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Full length Research Paper

Phytochemical screening, anti-nutrient composition, proximate analyses and the antimicrobial activities of the aqueous and organic extracts of bark of *Rauvolfia vomitoria* and leaves of *Peperomia pellucida*

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Two ethno-medicinally important plant species were extracted in three different solvents (aqueous, ethanol and methanol) and tested for their antimicrobial properties against selected human pathogenic organisms which include *Staphylococcus aereus, Escherichia coli, Klebsiella spp, Salmonella, Shigella*, and *Pseudomonas aeuroginosa* from patients admitted to Teaching Hospital Ado-Ekiti. The medicinal plant species, *Rauvolfia vomitoria* and *Peperomia pellucid*a were found to possess higher degree of antimicrobial activity in the organic solvent. The aqueous and ethanol extracts had zones of inhibition suggesting susceptibilities of the organisms (1.0 to 14.0mm at concentration of 25µg/ml). Methanol extract shows antibacterial activities with zones of inhibition that varied from 1.0 to 14.0mm at 200µg/ml. The organic extracts of *Peperomia pellucida* were also potent inhibitors of bacteria growth, showing the least MIC of 2.0µl/ml on most bacterial strains tested. A preliminary phytochemical report of the extracts shows the presence of phyto-constituents like flavonoids alkaloids, glycosides and phenolic compounds. The concentration of the following mineral elements were also determined: sodium, potassium, calcium, zinc, iron, manganese, lead and phosphorus while the percentage composition of ash, moisture, protein, fat, fibre carbohydrates and sugars were determined in the proximate analysis. The study suggests that the plants are promising for development of phytomedicine. The antimicrobial properties also indicates the potential usefulness of these plants in the treatment of various pathogenic disease which in future can be developed as a potential antimicrobial agent with reduced toxicity and adverse effects when compared with the synthetic chemotherapeutic agents.

Keywords: Antimcrobial activity, *rauvolfia vomitoria, peperomia pellucida,* phytochemistry, proximates analysis.

INTRODUCTION

Nature has provided an excellent store house of remedies to cure all the ailments of mankind. In ancient days, almost all the medicine used was from the natural sources, particularly from plants and these make plants to continue to be an important source of new drugs even now. The importance of botanical, chemical and pharmacological evaluation of plant derived agents used in the treatment of human ailments have been increasingly recognized in the last decades (Gbile, 1986). Many drugs, which are commonly used in modern day medicines, have been derived either directly or indirectly from herbal source. People take medicinal herbs for several reasons such as they may be dissatisfy with allopathic medicines or they may believe in efficacy of herbal medicines, more so a strong believe that there would be little or no side effects for herbal medicine (Sofowora, 1982). In Nigeria, *Rauvolfia vomitoria* has been used over the years for the treatment of hypertension and mental disorder. It is called African serpent wood or swizzle stick. In Yoruba, it is called

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(a) Peperomia pellucida *(b) Rauvolfia vomitoria*

Figure 1. Bark extracts of Rauvolfia vomitoria and leave extracts of Peperomia Pellucida

"asofeyeje", "ira" in Igbo and "Wadda" in Hausa. The *Rauvolfia vomitoria* has many alkaloids used mainly as anti- hypertension agents and sedatives. Root bark are commonly known for their aphrodisiac, antisporic, abortive and insecticidal properties also for the anti-helmintic, apercent, dysenteric, astringent, cardio tonic, diaphoretic, hypotensive, vulnerary and febrifugic potential. The most abundant and active of the alkaloid in *Rauvolfia vomitoria* is the reserpine, which is an iodole alkaloid known to irreversible bind to storage vesicles of neurotransmitters in synapse. In Africa, Rauvolfia *vomitoria* has been used extensively studied for various ailments. It is useful in the lowering of blood pressure (Amole, 2003), as an antimalarial (Amole et al., 1993), as well as an antipyretic (Amole and Onabanjo, 1999). Paul et al. (2011) also report the antimycobacterial antioxidant activity of extracts from the roots of *Rauvolfia vomitoria* . However, reserpine was determined as the most active of its various alkaloids in the year 1950s as antihypertensive agent. On the other hand, *Peperomia pellucida* (shiny bush) belonging to the family of *Piperaceae* is also known for its analgesic properties related to its effect on prostaglandin synthesis. Anti-inflammatory, chemotherapeutic, and analgesic properties have been found in crude extracts of *Peperomia pellucida,* it may have potential as a broad spectrum antibiotic, as demonstrated in tests against *Staphylococcus aureus, Bacillus subtilis, Pseudomonas aeruginosa , and Escherichia coli (* Bojo *et al*., 1994; Khan et.al., 2002 and Aziba et.al., 2001*).* Chloroform extracts from dried leaves of *Peperomia Pellucida* have been shown to exhibit antifungal activity against Trycophyton mentagrophytes. *Peperomia pellucida* has a pharmacological cycle of approximately a hundred days. The literature survey revealed that no systematic approach has been made to study the antimicrobial activity of the plants *Rauvolfia vomitoria and Peperomia Pellucida.* Hence the present study focused to screen for in vitro antimicrobial activity of the bark extracts of *Rauvolfia vomitoria* and leave extracts of *Peperomia Pellucida (Figure 1).*

