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ORIGINAL RESEARCH ARTICLE

Toxicological Studies and Comparative Anti-Parasitic Activities of *Securidaca longepedunculata* and *Senna occidentalis* Root extracts against the Viability of *Trichomonas vaginalis*

Manniru Musa Abdullahi[1], Tijjani Sabiu Imam[1] and Aminu Ismail Yola[2]
[1]Biological Science Department, Federal University of Education, Kano, P.M.B 3045, Kano State, Nigeria
[2]Biological Science Department, Bayero Univerity Kano P.M.B. 3110, Kano State, Nigeria

ABSTRACT
A parasite protozoa called *Trichomonas vaginalis*is is responsible for trichomoniasis, a sexually transmitted infection. Given the abundance of anti-parasitic compounds found in medicinal plants, looking into more complementary, secure, and efficient treatments is critical. The research aimed to ascertain how well *S. longepedunculata* and *S. occidentalis* plants worked to cure the vigina and male genital tract infections among the northern Nigerian tribes. Ethanol and the maceration process were used to create the plant extracts. Acute toxicity and phytochemical investigations were carried out according to standard procedures. Experimental rats administered an acute dose of 3000 mg/kg body weight of *S. longepedunculata* root extract demonstrated observable changes in physical activity, eye color, and external bleeding from their mouths and noses, indicating acute toxicity. One death was also reported 24 hours later. Both aqueous and ethanolic extracts contained phytochemicals, such as alkaloids, flavonoids, penol, reducing sugar saponins, and tannins. In vitro tests were conducted to assess the anti-parasitic effects of the two plant extracts against *Trichomonasvaginalis*. In the study, the plants' aqueous root extracts were employed for the acute toxicity test, against the test organisms. The anti-parasitic properties of the extracts from the two plants varied. The extracts exhibited the greatest growth inhibitory activity at 50 and 25 mg/ml concentrations, while the lowest activity was observed at a lower concentration of 3.125 mg/ml. At 50 mg/ml, the root extract of S*ecuridac longepedunculata* and *Senna occidentalis* exhibited the highest anti-parasitic activity on*T. vaginalis*, with 99.15% growth inhibition (GI).The statistical analysis results showed that *S. longepedunculata* and *S. occidentalis* differed significantly ($P<0.05$). In comparison to the negative control, the results showed a significant difference ($P<0.001$) between the groups of aqueous root extracts. The outcome outlines the rationale behind the traditional medical use of these plants to treat *Trichomonas vaginalis* infections. Further on station and field studies are required, according to this research, and should concentrate on other STIs of medical significance like gonorrhea, syphilis, etc. Conservation of *S. longepedunculata* and *S. occidentalis* should also be a key component to guarantee the plant's availability and sustainability.

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INTRODUCTION
With roughly 300 million cases worldwide and 3.7 million in the US each year, trichomoniasis is the most prevalent non-viral sexually transmitted disease (STD) caused by the extracellular parasite *Trichomonas vaginalis*, which infects the vagina and the male genital tract (Rowley *et al.,* 2019).

In Nigeria, it has been stated that the incidence of Trichomoniasis is yearly increasing and is becoming higher in urban areas than in rural communities, whereby about 57.70% of cases of trichomoniasis was found in urban areas and 39.16% cases found in rural communities, (Sule *et al.,* 2019)

According to reports, the incidence of trichomoniasis in Nigeria is increasing annually and is higher in urban areas than in rural communities; approximately 57.70% of trichomoniasis cases were found in urban areas and 39.16% in rural communities (Sule *et al.,* 2019).

Infections in men are usually asymptomatic, but infections in women are just as common and can cause symptoms. Research on *Trichomonas vaginalis* began in the 20th century with Donne's description of the organism in 1836, *Trichomonas vaginalis* typically has a pyriform (pear) shape, with four anterior flagella, and one posterior flagellum,

Correspondence: Manniru Abdullahi Musa. Biological Science Department, Federal University of Education, Kano, P.M.B 3045, Kano State, Nigeria. ✉ mannirumusa@gmail.com.
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with, one nucleus, and several energy-producing organelles (Veronica *et al.,* 2021).

