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Effect of Sacoglottis gabonensis *(Urban humiraceae)* stem bark extract, a palm wine additive on the rabbit jejunum

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ABSTRACT

The crude extract from Sacoglottis gabonensis (Urban Humiriaceae) stem bark was prepared using standard method. The jejunum of the rabbit was obtained through dissection. About 2-3cm^3 of the isolated jejunum was mounted in an organ bath containing Tyrode solution at 37^{o}c ±1^{o}c.These investigation was carried out on the isolated jejunum. Result showed that the extract induce relaxation effect on the intestinal motility of the isolated rabbit jejunum, whereas the standard drug acetylcholine induced contraction effect. The log- dose response curve for the extract shows that at higher concentration of the added extract the response is lower, while in the case of the standard drug, the trend was reversed, thus increase in drug concentration increases the intestinal motility of the isolated rabbit jejunum, with increase in amplitude. From the result it is likely that the extract may cause diarrhea and the standard drug causes constipation.

Key Words: Sacoglottis gabonensis, extract, stem bark, acetylcholine, relaxations and contraction.

INTRODUCTION

Plants have been used as a source of medicine throughout history and continue to serve as the basis for many pharmaceuticals used today. They provide a valuable source of therapeutic compounds because of their enormous biosynthetic capacity [1]. Natural plant products have been used in Nigeria especially in the tropical rainforest zone of southern Nigeria in local medicine practice but very little of such substances have been subjected to scientific verification. This has limited their introduction and use in orthodox pharmaceutical preparation.

Sacoglottis gabonensis is a tropical rainforest tree found in the tropical rainforest region of Africa and America. It belongs to the family *Humiriaceae.* In certain rural communities of Nigeria especially Abia , Akwa- Ibom ,Rivers ,Delta, Edo and Imo State ,the stem bark of this tree is commonly used as an additive to palm wine, a local alcoholic brew which is an exudates from the phloem of raphia and palm trees[2].

Palm wine is a generic name for group of alcoholic beverage obtained by fermentation from the saps of palm trees. Freshly harvested unfermented sap is a clear colorless liquid with a sweet sugary taste and no alcohol content after sometimes, it gets fermented becomes milky and increasingly less sugary and develops intoxicating effect [3]. Upon

fermentation by the endogenous micro flora of the palm, the sugar is converted into ethanol and organic acids resulting in the rapid deterioration of the organoleptic quality of the juice. This was reported to be due to suspension of living microorganism. The stem bark extract is normally added when the palm wine is fresh. It prolongs the shelf life of the palm wine and reduce foaming and effervescence. It impacts a bitter taste to the sugary palm wine thereby, making the beverage more tasty and acceptable with the amber color. It has been reported also that the tree bark extract of *S. gabonensis* delays the souring of palm wine, lowers its titratable acidity, but the palm wine becomes more alcoholic on standing [4]. Claim are unanimous among consumers of the bark extract treated palm wine that it is used as a spice to serve as heating agent in nursing, pregnant mothers and in the treatment and management of microbial infection like gonorrhea [5].The stem bark extract of *Sacoglotiss gabonensis* contains element (Fe,Zn, Mn,Cu) which take part in the oxidative reaction of anti oxidative enzymes in the body [6]. It is known to be inhibitory to *Lactobacillus plantharum, Leuconostoc mesenteroides, Escherichia coli* and *Sarcina lutea* isolated from palm wine [7].Neither the tree bark of *S. gabonensis* nor the crystalline C- glucoside ,(bergenin) isolated from it has been shown to posses any significant mammalian toxicity [8] The antioxidant potential of the stem bark on 2, 4 dinitrophenylhydrazine-induced membrane peroxidation *in vivo* has been reported [5]. The authors concluded that the mechanism of antioxidant action of the extract was multifactorial /multi-system involving inhibition of catalase, enhancing the superoxide dismutase (SOD) capability of the liver and red blood cells, and sparing tissue depletion/utilization of vitamin C (ascorbic acid) and vitamin E (tocopherol).

Despite appreciable progress made in the managing of various diseases using convectional therapeutic schemes, the search for the control of such diseases continues.

In the present study, our aim was to investigate the effect of ethanol extract of *sacoglottis gabonensis* on the small intestine.