MATERIALS AND METHODS

Medicinal plants

Bark of *Rauvolfia vomitoria* and *Peperomia pellucida* were collected at Ikere- Ekiti, Ekiti-State, Nigeria. It was identified and authenticated at the herbarium unit of the Department of Plant Science University of Ado-Ekiti, Nigeria.

Extraction procedures

Extracts of the plants were prepared according to the method of Olukoya *et al.,* (1995). Seventy grammes of the plant was dried and ground. The fine powder was soaked separately in 200mL of sterile distilled water, methanol and ethanol for seven days at 30 – 32^{0}C. The extracts were filtered through a Millipore filter (0.25µm). The resulting filtrates were concentrated under reduced pressure and then transferred into a well labelled sterile bottle.

Determination of proximate and anti-nutrients contents

The proximate compositions (crude protein, crude fat, crude fibre, ash, moisture and carbohydrate) were determined according to the methods of AOAC (1990). The phytate content was estimated by Wheeler and Ferrel (1971) method. The tannin by Makkar et al. (1993) method, oxalate by the AOAC (1980).

Phytochemical screening of extracts

The phytochemical screening of the extracts was done on both the aqueous and organic extracts using standard procedure as described by Edoga *et al.,* 2005 and

Table 1. Proximate Composition Of the Aqueous and Organic Solvent Extracts Of *Rauvolfia vomitoria* (African Serpent Wood) and *Peperomia pellucid*a (Shiny bush)

Parameter(s)	*Rauvolfia vomitoria*			*Peperomia pellucida*		
	Aqueous Extract	Ethanol Extract	Methanol Extract	Aqueous Extract	Ethanol Extract	Methanol Extract
Moisture Content	11.65 ± 0.05	11.68 ± 0.05	11.27 ± 0.01	12.32 ± 0.06	12.28 ± 0.09	12.48 ± 0.11
Carbohydrate	43.93 ± 0.12	44.93 ± 0.09	47.69 ± 0.16	48.42 ± 0.22	48.46 ± 0.26	53.44 ± 0.32
Fat	5.23 ± 0.01	7.63 ± 0.03	10.36 ± 0.06	4.35 ± 0.02	8.33 ± 0.05	11.23 ± 0.12
Protein	17.35 ± 0.07	17.38 ± 0.08	18.35 ± 0.11	16.52 ± 0.07	19.10 ± 0.11	19.43 ± 0.14
Crude Fibre	7.62 ± 0.02	7.63 ± 0.02	5.98 ± 0.01	6.83 ± 0.08	6.88 ± 0.08	8.22 ± 0.05
Ash	14.96 ± 0.03	13.68 ± 0.02	12.35 ± 0.01	11.55 ± 0.08	11.76 ± 0.09	10.72 ± 0.02

Values expressed as means±SEM, N=3.

Table 2. Qualitative Analysis of the Phytochemicals Of the Aqueous and Organic Solvent Extracts Of *Rauvolfia vomitoria* (African Serpent Wood) and *Peperomia pellucida* (Shiny bush).

Parameter(s)	*Rauvolfia vomitoria*			*Peperomia pellucid*a		
	Aqueous Extract	Ethanol Extract	Methanol Extract	Aqueous Extract	Ethanoc Extract	Methanol Extract
Alkaloids	+	+	+	+	+	+
Tannin	+	+	+	+	+	+
Saponnins	+	+	+	+	+	+
Steroid	-	+	-	-	-	-
Phlobatannins	-	-	-	-	-	-
Terpenoid	-	+	+	-	+	-
Flavonoid	+	+	+	+	+	+
Cardaic glycoside	_	+	+	_	+	+

+ indicates present and – indicates absent.