Imam et al., in 2017, conducted a research work on phytochemical screening and tested the Anti-parasitics activities of the root extracts of *S. longipedunculata* and *S. occidentalis* only, while in the current research work, it further included the acute toxicity study of the root extracts of *Securidaca longipedunculata* and *Senna occidentalis* on Albino rats, and quantitative determination of phytochemical contents of the root extracts in oder to cover the remaining gap, and Namadina et al., in 2020, conducted the same research but only on *Securidaca longipedunculata* and not in comparison with another plants root extracts as it has been conducted in the current study.

Securidaca longipedunculata and *Senna occidentalis* are the medicinal plants used by the traditional herbalist for the treatment of different sexually transmitted disease. *Securidaca longepedunculata* is a plant commonly known as violet tree in English, According to Abubakar *et al.,* (2019) the plant is known in Nigeria as Sanya Uwar magunguna in Hausa, "Ezeogwu" in Igbo, and "Ipeta" in Yoruba. *Securidacalongipedunculata* is a medium-sized tree that grows 8 to 9 meters tall. It has visible white or violet flowers, and its bark is smooth and pale. It is common in North-Central Nigeria and is found throughout hot, temperate regions of Africa. The stem, bark, and roots of *S. longipedunculata* are still among the most traded medicinal plants in Africa Abubakar *et al.* (2022).

Sennaoccidentalis is a small shrub or herbaceous plant that grows to a height of 0.5 to 2 meters. It has glossy green leaves and yellow flowers. The leaves are compound and alternate, comprising four to six pairs of opposing leaflets with a downy underside and edge and a pointy apex. (Ram and others, 2024). *Senna occidentalis* is a perennial plant belonging to the Fabaceae family and is well-known in Nigeria as an active therapy in improving human health and treatment of a wide range of diseases and infections by traditional herbalists. There are almost 250 to 300 accepted species of *Senna* distributed throughout the world but are most dispersed in tropical and subtropical regions of Africa, Asia, Europe, and Latin America. The plant is called Rai-dore or Sanga-Sanga in Hausa, "Ewe Oriesi" in Yoruba, and "Akidi Agbara" in Igbo. Studies on *Senna occidentalis's* effectiveness in treating sexually transmitted diseases (STDs) are important because they may result in the creation of novel, cost-effective treatments, particularly in areas like Nigeria, where access to conventional medicine is limited. They may also shed light on the plant's possible antimicrobial and anti-inflammatory qualities, as there is scanty scientific research on *Senna occidentalis* on sexually transmitted diseases (Bamola *et al.,* 2018).

MATERIALS AND METHODS

Collection of Plant Sample

Fresh roots of *Senna occidentalis* and *Securidaca longepedunculata* plants were gathered from Madachi town in the Rano Local Government Area of Kano State. Standard keys and descriptions were used to identify the plants (Duta, 2011). The plants were further verified and authenticated in the Department of Biological Sciences' Herbarium at Bayero University Kano, Nigeria.

The Accession number of *S. longipedunculata* and *S. occidentalis* are BUKHAN/0013 and BUKHAN/0073 respectively

Extraction of Plant Material

The Adoum *et al*., (1997) protocol was used. Separately, the roots of the *Senna occidentalis* and *Securidaca longepedunculata* plants were removed, thoroughly cleaned (but gently) at room temperature with distilled water, and then chopped into small pieces to aid in drying. The plant fragments were allowed to dry in the shade for three weeks. An electric blender was used to grind this into a fine powder. For ten days, 100 grams (100) of each plant root were steadily shaken at regular intervals while percolating in 1000 milliliters of sterile distilled water. The extracts were then kept in a refrigerator at 4°C for the analysis after the percolates were filtered and the solvent was removed using a Rotor evaporator (R 110) set to 40°C.

