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Research Article

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Evaluation of the analgesic activity of *Cissus aralioides* leaves in rat

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ABSTRACT

The study evaluated the analgesic effects of methanolic extract of Cissus aralioides leaves in rats. The analgesic effects of C. aralioides was evaluated using acetic acid induced writhing reflex and tail flick models in rats. The administration of the extract at the doses of 150, 300 and 600 mg/kg body weight to the rats resulted in a significant ($P < 0.05$) decrease in the number of writhing reflexes in rats in a dose dependent manner when compared to tween-20 solution treated group (negative control). In the tail flick model, Pre-treatment of the rats with Aspirin (100 mg/kg), extract (300 and 600 mg/kg) produced 59.25%, 21.71% and 22.59% increase in pain reaction time (PRT) respectively, when compared to the negative control group. The result of the study suggests that Cissus aralioides possesses analgesic properties and provides the pharmacological basis for its use in ethnomedicine for this purpose.

Keywords: Analgesia, Cissus aralioides, writhing reflex, acetic acid, Aspirin, tail flick

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INTRODUCTION

Cissus aralioides (Welw ex. Barker) Planch belongs to the family *Vitaceae*. It is commonly called “eriri agwo” in Igbo, South-Eastern Nigeria. *Cissus aralioides* is a strong climber that grows to the top of forest canopy. It has a succulent green stem, which is woody at the base. It is predominantly of Tropical African origin and found in deciduous forests and fringing jungles across Senegal to Northern and Southern Nigeria [1]. The plant is extensively used in traditional medicine in the treatment of disease conditionssuch as wound, rheumatism, fever, relieve of cough, gastrointestinal and urogenital infection [2-4].

The available experimental research literatures have reported the following pharmacological activities of *C. aralioides*: anti-inflammatory, antioxidant and antimicrobial activities [2, 4]. Borokini and Omotayo [3] reported the presence of saponins, alkaloids, tannins, steroids, glycosides, terpenes and flavonoids in the *C. aralioides* leaves. There is paucity of scientific information on the analgesic activity of *C. aralioides*. This study was therefore designed to evaluate the analgesic activity of *Cissus aralioides* based on its folkloric uses.

EXPERIMENTAL SECTION

Collection and Identification of Plant Material

The leaves of *Cissus aralioides* were collected from the forest in Michael Okpara University of Agriculture, Umudike, Abia State in June, 2013 and identified by Mr. Ndukwe Ibeh of the Department of Forestry and

Environmental Management, Michael Okpara University of Agriculture, Umudike. A voucher specimen catalogued MOUAU/CVM/VPP/2013/04 was deposited in the Department of Veterinary Physiology, Pharmacology and Biochemistry herbarium of the same University for reference purposes.

Preparation of the Plant Material

The leaves of the plant were dried at room temperature on a laboratory bench and pulverized into coarse powder. The powdered plant material was extracted using cold maceration method in 80% methanol for 48 hours with intermittent shaking at 3 hours interval. Thereafter, the extract was filtered using Whatman No. 1 filter papers. The filterate was dried in an oven at 40°C and the extract was stored in a refrigerator at 4°C as *Cissus aralioides* extract (CAE) until required for the experiment. The percentage yield was calculated with formula below:

$$\frac{\text{Weight of extracted material}}{\text{Weight of starting plant material}} \times \frac{100}{1}$$

Experimental Animals

Sixty (60) albino rats of both sexes weighing 100-130 g, were obtained from the laboratory animal unit of the College of Veterinary Medicine, Michael Okpara University of Agriculture Umudike, Abia State for the study. The animals were housed in aluminum cages at room temperature and under natural light/darkness cycles. The rats were supplied with clean drinking water and fed *ad libitum* with standard commercial pelleted grower feed (Vital feed® Nigeria). The rats were acclimatized for two weeks prior to the study. They were maintained in accordance with the recommendations of the Guide for the care and use of laboratory animals [5] and the experimental protocol was approved by the institution's ethical committee.

Effect of CAE on acetic acid-induced abdominal writhing in rats

The method of Vale *et al* [6] was used. Five groups of rats consisting of 6 rats each were fasted for 12 h but free access to tap water. Group A received 5 % tween 20 solution (10 ml/kg) and served as negative control. Group B served as positive control and received Aspirin (100 mg/kg) orally, while Groups C - E received 150, 300 and 600 mg/kg of CAE by oral administration, respectively. Forty five minutes later, the rats received 5 ml/kg of 0.7% acetic acid intraperitoneally. The number of writhing or abdominal stretches produced in each rat was counted for 30 min.