Sofowora,1992. Qualitative tests were carried out on the following parameters tannins, phlobatannins, saponins, flavonoids, steroids, terpenoids and cardiac glycosides.

Determination of total phenol content

The total phenol content of the extracts was determined using the standard method. Briefly, appropriate dilutions of the extracts were oxidized with 2.5mL of 10% Folin-Ciocalteaus reagent (v/v) and neutralized by 2.0mL of 7.5% sodium carbonate. The reaction mixture was incubated for 40min at 45^0c and the absorbance was measured at 765nm in the spectrophotometer. The total phenol content was subsequently calculated using tannic acid as standard.

Investigation on Antimicrobial Activities

Test organisms

The test organisms which included *klebsiella pneumonia*, *Staphylococcus aureus*, *Streptococcus mutans*, *Escherichia coli* and *Pseudomonas aeruginosa* were clinical strains obtained from the stock culture of the microbiology laboratory, teaching hospital, Ado-Ekiti, Ekiti state, Nigeria.

Antimicrobial assay

The antimicrobial assay was done using the agar diffusion method. The various test bacteria were standardized using the 0.5 McFarland turbidity standards. These standardized strains were inoculated onto the surface of sterile plates of Diagnostic sensitivity test agar (DST). Cork borer (6mm) was used to make wells on the inoculated DST agar. One milliliter of each concentration of extracts was introduced into designated wells. These were allowed to be absorbed into the agar, and then incubated at 37^0C for 24h. The antimicrobial activities were determined by the width of the zone of growth inhibition (Bauer, 1996).

Table 3. Mineral Composition Of the Aqueous and Organic Solvent Extracts Of *Rauvolfia vomitoria* (African Serpent Wood)and *Peperomia pellucida* (Shiny bush).

Parameter(s)	*Rauvolfia vomitoria*			*Peperomia pellucida*		
	Aqueous Extract	Ethanol Extract	Methanol Extract	Aqueous Extract	Ethanol Extract	Methanol Extract
Sodium	4.16 ± 0.12	28.85 ± 0.35	28.95 ± 0.27	2.79 ± 0.09	19.82 ± 0.25	29.80 ± 0.31
Potassium	5.06 ± 0.17	35.09 ± 0.51	40.37 ± 0.37	3.48 ± 0.11	24.72 ± 0.17	29.54 ± 0.28
Calcium	5.46 ± 0.12	37.86 ± 0.41	31.87 ± 0.34	4.14 ± 0.05	29.40 ± 0.21	25.53 ± 0.22
Magnesium	4.38 ± 0.15	30.37 ± 0.32	28.48 ± 0.29	3.48 ± 0.05	24.72 ± 0.15	22.51 ± 0.15
Zinc	1.16 ± 0.09	32.73 ± 0.31	37.51 ± 0.33	5.07 ± 0.04	36.01 ± 0.22	27.49 ± 0.21
Iron	1.01 ± 0.05	8.04 ± 0.13	25.35 ± 0.21	0.92 ± 0.02	6.53 ± 0.13	4.80 ± 0.09
Copper	0.001 ± 0.00	0.07 ± 0.03	0.01 ± 0.00	0.01 ± 0.00	0.07 ± 0.02	0.09 ± .03
Lead	0.11 ± 0.02	0.01 ± 0.00	ND	ND	ND	ND
Manganese	0.11 ± 0.02	0.76 ± 0.04	1.25 ± 0.06	0.08 ± 0.01	0.57 ± 0.07	0.89 ± 0.11
Cobalt	0.03 ± 0.01	0.21 ± 0.07	0.06 ± 0.02	0.02 ± 0.01	0.14 ± 0.03	0.09 ± 0.04
Phosphorus	151.18 ± 11.25	683.08±83.50	541.21 ± 76.32	174.01 ± 61.55	129.21 ± 36.11	89.18 ± 21.12

Values expressed as means ± SEM, N=3. ND means Not Detected.