Phytochemical Screening of Aqueous and Methanolic Extract of the Extract of the Plant

Standard procedures outlined by Evan, (1989); Sofowora, (1993); and Namadina (2020). were used to perform phytochemical tests on the samples' crude extracts in order to identify their chemical constituents.

Tests for Saponins (*Frothing test*):

A portion of the extract was mixed with roughly 10 milliliters of distilled water and violently shaken for 30 seconds. After 30 minutes of observation, the tube was left to stand vertically. The presence of saponins is indicated by honeycomb foam that lasts for ten to fifteen minutes (Evans, 1989)

Test for Reducing Sugar:

Fehling's test for reducing sugar was used to determine whether reducing sugar is present. Each extract was filtered after 0.5 g had been dissolved in distilled water. 5 cm3 of equal volumes of Fehling's solutions A and B were added to the filtrate and heated. The red colour changes of the solution were observed (Sofowora, 1993)

Test for Flavonoids (*Shinoda Test*):

Some drops of concentrated hydrochloric acid were added after a portion of the extract had been dissolved in 1-2 milliliters of 50% methanol while heated metallic

magnesium chips were present. Flavonoids are indicated by their red appearance (Krupali *et al.,* 2020).

Test for phenols (Ferric Chloride Test)

After boiling the fat-free sample for 15 minutes with 50 milliliters of ether, 5 milliliters of the extract were pipetted into a 50 milliliter flask, followed by 10 milliliters of distilled water, 2 milliliters of ammonium hydroxide solution, and 5 milliliters of concentrated amyl alcohol. The sample was made up to mark and left to react for approximately half an hour for color development, which was measured at 505 nm. (Namadina *et al.,* 2020).

Test for Tannins (*Ferric chloride test*):

Three to five drops of ferric chloride solution were added to the extract section. A Greek-black precipitate indicates condensed tannins, whereas hydrolyzable tannins produce a blue or brownish-blue precipitate (Evans, 1989; Namadina, 2020).

Test for Alkaloids (*Wagner's Test*):

A few drops of Wagner's reagent were poured into a portion of the extract; a whitish precipitate indicated the presence of alkaloids (Vaishnav & Sahoo, 2020).

Quantitative Phytochemical Analysis of Root Extract *of S. longepedunculata* and *S. occidentalis*

Determination of Alkaloids

200ml of 10% acetic acid in ethanol was added to a 250mLbeaker containing about 5g of the sample. The mixture was then covered and left to stand for four hours. After filtering, the extract was concentrated to 25% of its initial volume in a water bath. The extract was mixed with concentrated ammonium hydroxide drop by drop until the precipitation was finished. After letting the entire solution settle, the precipitates were gathered, cleaned with a diluted solution of ammonium hydroxide, and filtered. Alkaloids made up the residue, which was subsequently dried and weighed (Harborne, 2009; Namadina *et al.,* 2020).

Determination of Flavonoids

At room temperature, 100ml of 80% aqueous ethanol was used to repeatedly extract roughly 10g of the plant sample. A Whatman filter upper No. 42 (125mm) was used to filter the entire solution. After being moved into a crucible, the filtrate was dried out over a water bath and weighed to maintain a consistent weight (Namadina *et al.,* 2020).

Determination of Saponins

Tailang *et al.,* (2009) methodology was applied. 100ml of 20% aqueous and ethanol was added to a conical flask containing 10g of the ground samples that had been weighed for each. The samples were heated to roughly 55°C for four hours while being constantly stirred over a hot water bath. After filtering the mixture, 200 milliliters of 20% ethanol were used to extract the residue once more. Over a water bath at roughly 90° C, the combined extracts were reduced to 40 ml. After transferring the concentrate into a 250mL separatory funnel, 20 ml of diethyl ether was added and vigorously shaken. The ether layer was thrown away, but the aqueous layer was recovered. After repeating the purification procedure, 60 milliliters of n-butanol were added. Ten milliliters of 5% aqueous sodium chloride were used twice to wash the combined n-butanol extracts. A water bath was used to heat the leftover solution. The samples were dried in an oven to a consistent weight following evaporation. The percentage of saponins was determined. (Namadina *et al.,* 2020).

