Journal of Biological Sciences and Bioconservation
Volume 9, Number 1, 2017
ISSN: 2277-0143

PROXIMATE, PHYTOCHEMICAL QUANTIFICATION AND ANTIDIARRHOEA POTENTIAL OF GONGRONEMA *LATIFOLIUM* EXTRACT IN ALBINO RATS

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ABSTRACT

Diarrhoea is a potentially morbid condition with high prevalence worldwide, it constitute a major health situation especially in children under the age of five years old. The world health organization has encouraged studies that can bring about solutions to diarrhea. Thus this work investigated the proximate, phytochemical quantification and anti-diarrhea potential of *G. latifolium* extract with experimental animals. The result of the proximate analysis reviewed carbohydrate composition to be the highest, followed by the protein composition while fat had the least value. The result of the phytochemical analysis, showed high percentage saponons, flavonoids and alkaloids. Also the result of the anti-diarrhea study showed a reduction in the degree and frequency of defecation of diarrhea stool. The result indicates that the ethanolic extract of *G. latifolium* contains compounds that could inhibit castor oil induced diarrhea.

Keywords: Diarrhea, *Gongronema latifolium,* Phytochemicals, Proximate

INTRODUCTION

Diarrhea is a condition of having frequent loosed and watery stool at least three times in a day [1]. It is mostly caused by bacteria infection. It could also be a symptom of other health cases like in

food poisoning. The word diarrhea is derived from a Greek word dia (through) and rrhoea (flow), meaning flowing through [2]. It is also associated with increase in bowel movement and is characterized by increase in frequency of wet stool sometimes accompanied by stomach cramp [3], [1]. Frequent excretion of formed stools is not diarrhea but the consistency and sudden release of watery stool denotes diarrhea condition. Diarrhea infection is the leading cause of death world wide and continue to take a high public health toll especially in children. In Nigeria, it remains the number one killer disease among children under five (5) years old [4].

G. latifolium belongs to the family *Asclepiadaceae,* it is a non wooden, climbing plant with broad green leaf. It has a bitter and slightly sweet taste, used as spice and vegetable in traditional medicine [5]. The plant *Gongronema latifolium* is widely distributed in the tropical rain forest of West African countries such as Nigeria, Ghana, Cameroon, Senegal, Guinea- Bissau, Sierra Leone and Cote d'ivoire. The leaf is used for medicinal and nutritional purposes [6]. In Nigeria,it is popularly called "Utazi" and "Arokeke" by the Igbos and the Yorubas respectively. Various parts of the plant particularly the stem and the leaf are used as chewing sticks or liquour in places like Sierra Leone [7]. Still in Sierra Leone, a decoction of the pounded stem is used for intestinal symptoms that are usually associated with parasitic worms [8].

G. latifolium leaf is widely used in folk medicine as spice and vegetable [9]. The leaf is used to prepare food for mothers that have recently put to birth as it is believed that it has the potential to stimulate appetite for food, quickens the return of menstrual cycle and reduce post – partum contraction [10]. Previous studies carried out showed that *G. latifolium* possesses hypoglycemic effect and may be used in managing hyperglycemic conditions and Diabetes mellitus in Nigeria [5]. The presences of certain phytochemical compounds found in *G. latifolium* suggest that it could be used as a therapeutic plant to combat some health conditions. The leaf is

consumed as vegetable, vegetables are edible plants harvested and eaten as supporting food or main dishes and may possess aromatic, bitter or tasteless properties [11]. Eighty percent of some Asian and African countries presently practice the use of herbal medicine for different health issues and this was estimated by the World Health Organization (WHO). Thus this study is aimed at quantifying the phytochemical present in *G. latifolium* and determination of its anti-diarrhea properties.

MATERIALS AND METHODS

Castor oil (Finest gold) BELL, SONS and CO (DRUGGISTS) LTD, Ethanol (BHD) and Loperamide Hydrochloride. Xepa – Soul Pattinson, Malaysia.

Collection of Plant Sample and Preparation

Fresh green leaf of *Gongronema latifolium* was collected between January and February, 2016 from Rumuosi in Obio/Akpor Local Government Area of Rivers State, Nigeria. The leaf was washed with tap water and spread on a clean flat sack material in a well ventilated room, shade and air dry at room temperature for a week. Dried leaves were ground into fine powdered particles, weighed and stored.

Proximate Analysis: [12]. Method was adopted

Phytochemical Quantification: [12],[13]. Method was adopted for preparation/extraction of sample for GCMS quantitative analysis.