Minimum inhibitory concentrations

100mL of Mueller-Hinton broth was diluted with extract in each well of a microtitre plate.100µl of stock solution of aqueous, methanol and ethanol (400mg/ml) was added respectively and subsequently two fold serially diluted with Mueller – Hinton broth. The inoculums suspension (20µl) of each bacterial strain was then added in each well containing the extract dilution and the Muller- Hinton broth. The final concentration of the extracts was measured respectively.

Statistical Analysis

Differences between the means were calculated by using student t-test, and the significant levels of the data were calculated by analysis of variance according to Steels and Torrie (1981).

RESULTS

The results on the investigation of antimicrobial activities of aqueous, ethanol and methanol extracts of bark of *Rauvolfia vomitoria* and the leaves of *Peperomia pellucida* are presented in Tables 4-6**.** The aqueous and ethanol extracts had zones of inhibition suggesting susceptibilities of the organisms (1.0 to 14.0mm at concentration of 25µg/ml). Methanol extract shows antibacterial activities with zones of inhibition that varied from 1.0 to 14.0mm at 200µg/ml; little or no activity was seen in the aqueous extract of *Peperomia pellucida* (Table 6). At concentration of 25µg/mL, all the bacteria were more sensitive to the aqueous, methanol and ethanol extracts of *Rauvolfia vomitoria* than *Peperomia pellucida* when compared. Activities of *Rauvolfia vomitoria* against Gram positive and Gram negative bacteria observed indicates that the extracts of the plants are of broad spectrum. The zone of inhibition ranges from 1.0 to 14.00mm. The qualitative phytochemical tests (Table 2) showed that *Rauvolfia vomitoria* contained alkaloids, tannin, saponin and flavonoid, Terpenoid while Steroid, Phlobatannins, Terpenoid and Cardaic glycoside were not detected in the aqueous extract of the plant. Steroid and Phlobatannins are also absent in all the three extracts of *Peperomia pellucid*a plant. Table 4 shows the result of anti -nutrients constituents of the aqueous and organic Solvent Extracts of *Rauvolfia vomitoria* and *Peperomia Pellucida.* The percentage composition of tannin was highest (7.37 %) in *Peperomia Pellucida* while that of flavonoids was least (0.37%) in *Rauvolfia vomitoria.* The proximate analysis of the powdered samples revealed that each sample contain considerable amount of nutrients. 53.44% carbohydrates content was observed in the methanol extract of *Peperomia Pellucida* while all the samples contain considerably low quantities of fat and crude fibre. The proximate analysis of the two plants (Table1) reveals that the plants have appreciable amount of ash, moisture content and protein. The mineral analysis table 3 showed that the two plants contain the following elements: sodium, potassium, calcium, magnesium, zinc, iron, copper, manganese and phosphorus. Lead was not detected in all the samples investigated except in aqueous and ethanol extracts of the *Rauvolfia vomitoria.*

DISCUSSION AND CONCLUSION

The aqueous and methanol extracts of *Rauvolfia vomitoria* and *Peperomia pellucida* when used against

Table 4. Anti-nutrients Constituents Of the Aqueous and Organic Solvent Extracts Of *Rauvolfia vomitoria* (African Serpent Wood) and *Peperomia Pellucida* (Shiny bush).

Parameter(s)	*Rauvolfia vomitoria*			*Peperomia pellucida*		
	Aqueous Extract	Ethanol Extract	Methanol Extract	Aqueous Extract	Ethanol Extract	Methanol Extract
Tannic acid(%)	3.64 ± 0.15	3.23 ± 0.28	3.78 ± 0.38	7.37 ± 0.21	6.45 ± 0.18	5.45 ± 0.16
Polyphenol(%)	2.10 ± 0.17	1.91 ± 0.05	1.35 ± 0.05	4.61 ± 0.12	4.42 ± 0.07	7.21 ± 0.22
Phytic acid(mg/g)	17.30 ± 0.85	18.12 ± 0.91	42.83 ± 0.75	18.94 ± 0.82	19.35 ± 0.35	28.01 ± 0.31
Phytin phosphorus(mg/g)	4.87 ± 0.18	5.10 ± 0.11	12.06 ± 0.16	5.45 ± 0.14	11.60 ± 0.17	12.06 ± 0.12
Oxalate(mg/g)	3.69 ± 0.55	3.78 ± 0.67	3.06 ± 0.21	3.78 ± 0.09	3.24 ± 0.05	3.96 ± 0.07
Alkaloids(%)	2.21 ± 0.32	2.23 ± 0.42	3.39 ± 0.25	1.36 ± 0.03	1.37 ± 0.03	2.39 ± 0.06
Flavonoids(%)	0.37 ± 0.05	0.39 ± 0.05	2.18 ± 0.44	1.22 ± 0.03	1.25 ± 0.03	2.20 ± 0.02