Effects of CAE on tail flick response in rats

The experiment was carried out by measuring tail withdrawal time from hot water as described by Adzu *et al* [7]. Thirty rats were randomly divided into 5 groups (A - E) of 6 rats each and fasted for 12 h. The rats were treated as follows; Group A served as negative control and received 5% tween 20 solution (10 ml/kg) per os, Group B served as positive control and received Aspirin (100 mg/kg) orally while Group C – E received CAE (150, 300 and 600 mg/kg, respectively) per os. One hour post drug treatment about 3 cm of the tail of each rat was dipped into a water bath containing warm water maintained at temperature of 50 ± 1 °C. The time taken for the rat to flick the tail known as the pain reaction time (PRT) was recorded for all the mice.

Statistical analysis

Data obtained were presented as mean ± SEM and analyzed using one-way analysis of variance (ANOVA). The variant mean were separated by least significant difference (LSD) of the different groups. Significance was accepted at the level of $p < 0.05$.

RESULTS

Effects of CAE on acetic acid induced abdominal writhing reflex

The results of effects of CAE on acetic acid induced abdominal writhing reflex are presented in Table 1. The extract (150, 300 and 600 mg/kg) produced a significant ($P < 0.05$) dose-dependent decrease in the number of abdominal writhing in the treated rats when compared to tween-20 treated rats. The extract 150, 300, 600 mg/kg and Aspirin (100 mg/kg) caused 62.08%, 65.49%, 67.25% and 93.12% inhibition of abdominal writhing respectively, in treated rats when compared to tween-20 treated rats.

Effects of CAE on tail flick response

The extract (300 and 600 mg/kg) and Aspirin (100 mg/kg) significantly ($P < 0.05$) increased the pain reaction time (PRT) in treated groups when compared to the tween-20 treated group. Aspirin (100 mg/kg), CAE 150, 300 and 600

mg/kg elicited 59.25%, 12.81%, 21.71% and 22.59% increase in PRT respectively, in treated groups when compared to the tween-20 treated group.

Table 1. Effects of CAE on acetic acid induced writhing reflex

Treatment	No. of writhing reflex ± SEM	% inhibition
5% tween 20 10ml/kg	19.33 ± 0.21	-
Aspirin 100 mg/kg	1.33 ± 0.19*	93.12
CAE 150 mg/kg	7.33 ± 0.42*	62.08
CAE 300 mg/kg	6.67 ± 0.20*	65.49
CAE 600 mg/kg	6.33 ± 0.21*	67.25

**P < 0.05 when compared to tween 20 treated group*

Table 2. Effects of CAE on tail immersion

Treatment	Pain reaction time (Sec) ± SEM	% increase in PRT
5% tween 20 10ml/kg	5.62 ± 0.17	-
Aspirin 100 mg/kg	8.95 ± 0.58*	59.25
CAE 150 mg/kg	6.34 ±0.17	12.81
CAE 300 mg/kg	6.84 ± 0.27*	21.71
CAE 600 mg/kg	6.89 ± 0.38*	22.59

**P < 0.05 when compared to tween 20 treated group*

DISCUSSION

The analgesic effects of methanolic extract of *Cissus aralioides* leaves was investigated in rats using acetic acid induced writhing reflex and tail immersion models. The choice of the doses used was based on the report of previous study [4].

The acetic acid induced writhing reflex model is a sensitive procedure commonly used for establishing peripherally acting analgesic drugs and it involves the local peritoneal receptors [8, 9]. The procedure involved injection of irritants (0.7% acetic acid) into the peritoneal cavity of rats. The animals react with a characteristic stretching behavior which is called writhing [10, 11]. The stretching behavior is due to the sensitization of the peritoneal nociceptive receptors by prostaglandins and the animal stretch in order to remove the pain [12]. Pretreatment of the rats with extract (150, 300 and 600 mg/kg) significantly ($P < 0.05$) reduced the number of writhing in a dose-dependent manner, comparable to the effects produced by aspirin (100 mg/kg). The comparable effects of the extract and aspirin are indication that the extract may have aspirin-like mechanism of action [13]. Aspirin is a non steroidal anti-inflammatory drug (NSAID) that inhibit cyclooxygenase (COX) enzyme irreversible by acetylating a serine residue in its active site. The relative potency of NSAIDs in therapy roughly parallels their potencies as COX inhibitors [14].
The tail flick method has been found to be suitable for the evaluation of central acting analgesic drugs [11]. The pre-treatment of the rats with the extract (300 and 600 mg/kg) exhibited a mild analgesic effect. The exhibition of mild analgesic effect against the tail flick model is an indication that the extract has some central nervous system involvement and not exclusively by inhibition of prostaglandin synthesis [15].

The analgesic activities of *C. aralioides* may be mediated by the phytochemical constituents [16]. Some of the phytochemical constituents; alkaloids, saponins, glycoside, have been shown to possess analgesic properties [17].

In conclusion, the study demonstrates that *C. araloides* leaves have analgesic properties and validates its use in the folkloric medicine in the management of pain. More study is required to isolate and characterize the active principle responsible for the analgesic properties.

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