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## Short Communication

# Central Nervous System Depressant Effect of the Fruits of *Piper guineense*

Felicia E. Williams<sup>1</sup>, Olusegun S. Adedeji<sup>2</sup>, Julius O. Aiyedun<sup>3</sup> and Hope Obianwu<sup>4</sup>

<sup>1</sup>Department of Clinical Pharmacy and Pharmacy Practice, University of Ilorin, Ilorin, Nigeria.

<sup>2</sup>Department of Animal Production and Biotechnology, Ladoke Akintola University of Technology, Ogbomosho, Nigeria.

<sup>3</sup>Department of Veterinary Public Health and Preventive Medicine, University of Ilorin, Ilorin, Nigeria.

<sup>4</sup>Department of Pharmacology and Toxicology, University of Benin, Benin City, Nigeria.

Correspondence: [wifel2003@yahoo.com](mailto:wifel2003@yahoo.com); +2348033354532

**ABSTRACT:** The central nervous system depressant effect of the butanol extract of the fruits of *Piper guineense* was pharmacologically screened by measuring the prolongation of barbiturate sleeping time. Nine rats (n=9) were used and assigned into three groups, with each group comprising of three rats (n=3). Group A served as the Control, while Groups B and C served as tests. Thiopentone sodium (40 mg/kg body weight) was administered subcutaneously to the rats in Group A, 2 mg/kg of the butanolic extract of the fruits of *Piper guineense* was administered subcutaneously to the rats in Test Group B, 30 minutes before administering same dose of thiopentone sodium, while rats in Group C received 4 mg/kg of the butanolic extract 30 minutes before administering same dose of thiopentone sodium. The sleeping time was recorded. Student-t-test at 5% significance level was used to analyze the results obtained. The mean barbiturate sleeping time prolongation of 53.67 minutes was produced by 2 mg/kg of the extract while a dose of 4 mg/kg produced mean barbiturate sleeping time prolongation of 103.67 minutes. This study suggests that the fruits of *Piper guineense* have central nervous system depressant effect.

**KEYWORDS:** *Piper guineense*, fruits, glycosidic constituents, central nervous system, depressant.

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## INTRODUCTION

Many of the orthodox medicines used in prevention and treatment of diseases today in Nigeria originate from plants (Federal Ministry of Health, Nigeria, 2005). For example, atropine is indicated for mydriasis and cyclopegia during optic refraction, an antidote of organophosphorus poisoning and symptomatic relief of gastro-intestinal disorders is found in Belladonna plant, digoxin a glycoside used for treatment of congestive heart failure is from leaves of *Digitalis lanata*. Quinine an antimalarial and quinidine an antiarrhythmia are alkaloids found in Cinchona bark while aspirin is from Willow bark (Ansari and Inamdar, 2010).

Some of these plants have depressant effects on the central nervous system (CNS). For example Chinese herb *Corydalis ambigua* has been found to have analgesic, sedative-tranquillizing and hypnotic actions (Zhu, 1991). Terpinen-4-ol a mono-terpene component of the essential oil from the leaves of *Clerodendrum phylomis* showed a depressant effect on the CNS (Katekhaye et al, 2012). Also the ethanolic extract of the root of *Capparis zeylanica* Lin. (Capparidaceae) has CNS depressant effects (Mishra et al, 2011).

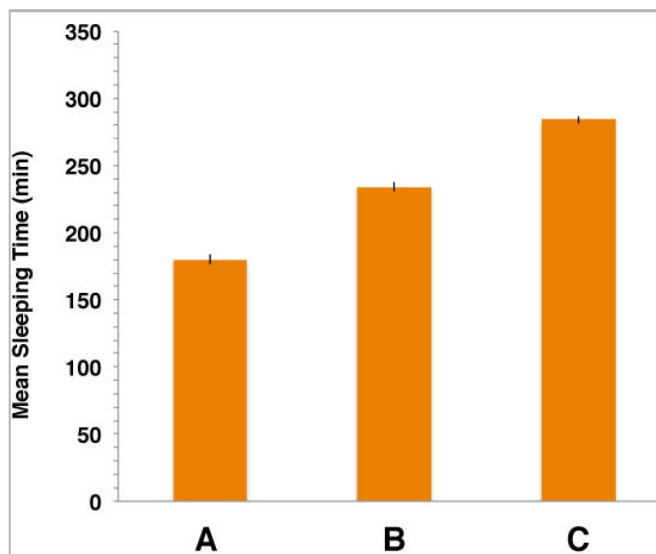
The measurement of barbiturate sleeping time is one of the pharmacological screening methods used to evaluate the pharmacology of drugs that act on the CNS. Barbiturate-induced sleep is similar to natural sleep. Prolongation of barbiturate sleeping time is a measure of the sedative properties of a given drug while shortening of the barbiturate sleep is correlated with CNS stimulation.

This investigation examines the purported CNS depressant effect of *Piper guineense*, a member of the family Piperaceae. It has common names such as Ashanti pepper and Benin pepper. Locally in Nigeria, it is called Oziza (Ika), Uziza (Igbo), Masoro (Hausa), Chitta (Fulani), Iyere (Yoruba), Enie (Edo), Eshasha (Urhobo) and Adusa (Efik). Phytochemical analyses of the plant constituents showed it has glycosides, alkaloids, tarponins and volatile oil. This study is aimed at determining the CNS depressant effect of the butanolic extract of the glycoside constituents of the fruits of *Piper guineense*.