Values expressed as means ± SEM, N=3

Table 5. Anti-microbial Effect of Aqueous and Organic Solvent Extracts Of *Rauvolfia vomitoria* (African Serpent Wood) (Zone of inhibition in mm)

Test organisms	Aqueous extract				Ethanol extract				Methanol extract			
	25 µg/ml	50 µg/ml	100 µg/ml	200 µg/ml	25 µg/ml	50 µg/ml	100 µg/ml	200 µg/ml	25 µg/ml	50 µg/ml	100 µg/ml	200 µg/ml
Klebsiella spp	14.00	14.00	14.00	10.00	14.0	_	12.0	14.0	_	_	12.0	14.0
Shigella	14.00	14.00	15.00	12.00	14.0	12.0	14.0	15.0	10.0	12.0	14.0	14.0
Salmonella	8.00	10.30	12.00	16.00	08.0	12.0	08.0	12.0	_	10.0	12.0	15.0
Enterobacter	12.00	14.00	12.00	10.00	12.0	10.0	12.0	12.0	-	10.0	12.0	14.0
Staphylococcus aereus	8.00	12.00	11.00	11.00	08.0	_	08.0	11.0	10.0	12.0	12.0	12.0
Pseudomonas aeuroginos	8.00	12.00	14.00	16.00	08.0	10.0	08.0	14.0	12.0	12.0	14.0	15.0
Escherichiacoli	12.00	14.00	12.00	14.00	12.0	08.0	12.0	12.0	14.0	16.0	16.0	16.0

– indicates not effective.

Table 6. Anti-microbial Effect of Aqueous and Organic Solvent Extracts Of *Peperomia Pellucida* (Shiny bush). (Zone of inhibition in mm)

Test organisms	Aqueous extract				Ethanol extract				Methanol extract			
	25 µg/ml	50 µg/ml	100 µg/ml	200 µg/ml	25 µg/ml	50 µg/ml	100 µg/ml	200 µg/ml	25 µg/ml	50 µg/ml	100 µg/ml	200 µg/ml
Klebsiella spp.	-	-	-	-	12.0	12.0	13.0	16.0	-	0.70	10.0	10.0
Shigella	-	-	-	-	-	13.0	15.0	17.0	0.80	0.90	08.0	11.0
Salmonella spp.	-	-	-	-	-	-	-	-	-	06.0	0.70	0.70
Entero cocci	-	-	-	-	8.0	12.0	14.0	12.0	-	-	-	-
Staphylococcus aereus	-	-	-	-	-	-	-	-	-	-	-	-
Pseudomonas aeuroginosa	-	-	-	-	6.0	10.0	10.0	11.0	-	-	06.0	08.0
Escherichia coli	-	-	-	-	6.0	13.0	15.0	17.0	10.0	9.0	8.0	11.0

– indicates not effective.

some pathogenic organisms such as *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Enterobacter, Pseudomonas aeruginosa* and *Escherichia coli* show marked antibacterial activities. These observations against both Gram-positive and Gram – negative organisms indicate broad spectrum activities of these plants since majority of the organisms were sensitive to the extracts. However, the methanol extract proved to be more effective, probably the best extracting solvent for these plants. The poor anti bacterial activity observed in the aqueous extract of *Peperomia pellucida* indicates that this solvent may not be good for the extraction of active

Table 7. Minimum Inhibitory Concentration (g/ml) Of The Aquoeus Extract of *Rauvolfia vomitoria* (African Serpent Wood) and *Peperomia Pellucida* (Shiny bush).