Determination of Tannins

After 500 mg of each sample was weighed into a 50 ml plastic bottle, 50mL of distilled water was added, and the mixture was shaken for an hour on a mechanical shaker before being filtered into a 50mL volumetric flask and adjusted to the appropriate level, the absorbance was measured at 120 mm within 10 minutes. After that, five milliliters of the filtrate were pipetted into a test-tube and mixed with 0.008M potassium ferrocyanide and two milliliters of 0.1M FeCl3 in 0.1M HCI (Van-burden and Robinson 1981; and Namadina *et al.,* 2020).

Determination of Total Phenols

The fat-free sample was boiled in fifty milliliters of ether for fifteen minutes. After pipetting roughly 5 ml of the extract into a 50 ml flask, 10 ml of distilled water was added. About 2 ml of ammonium hydroxide solution and 5ml of concentrated amyl alcohol were added. After being prepared to mark, the sample was left to react for roughly half an hour in order to develop its color. At 505 nm, this was measured.

Collection of test Organism

The Donné A. (1836). protocol was adopted. Test microorganisms were isolated from the vaginal discharge of female patients attending the Gynecology unit after being acquired from the Parasitological Laboratory of Murtala Muhammad Specialist Hospital in Kano. Prior to sample collection, the subjects' informed consent was acquired after they were fully informed about the research's methodology and rationale. A sterile vaginal swab was used to collect two vaginal swabs from women who had trichomoniasis. In order to search for motile trichomonads, the first swabs were taken from the vagina's lateral walls and used to create a wet mount preparation on a glass slide with a drop of regular saline. Immediately after being extracted from the posterior fornix of the vagina, the second swab was inoculated on TV-media at 32°C. After 24, 48, and 96 hours incubation, it was examined for motile trichomonades.

Preparation of culture medium

In order to prepare the Trichomonas medium, 90ml of distilled water was used to dissolve the powder (1.3g of nutritional broth, 1.0g of glucose, and 0.2g of L-cystieine hydrochloride). The resulting homogenized solution was then boiled. This was autoclaved for 15 minutes at 121 degrees Celsius to sterilize it. It was then allowed to cool to 50oC. It was mixed with 80 milliliters of inactivated pooled human serum. In addition, 10 grams of chloramphenicol were aseptically added to the sterile medium, and 1 mol/l of sodium hydroxide (NaOH) was used to bring the pH down to 6.4. The medium was kept in the refrigerator after being dispensed in sterile Bijou bottles in 2 ml volumes (Al-Saeed 2011).

Bioassay of the Extracts on *T. vaginalis*

Assay for *S. longepedunculata* and *S. occidentalis* root extracts: 1 milliliter of dimethyl sulfoxide (DMSO) was used to dilute 0.05 grams of each aqueous root extract. A concentration of 50 mg/ml was thus obtained. Eppendorf tubes were used to gently shake the mixture. The concentrations of 25, 12.5, 6.25, and 3.125 mg/ml were obtained by doubling the dilution. 100 µg/ml of metronidazole was used as a positive control against 50 µl of the test organism suspension, and 100 mg/ml of phosphate buffer and DMSO was used as a negative control. Each tube was incubated at 37°C for 24, 48, and 72 hours after each extract concentration test was conducted against 50µl of the test organism suspension.

The heamocytometer slide was covered with a cover slip after a drop of the prepared sample suspension was put on it. The hemocytometer slide was examined under a microscope (Hundmetzlar 640, Germany) after gently pressed coverslip until a rainbow ring appeared along its edges or on either side. Complete active and flagella-active parasites were deemed viable when sixteen (16) squares were seen in the middle of the slide (Ogundana, 1999; Tonkal, 2009)

Determination of an Acute Toxicity Test of an Extract

Animal treatment: Male rats were randomly selected and placed into four groups (A, B, C, and D) of 4 animals each, with a weight average of 150g ± 5g. Rats in groups B, C, and D were orally administered with an Aqueous extract of the plants with 1.2ml containing 3000mg/kg of the three extracts each in a single oral dose (OECD, 2000; Bayne *et al.* 2024).