Collection of Experimental Animals

Albino rats weighing between 100- 150g, were obtained from animal house of the University of Port Harcourt, Choba, Nigeria. The animals were acclimatized for a period of seven days prior to the commencement of experiment. The animals were grouped into five (5) different groups of three (3) animals each in each group.

Castor oil induced diarrhea in rats and faecal count:
Castor oil-induced diarrhea was determined by the method of [14]. Rats weighing between 100 – 150 g fasted for 18 hours were randomly distributed into five groups. The administration was done. The times taken for onset of diarrhea and faecal droppings were recorded. Percentage inhibition was calculated [15] - [17].
% inhibition: (control – test)/control x 100.

RESULTS AND DISCUSSION

Gongronema latifolium is consumed fresh, cooked or dried and applied as powdery spice, it carries a moderate sweet – bitter taste and could be used as bittering agents in brewing to produce characteristic flavor and foam. The leaf could be used as a substitute for commercial hops in lager beer production due to its taste [5]. Table 1 showed the proximate analysis of *Gongronema latifolium.* The result revealed that the plant is a good source of carbohydrate which had the highest nutritional content followed by protein, fibre, moisture and fat had the least value. Earlier studies by [18], reported that *G. latifolium* has high moisture, carbohydrate and protein content.

The quantitative phytochemical analysis of *Gongronema latifolium* presented in Table (2) showed that saponins had the highest value followed by flavonoids, alkaloids, tannin, phenol, oxalate and phytate had the list value. Earlier study suggested that the phytochemical evaluation of the leaf of *G. latifolium* was rich in saponin, alkaloids, phenols and flavonoids [9]. *Gongronema latifolium* is among the type of plants which are good source of potential therapeutic agents that eradicates various diseases due to the presence of bioactive phytochemicals found in the plants [19]. Earlier studies have also reported that the phytochemical compounds like saponin, alkaloids, flavonoids and tannin may be responsible for the antidiarrhoea activity of medicinal plants [20] - [22]. Table (3) showed the inhibitory effect of the ethanolic extract of *G. latifolium* on castor oil induced diarrhea in experimental animals. The result showed high

percentage inhibition of diarrhea in the groups treated with the extract. The group (3) which received the 200 mg/kg ethanolic extract of the leaf had the highest percentage inhibition followed by group 4 and 5. Comparing the values of the groups pretreated with the plant extract and standard drug both showed inhibitory activity to castor oil induced diarrhea in the pretreated experimental animals in which the extract especially in the (group 3) exhibited high rate of percentage inhibition of castor oil induced diarrhea.

It is well documented that castor oil produces diarrhea due to its most active metabolite – ricinoleic acid by hyper- secretory response, which stimulates peristaltic activity in the small intestine, leading to changes in the electrolyte permeability of the intestinal mucosa [23]. The reduction in faecal output by a substance is the basis of the pharmacological evaluation of a potential anti-diarrhea agent [24],[25]

Table 1: Proximate Analysis of *Gongronema Latifolium.*

Nutrient Composition	Percentage (%)
Moisture content	12.49
Ash content	7.36
Fibre content	19.86
Fat content	5.98
Protein content	22.00
Carbohydrate content	32.31

Table 2: Quantitative Phytochemical Analysis of *Gongronema latifolium*

Components	Sub Class	Concentration(µg/g)
Flavonoids	Rutin	5.9438
	Anthocyanin	3.8212
	Catechin	27.78212
	Kaemferol	9.9111
	Epicatechin	1.0695
	(Total) =	48.527
Saponin	Sapogenin	58.2013
Alkaloids	Aspartein	0.0002
	Lunamarine	14.7055
	Ribalinidine	2.3380
	(Total) =	17.04
Tannin		11.6700
Phenol		4.7958
Phytate		0.2948
Oxalate		1.4793

Table 3: The Effect of Ethanolic Extract of *Gongronema latifolium* on the Wet Faecal Count of Castor Oil-Induced Diarrhoea in Albino Rats.

Groups	Treatment	Mean of Wet Faeces	% Inhibition
Groups 1	Untreated	0.0 ± 0.00	-
Groups 2	Control	2.0 ± 1.58	-
Groups 3	200mg/kg of extract	0.4 ± 0.54	81.80
Groups 4	400mg/kg of extract	0.6 ± 0.56	72.70
Groups 5	5mg/kg/ Loperamide HCl	0.6 ± 0.56	72.70

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Reference to this paper should be made as follows: Nwachoko, Ndidi., Onuoha, Samuel C., Amadi, Justus O. (2017),. Proximate, Phytochemical Quantification and Anti-diarrhea Potential of Gongronema *Latifolium* Extract in Albino Rats. *J. of Biological Science and Bioconservation,* Vol. 9, No. 1, Pp. 96 - 105.