Test organisms	***Rauvolfia vomitoria* (African Serpent Wood)**										***Peperomia Pellucida* (Shiny bush).**									
	0.38 g/ml	**0.76 g/ml**	**1.57 g/ml**	**3.13 g/ml**	**6.25 g/ml**	**12.5 g/ml**	**25 g/ml**	**50 g/ml**	**100 g/ml**	**200 g/ml**	**0.38 g/ml**	**0.76 g/ml**	**1.57 g/ml**	**3.13 g/ml**	**6.25 g/ml**	**12.5 g/ml**	**25 g/ml**	**50 g/ml**	**100 g/ml**	**200 g/ml**
Klebsiella spp	-	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-	-	-
Shigella	-	-	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-
Salmonella	-	-	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-
Enterobacter	-	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-	-	-
Staphylococcus aereus	-	-	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-
Pseudomonas aeuroginos	-	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-
Escherichia coli	-	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-

+ indicates effective and – indicates not effective.

Table 8. Minimum Inhibitory Concentration Of The Ethanol Extract of *Rauvolfia vomitoria* (African Serpent Wood) and *Peperomia Pellucida* (Shiny bush).

Test organisms	***Rauvolfia vomitoria* (African Serpent Wood)**										***Peperomia Pellucida* (Shiny bush).**									
	0.38 g/ml	**0.76 g/ml**	**1.57 g/ml**	**3.13 g/ml**	**6.25 g/ml**	**12.5 g/ml**	**25 g/ml**	**50 g/ml**	**100 g/ml**	**200 g/ml**	**0.38 g/ml**	**0.76 g/ml**	**1.57 g/ml**	**3.13 g/ml**	**6.25 g/ml**	**12.5 g/ml**	**25 g/ml**	**50 g/ml**	**100 g/ml**	**200 g/ml**
Klebsiella spp	-	-	-	+	+	+	+	+	+	+	-	-	-	-	-	-	+	+	+	+
Shigella	-	-	-	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-
Salmonella	-	-	-	-	-	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-
Enterobacter	-	-	-	+	+	+	+	+	+	+	-	-	-	-	-	+	+	+	+	+
Staphylococcus aereus	-	-	-	-	-	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-
Pseudomonas aeuroginos	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	+	+	+	+
Escherichia coli	-	-	+	+	+	+	+	+	+	+		-	-	-	-	-	-	+	+	+

+ indicates effective and – indicates not effective

Table 9. Minimum Inhibitory Concentration Of The Methanol Extract of *Rauvolfia vomitoria* (African Serpent Wood)and *Peperomia Pellucida* (Shiny bush).

Test organisms	***Rauvolfia vomitoria* (African Serpent Wood)**										***Peperomia Pellucida* (Shiny bush).**									
	0.38 g/ml	**0.76 g/ml**	**1.57 g/ml**	**3.13 g/ml**	**6.25 g/ml**	**12.5 g/ml**	**25 g/ml**	**50 g/ml**	**100 g/ml**	**200 g/ml**	**0.38 g/ml**	**0.76 g/ml**	**1.57 g/ml**	**3.13 g/ml**	**6.25 g/ml**	**12.5 g/ml**	**25 g/ml**	**50 g/ml**	**100 g/ml**	**200 g/ml**
Klebsiella spp	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	+	+	+	+
Shigella	-	-	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-
Salmonella	-	-	-	-	-	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-
Enterobacter	-	-	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	+	+	+
Staphylococcus aereus	-	-	-	-	-	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-
Pseudomonas aeuroginos	-	-	-	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-
Escherichia coli	-	-	-	+	+	+	+	+	+	+	-	-	-	-	-	-	+	+	+	+

+ indicates effective and – indicates not effective.

components of the plant. The phytochemical screening and quantitative estimation of the percentage crude yield of chemical constituents of the plants show that the leaves are rich in alkaloids, flavonoids, tannin, saponins and tepernoid. The presence of these compounds in the plants has been attributed to most of their biological activities (Seenivasan *et al.*, 2006). Preliminary phytochemical investigations of the leave extract of *Rauvolfia vomitoria* had earlier been reported by Omole *et al. (*2009) which revealed the presence of alkaloids, saponins, tannins and reducing sugars The chemical composition of the barks and leaves of these plants were also determined. These compounds have been found to be responsible for the important biological activities including antibacterial, antiviral, antidiabetic and antihepatotoxic of these plants (Iwu, 1993; Corthout, 1993). These two plants studied in this work can be seen as potential sources of useful antibacterial drugs. Further study is however recommended on these plants in other to isolate, identify, characterize and elucidate the structure of the bioactive components.

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