The rats were observed for Toxic symptoms such as weakness, loss of appetite, difficulty in movement, nose and mouse bleeding, noise, and mortality for the first two hours and 24h, which were used as the indices for acute toxicity effect (Lorke, 1983). Group A remained as control group, treated like the test groups except that the animals were administered with 1.2ml of distilled water. The animals were allowed free access to rat pellets and tap water. This study were carried out at Animal House of the Department of Biological Sciences, Bayero University, Kano, Nigeria. The animals were handled according to the NIH Guide for the Care and Use of Laboratory Animals (NIH, 1985) and in accordance with the Principles of Good Laboratory Procedure (WHO, 2009; Bayne *et al.*, 2024).

The volume (mg) of the aqueous root extract given to each rat was determined by its weight and required dose (OECD, 2000).

$$\text{Volume administered (mg)} = \frac{\text{Body weight of rat (g)}}{\text{k(g)}} \times \text{Required dose (mg)}$$

where

k = 1000g,

Statistical analysis

Percentage mortality of the parasites (PM %) was calculated using the following equation:

$$\text{PM} = \frac{\bar{x_a} - \bar{x_b}}{\bar{x_a}} \times 100$$

Key of the fomular:

"$\bar{x}_a$" is for the mean number of viable parasites in the negative control tube

"$\bar{x}_b$" is for the mean number of viable parasites in a test tube (Tonkal, 2009).

Analysis of Variance (ANOVA) was utilized to compare the percentage mortality and determine whether there was a significant difference between the control and plant extracts at the $p \leq 0.05$ level using statistical software (GraphPad InStat).

RESULTS

Percentage Yield of Extracts

Table 1 below shows the yield of the aqueous extraction of the roots of the two chosen plants.

Out of 100g of each of the two chosen plants' root powders, the weighted extracts of the S. longepedunculata and S. occidentalis root powders were found to be 4.3g and 3.1g, respectively, after extraction.

Phytochemical Screening of the Plants:

Phytochemical screening of the root extract of the *Senna occidentalis* and *S. longepedunculata* plants under investigation showed the presence of alkaloids, flavonoids, tannins, reducing sugar, saponins, and Phenol (Table 2).

Table 1: Percentage Yield of Extractsof *Senna occidentalis* and *Securidac longepedunculata*

Item	*Senna occidentalis*	*Securidaca longepedunculata*
Plant Part Used	Root powder	Root powder
Weight of Powder	100 g	100 g
Quantity of Extract Yield	3.1 g	4.3 g
Percentage Yield (%)	3.1%	4.3%

Table 2: Phtochemical Components in the Aqueous and Ethanolic Extract of *Securidaca longepedunculata* and *Senna occidentalis*

Phytochemicals	*Securidaca longepedunculata*		*Senna occidentalis*	
	Aqueous Extract	Ethanolic Extract	Aqueous Extract	Ethanolic Extract
Alkaloids	+	+	+	+
Anthraquinones	-	-	-	-
Flavonoids	+	+	+	+
Phenol	+	+	+	+
Reducing sugar	+	+	+	+
Saponins	+	+	+	+
Tanins	+	+	+	+

Keys: + = Presence; - = Absence

Table 3. Quantitative Phytochemical Contents of *Securidaca longepedunculata* and *Senna occidentalis*

Phytochemicals	***S. longepedunculata* (mg/g)**	***Senna occidentalis* (mg/g)**
Alkaloids	62.0	82.0
Flavonoids	117.0	137.0
Phenol	71.0	2.7
Reducing sugars	2.3	3.0
Saponins	9.0	4.0
Tannins	1.16	1.11

Anti-Parasitic Propertiesof*S. longepedunculata* and *S. occidentalis* against *Trichomonas vaginali*

The statistical analysis's findings indicated a significant difference ($P<0.05$) between S. longepedunculata and S. occidentalis, as well as a significant difference ($P<0.001$) between the entire group of aqueous root extracts and the negative control and the aqueous root extract of S. occidentalist when the two extracts were combined (Table4).