MATERIALS AND METHODS

Plant material: Samples of fresh cuttings of *Sacoglottis gabonensis* stem bark were purchased from Abeokuta market, Ogun State Nigeria, wrapped in polythene bag and immediately upon return to Maiduguri refrigerated pending use. . The plants was identified and authenticated by a botanist in the Department of Biological Sciences of the University of Maiduguri. Nigeria.

Preparation of the extract: The pulverized bark of *Sacoglottis gabonensis* (215g) was weighed and exhaustively soxhlet-extracted with absolute ethanol for 3 hours. The extract was then evaporated under reduced pressure and kept in a refrigerator for pharmacological investigation.

Preparation of standard drugs: Acetylcholine chloride a pharmacological drug (agonist) is manufactured by British drugs house chemical Poole, England. 1.00mg of the drug was weighed into a flask, 1ml of distilled water was added and the volume was made up to 10.0ml with distilled water, equivalent to 0.1mg/ml or 100ug/ml.1ml of the 100ug/ml was made up to 10ml which is equivalent to 10ug/ml.

Experimental animal: Rabbit of either sex were purchased and kept at the Experimental Animal House in the physiology and pharmacology unit of veterinary medicine department for a week on good feed and water every day. The experiments were performed on the rabbits in accordance with the guiding principle for the care and use of laboratory animal approved by the University of Maiduguri, Nigeria.

Effects of the crude Extract on intestinal contraction: The rabbits were killed by stunning and then exsanguinated by cutting the throat .A midline incision was made at the abdomen to expose the small intestine. 2-3cm^3 was carefully cut and dropped into a beaker (bath) containing Tyrode solution (NaCl, KCl, $MgCl_2$, $NaH_2PO_4.2H_2O$, $NaHCO_3$, $CaCl_2$ and Glucose. One end of the jejunum was tied with thread to the bent end of the stylus tube, while the other ends to a frontal writing lever. The tissue was mounted into the bath of 50 cm^3 capacity. It was then allowed for about 30 minutes to stabilize in the bath at a temperature of $37^0c \pm 1^0c$, through which air was bubbled before the start of any experiment.

Normal contraction was noted at a speed of 0.1mm/s on the kymograph recording paper after which the extract was added at a concentration of 0.2cm^3 to the 50cm^3 tissue bath and allowed to act on the tissue for 30 seconds. The organ bath was drained and refilled with a fresh tyrode solution. The tissue was allowed to recover and stabilized for

5 minute to attain the baseline of contraction. Various doses (0.2, 0.4, 0.6, 0.8, and 1.0cm^3) of the crude extract were added one after the other to the tyrode solution bathing the tissue. The organ was washed after each addition of extract. The amplitude of contraction or relaxant effect was measured in centimeter. The increase or decreases in responses to standard drug and extract were plotted against their log-concentrations.

RESULTS AND DISCUSSION

The effect of sacoglottis gabonensis stem bark ethanol extract on the rabbit isolated jejunum and the standard drug (Acetylcholine) administered to achieve standard peak of contraction were studied, using Harvard kymograph recorder. The doses of extract added to the isolated rabbit jejunum have induced decrease in the length of contracture (Table1).The extract exerted lowest response of 1.5mm at 0.20ugmL^{-1} and a maximum response of 2.9mm at 0.04ug mL^{-1} gut-bath. The effect of *Saco glottis gabonensis* on the rabbit isolated jejunum is noticed to be dose dependent; this is because as shown in Table 1 the extract-induced relaxation is dependent on the concentration of extract.

