results remain preliminary and need to be investigated further, in particular to determine the mechanisms of action of the different molecules contained in these extracts and the toxicity of these two plants.

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