Following 72 hours of incubation, the aqueous roots extract of S. longepedunculata in the culture media demonstrated the highest percentage mortality (99.01% and 98.01%) at concentrations of 50 mg/ml and 25 mg/ml, respectively. After 24, 48, and 72 hours of incubation, the lowest percentage mortality (89.50%) was observed at lower concentrations of 3.125 (Table 4).

The efficacies of S. occidentalis aqueous root extracts, on the other hand, revealed the lowest mortality (68.51%) at concentrations of 3.125 mg/ml in culture media after 24, 48, and 72 hours of incubation, while the highest mortality (95.15% and 91.49%) was observed at concentrations of 50 mg/ml and 25 mg/ml, respectively (Table 4).

The combination of *S. longepedunculata* and *S. occidentalis* aqueous root extracts demonstrated the highest percentage mortality (93.62%) at doses of 25 mg/ml and the lowest mortality (70.07%) at 3.125 mg/ml concentrations.

Table 4. Mortality Percentage at Various Concentrations of *Securidaca longepedunculata* and *Senna occidentalis in* Comparison to Normal Control.

Concentration (mg/ml)	**Extract's mortality percentage (%)**				
	S.ecuridaca longepedunculata	*Senna occidentalis*	*Securidaca. longepedunculata* and *Senna occidentalis*	Control (-ve)	Control (+ve)
50	99.01	95.89	99.01	0	99.57
25	98.01	91.49	96.03	0	
12.5	96.17	78.01	91.61	0	
6.25	92.19	74.18	84.97	0	
3.125	89.50	68.51	78.72	0	

Table 5, below demonstrated that after the examined organism (*Trichomonasvaginalis*) was exposed to the aqueous root extracts of *S. longepedunculata* and *S. occidentalist* alone and in combination, the mean standard deviation of the viable parasite was determined.

According to statistical analysis, the mean number of viable parasites (*T. vaginalis*) after being exposed to aqueous root extracts of *S. occidentalis* after 24, 48, and 72 hours of incubation was 9.67±2.52 at the highest concentration of 50 mg/ml, and the mean number was 60.67±60.58 at the lowest concentration of 3.125 mg/ml (Table 5).On the other hand, following 24, 48, and 72 hours of incubation, the mean standard deviation for the *S. longepedunculata* aqueous root extracts was 2.33±2.52 at the highest concentration of 50 mg/ml and 24.67±17.79 at the lowest value of 3.125 (Table 5).

After 24, 48, and 72 hours of incubation, the highest mean standard deviation (50.00±37.47) was recorded at a concentration of 3.125 mg/ml when the aqueous root extracts of S. longepedunculata and *S. occidentalis* were combined. The lowest mean standard deviation (2.33±2.52) was recorded at a concentration of 50 mg/ml.

Toxicity results

No death records or any sign of toxic effect were observed in the experimental rats treated with acute dose of 3000 mg/kg body weight of the root extract of *S. occidentalis*. This means that the median lethal dose (LD_{50}) for the oral administration of the crude extract in rats was, therefore greater than 3000 mg/kg (Table 6). However, experimental rats given an acute dose of 3000 mg/kg body weight of the root extract of *S. longepedunculata* showed a noticeable change in physical activity, eye color, and external bleeding from the two rats' mouths and noses. Additionally, one death was noted after 24 hours. This suggests that the LD50 of the crude extract in rats may be higher than 3000 mg/kg.