Table 1: The Effect of Extract on the Rabbit Isolated Jejunum

S/N		Final bath Concentration. (uglml)	Log Concentration.	Responses (mm)
Control		-	-	3.4
1		0.04	-1.4	2.9
2		0.08	-1.1	2.8
3		0.12	-0.9	2.7
4		0.16	-0.8	2.1
5		0.2	-0.7	1.5

Table 2: The Effect of Acetylcholine on the Rabbit Isolated Jejunum

S/N	Final bath Concentration. (uglml)	Log Concentration.	Response in mm.
Control	-	-	-
1	97.2	2.0	2.3
2	194.4	2.3	2.6
3	291.6	2.5	3.7
4	388.8	2.6	4.1
5	486	2.7	5.4

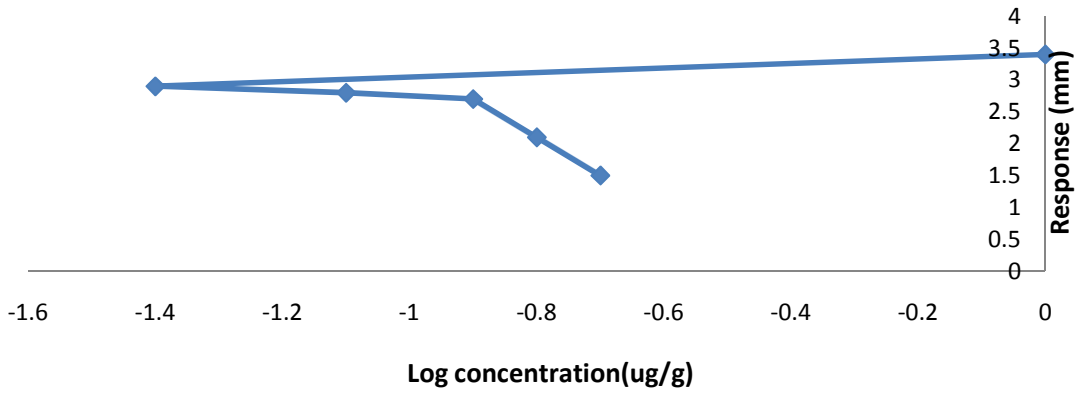

Figure1: Log-dose response curve for extract.

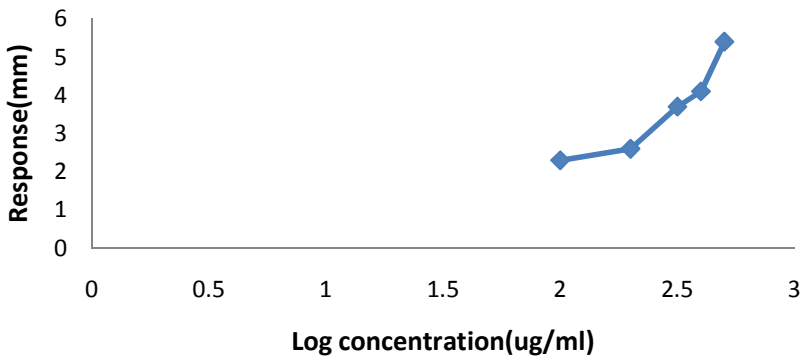

Figure2: Log-dose response curve for standard drug (Acetylcholine).

That is the higher the extract concentration, the greater the rabbit isolated jejunum induced relaxant effect. The log dose- response curve (Figure 1) shows that the response of the rabbit isolated jejunum to various doses of extract is also dose –dependent. It is clear that the amplitude shows a decreasing effect as a result of increase in the concentration of extract.

The effect of the standard drug (Acetylcholine) on the rabbit isolated jejunum summarized in Table 2 shows induced increased contraction of the jejunum under the same temperature with significant changes. The drug exerted lowest response of 2.3mm at 97.2ugmL^{-1} gut –bath and maximum response of 5.4mm at 486.0ugmL^{-1} gut –bath. The result shows that the Acetylcholine (97.2-486.0ugmL 1) dose-dependently increase the amplitude of contraction in the jejunum as shown in the log dose-response curve in (Figure 2).The increase in amplitude as a result of increase in the concentration of the drug could probably be due to the enhancement of the slow wave activity by the drug. Slow wave can normally be recorded in both circular and longitudinal muscles of the small intestine [9].

They are produced by specialized pacemaker cells located in the circular and longitudinal muscle layer of the intestine [10].

In conclusion, the ethanol extract of the bark of sacoglotis gabonensis has produced relaxant effect in response to the intestinal jejunum; the standard drug caused increased contraction and is capable of stimulating the muscarinic cholinoceptors. The relationship between drug concentration and the magnitude of the response that is observed is not complicated, hence from the result it is likely that the standard drug may cause diarrhea while the extract may cause constipation.

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