As a result of the therapeutic claims about the use of the fruits of *Piper guineense* it has become necessary to subject the constituents of the fruits to pharmacological screening with a view to finding any pharmacological basis for its traditional use. Such screening using laboratory animals enable investigators to predict potential safety and efficacy of these constituents.

## MATERIALS AND METHODS

The fruits of *Piper guineense* were collected from Aluku village, Edo State, Nigeria, and authenticated in the department of Pharmacognosy, University of Benin, Benin City, Nigeria. The fruits were washed and dried at room temperature for three days and placed in an oven at 60°C for further three days. The fruits were powdered and 250 g of the powder subjected to extraction. The extraction was carried out in the department of Pharmacognosy, University of Benin. The butanol extract was tested for the presence of glycoside using Fehling solution after hydrolysis with 10% sulphuric acid and making it alkaline with 10% sodium hydroxide.



**Figure 1: Central nervous system depressant effect of butanolic extract of fruits of *Piper guineense*.** A, Thiopentone sodium (40mg/kg); B, Butanol Extract (2 mg/kg); C, Butanol Extract (4 mg/kg). Values are expressed as mean  $\pm$  standard deviation of the sleeping times from 3 different experimental animals.

Nine adult male Wistar rats were procured from the animal house of the department of Pharmacology, University of Benin. The rats were divided into three groups, with each group comprising of three rats (n=3) and designated Groups A-C. Group A served as control, while Groups B and C served as tests. To animals in group A, Thiopentone sodium 40 mg/kg was administered subcutaneously; in Test Group B, 2 mg/kg of the butanol extract of the fruits of *Piper guineense* was administered subcutaneously 30 minutes before administering same dose of thiopentone sodium while 4 mg/kg of the extract of the fruits of *Piper guineense* was administered subcutaneously 30 minutes before administering same dose of thiopentone sodium to the rats in

**Table 1: Effect of 2 mg/kg of butanol fraction of the extract of the fruit of *Piper guineense* on barbiturate sleeping time.**

Treatments	Mean sleeping time (min)	SEM	95% Confidence Interval of the difference		T	df	Sig. (2 tailed)
A	180±3.6	2.1					
B	233.67±3.2	1.9					
Paired A-B	-53.67±3.1	1.8	-61.26	to -46.07	-30.426	2	0.001

A, Thiopentone sodium (40mg/kg); B, Butanol Extract (2 mg/kg); C, Butanol Extract (4 mg/kg).  
Statistically significant: P-value < 0.05

**Table 2: Effect of 4mg/kg of butanol fraction of the extract of the fruit of *Piper guineense* on barbiturate sleeping time.**

Treatments	Mean sleeping time (min)	SEM	95% Confidence Interval of the difference		T	df	Sig. (2-tailed)
A	180±3.6	2.1					
C	283.67±2.9	1.7					
Paired A-C	- 103.67±1.2	0.7	-106.53	to -100.8	-155.5	2	0.000

**Table 3: Comparison between barbiturate sleeping time due to different doses of butanol fraction of the extract of the fruit of *Piper guineense*.**

Treatments	Mean sleeping time (min)	SEM	95% Confidence Interval of the difference		T	df	Sig. (2 tailed)
B	233.67±3.2	1.9					
C	283.67±2.9	1.7					
Paired B-C	-50.0±3.5	2.0	-58.61	to -41.4	-25.0	2	0.002

A, Thiopentone sodium (40mg/kg); B, Butanol Extract (2 mg/kg); C, Butanol Extract (4 mg/kg).  
Statistically significant: P-value < 0.05

Test Group C. The sleeping time was recorded as the time interval between the loss and gain of righting reflex. The results obtained were analyzed statistically using Student-t-test at 5% significance level.

## RESULTS AND DISCUSSION

Thiopentone sodium is a short acting barbiturate that acts as a CNS depressant. The butanol fraction of the extract prolonged the barbiturate sleeping time (Figure 1). At a dose of 2 mg/kg of the extract, a mean sleeping time of  $233.67 \pm 3.2$  minutes was recorded, amounting to a prolongation of the barbiturate sleeping time of 53.67 minutes (29.8%). Increasing the dose of the extract to 4mg/kg resulted in mean sleeping time of  $283.67 \pm 2.9$  minutes which a further prolongation of the sleeping time of 103.67 minutes (57.59%).

The potentiation of the barbiturate sleeping time of the extract observed in this study was higher than that produced by the extract of the root of *Capparis zeylanica* (Mishra et al., 2011). In that study, the values obtained were 14.9, 27.8, and 51.7 minutes using 100 mg/kg, 200 mg/kg and 400 mg/kg respectively. The observed difference could be due to the differences in the type of laboratory animals. The current study made use of rats while the previous made use of mice.

The clinical implication of this study is the potential herbal-drug interactions between antidepressants and antipsychotics. The concomitant use of the fruits of *Piper guineense* with antidepressants could result in poor therapeutic outcome for patients who are on antidepressant therapy. Also, patients on antipsychotic therapy who concomitantly use the fruits of *Piper guineense* could experience poor therapeutic outcome. These potential herb-drug interactions could lead to adverse drug reactions.

The presence of glycoside constituents in the fruits of *Piper guineense* was established using the Fehling's reagent test (data not shown).

It is likely that these glycoside constituents of the fruits of *Piper guineense* exerted the dose dependent central nervous system depressant effect observed in this study. There is clinical implication of potential herbal-drug interactions in case of concomitant use of the fruits of *P. guineense* with antidepressants and antipsychotics.

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