Table 5: The Mean number of viable parasite on *T. vaginalis* Culture media after 72 hours at different concentrations of the two chosen plants' aqueous root extracts

Aqueous Root extracts	Concentrations (mg/ml)				
	50	25	12.5	6.25	3.125
S. longepedunculata	2.33±2.52	4.67±3.51	9.00±6.24	18.33±14.98	24.67±17.79
S. occidentalist	9.67±8.62	47.33±46.44	51.67±51.73	74.00±53.69	60.67±60.58
S. longepedunculata & *S. occidentalist*	2.33±2.52	9.33±4.51	19.67±11.59	35.33±31.97	50.00±37.47
Control (+ve)100µg/ml	1.00±1.00				
Control (-ve)/0.00µg	235.00±25.00				

LSD = 1.992

DISCUSSION

The successful identification of biologically active compounds from plant material is largely dependent on the type of solvent used in the extraction process, which is one of the plausible explanations for these findings. The following characteristics should be present in a good solvent for plant extraction:

It should be easy to evaporate at low temperatures, promote rapid physiologic absorption of the extract, and not cause the extract to be complex or dissociate (Tonkal, 2009). Targeted compounds will also influence the decision. Methanol, Ethanol, and Water are the most often used solvents for studying microbial activity in plants Rojas (2006). The bioactive component of the roots of the two selected plants was extracted in this study using ethanol and water.

Alkaloids, tannins, saponins, reducing sugar, triterpenoids, were found in both *S. occidentalis* and *S. longepedunculata* according to earlier research and falavonoid was only found in aqueous root extracts of *S. occidentalis* (Imam *et al.*, 2017). However, the current investigation of the water and ethanol extraction methods also showed correlation with the previously mentioned studies. Furthermore, in addition to that it was discovered that all of the extracts contained flavonoid and penol compounds. The results of the phytochemical screening of the aqueous root extracts of *S. longepedunculataand S. occidentalis* revealed that both the ethanolic and aqueous extracts contained alkaloids, flavonoids, reducing sugar, saponins, and Penol in a respectable amount.

These chemical components were found in the aqueous root extract of S. longipedunculata and S. occidentalis, suggesting that these plants would produce pharmacologically significant plant-based medications if they were appropriately screened. This is more strongly supported by the fact that S. longipedunculata which belongs to the Polygalaceae family of plants, were used in ethnomedicine to treat STIs and a few other conditions, most notably epilepsy (Mathias, 1982; Wekesa *et al.,* 2020).

The antimicrobial properties and therapeutic value of the plant parts of *S. longepedunculata* and *S.occidentalis* have been documented in earlier research (Imam *et al.,* 2017, Sharma, 2013; Omoregie, 2013; Igbinosa, 2012; and Narayani, 2012).

The Quantitative phytochemical content of the roots of *Senna occidentals* and *Securidaca longipedunculata* was shown in Tables 4 and 5.

The flavonid (137.0 and 117.0 mg/g) was the highest phytochemical detected in both plants, respectively, while the lowest was tannins (1.16 and 1.11 mg/g) in S. logepedunculata S.occidentalis, respectively. These phytochemicals are known to exhibit medicinal activity as well as pharmacological activity. (Namadina *et al.*, 2020).

Table 6. The alterations in behavior and physical characteristics brought on by exposure to aqueous root extracts of *S. occidentalis* and *S. longepedunculata*

Plant's extract	BW(g)	Dose (mg/Kg b.w.)	No. of Animal/group	NECC		Feeding Habit		External Bleeding (in No)				Mortality
				0 Hrs	> 24Hrs	0 Hrs	> 24Hrs	Mouth	Nose	Eye	Ear	Skin	
SL	150	3000	4	0	3	0	3	2	1	0	0	0	1
SO	150	3000	4	0	0	0	0	0	0	0	0	0	0
Control	135	3000dsw	4	0	0	0	0	0	0	0	0	0	0

Keys: SL = *S. longepedunculata,* **SO** = *S. occidentalis,* **BW** = body weight **DSW** = Does far body weight, **NECC** = No of Eye Colour Change.

Some phytochemicals, such as flavonoids, alkaloids, penol, tannins, and saponins, have been linked to antimicrobial activity (Namuli, 2011). Accordingly, the presence of alkaloids, flavonoids, phenol, saponins, and tannins which also happen to have the highest quantitative phytochemical contents among all the crude root extracts may be the cause of the effectiveness of the aqueous root extracts of *S. longepedunculata* and *S. occidentalis* (Table 3).

It's noteworthy that every root extract from the chosen plants responded to *T. vaginalis* mortality in culture media, according to the results. At 50 mg/ml concentrations, the combined extract (SLSO) and single extracts of SL had the highest percentage mortality (%PM) (99%,PM),This could be because of the presence of tannins, sponing, alkalois, flavonoids, and penol, all of which have been shown in the literature to have an impact on gonorrhea and other STDs (Dipak, 2011; Kavita, 2002; and Shanjida, 2014).

These plants' roots were effective in treating venereal diseases, such as vaginal itches, which are caused by sexual infections (Aiyelaagbe *et al.*, 2007). The results demonstrate the effectiveness of *S. longepedunculata* and *S. occidentalis* against the viability of T. vaginalis, but they did not specify the types of sexual diseases.

As compared to the positive control, the results showed that the crude root extracts were more effective against T. vaginalis at concentrations of 50 and 25 mg/ml after 72 hours. It demonstrated that the presence of various bioactive substances, such as saponins and tannins, which are more soluble in aqueous solution, may account for variations in the effectiveness of crude root extracts (Imam, *et al.,* 2017).

However, it showed that mortality rose with increasing aqueous root extract concentrations and decreased with decreasing aqueous root extract concentrations in most of the extracts, according to the statistical analysis of the data.

Inaddition to that statistically speaking, After 24, 48, and 72 hours of incubation, the mean standard deviation of the viable parasites (T. vaginalis) showed that the higher the concentration of the aqueous root extract, the higher the mortality, and the lower the concentration, the lower the mortality of the parasite. This suggested that the parasites' mortality depended on their concentration. According to the acute toxicity study results (Table 6), there were no documented deaths or indications of a toxic effect.

According to the findings of the acute toxicity investigations (Table 6), experimental rats given an acute dose of 3000 mg/kg body weight of *S. occidentalis* root extract showed no signs of toxicity or death. This indicates that when the crude extract was given orally to rats, the median lethal dose (LD50) was higher than 3000 mg/kg (Table 6).

Nevertheless, experimental rats given an acute dose of 3000 mg/kg body weight of *S. longepedunculata* root extract showed a noticeable change in physical activity; two rats'

eyes and noses showed external bleeding, and one of them died after 24 hours, suggesting that the crude extract's LD50 in rats may be greater than 3000 mg/kg

CONCLUSION

According to the aforementioned findings, the traditional medicinal plants *S. occidentalis* and *S. longipedunculata* have a variety of components in their roots that have anti-parasitic properties against *T. vaginalis*. The highest concentrations of 50 and 25 mg/ml of aqueous root extracts exhibited the pattern of inhibition. Metronidazole, a common anti-parasitic, was also used to compare the extracts' potencies. Various bioactive compounds that are more soluble in aqueous solution appear to be the cause of the variations in the extracts' activities (Tailang, 2009).

RECOMMENDATIONS

Based on the findings from the current studies, the following suggestions are recommended:

i. Other medically significant sexually transmitted diseases, like gonorrhea, chlamydia, syphilis, etc., should be the focus of future research.
ii. Further research should be to identify the active chemical component or components and clarify their precise mechanism of action, safety margin, and effectiveness.
iii. Both acute and sub acute as well as chronic toxicity test should slso be conducted in order ta access fully the impact of toxicity of the extract to the tissue damage of the Albino rats
iv. Conservation of *J. curcas, S.longepedunculata* and *S.occidentalis* biodiversity should be an important aspect to ensure sustainable availability of the plant.
v. In addition to raising awareness of HIV, the federal and state governments should establish a program to educate the public about the risks and dangers of sexually transmitted diseases.

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