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Anticonvulsant activity of butanol fraction of methanol root bark extract of *Securinega virosa* Roxb (ex Willd) Baill. in laboratory animals

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Securinega virosa **is a commonly used medicinal plant in African traditional medicine in the management of epilepsy. In an attempt to isolate and characterize the bioactive principles responsible for the anticonvulsant property, the crude methanol root bark extract of the plant was exhaustively partitioned into petroleum ether, chloroform, ethyl acetate and n-butanol. The anticonvulsant potential of the n-butanol fraction (75, 150 and 300 mg/kg) was evaluated using maximal electroshock (MES) test in chicks, strychnine, picrotoxin, 4-aminopyridine and pentylenetetrazole-induced seizures in mice. The fraction did not protect the chicks against tonic-hind limb extension due to MES. Similarly, the fraction did not afford significant protection against seizures induced by strychnine, aminopyridine and picrotoxin contrary to the observations of protections in the crude extract, against pentylenetetrazole-induced seizure, the fraction afforded 66.67% protection and significantly (P<0.01) delayed the onset of seizure in unprotected animals. Column chromatographic separation of the n-butanol fraction yielded three major sub-fractions which were subjected to anticonvulsant screening using pentylenetetrazol (PTZ)-induced seizure. The anticonvulsant potential of the n-butanol fraction was retained in the more polar sub-fractions. The findings of this study suggest that the n-butanol fraction *Securinega virosa* root bark contains bioactive principle(s) that possess anticonvulsant activities which may be beneficial against absence seizure. This lends further credence to the ethnomedicinal claim of the use of the root of *S. virosa* in the management of epilepsy.**

Key words: *Securinega virosa*, epilepsy, seizure, maximal electroshock, pentyleneterazole, picrotoxin, 4-aminopyridine, strychnine.

INTRODUCTION

Epilepsy, a disorder characterized by recurrent seizures of cerebral origin is the second most common chronic neurological condition seen by neurologists worldwide (Sridharan, 2002). Approximately 10 million people of all ages are affected in Africa. Children, adolescent and the ageing population are mostly affected (WHO, 2004).

About 20 to 30% of patients living with epilepsy poorly respond to the conventional anti-epileptic therapy (WHO, 2001; Rout and Kar, 2010). In developing countries, many people living epilepsy may not receive basic treatment due to high cost, unavailability and untoward effects associated with the conventional agents (Maiha et

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al., 2009). They, therefore, resort to traditional medicine for the management of epilepsy and other neurological conditions. *Securinega virosa* (Family: Euphorbiaceae) is one of the most widely used medicinal plant among the traditional practitioner in West Africa and has enjoyed wide patronage in the treatment of epilepsy and mental illnesses. It is a dense, low branching, many branched shrub, sometimes a small spreading tree up to about 6 m high, although, more commonly 2 to 3 m, evergreen or deciduous. It grows in tropical Africa, India, Malaya, China and Australia (Dalziel, 1936). The local names of the plant in Nigeria include "Tsuwaawun karee" (Hausa), "Iranje" (Yoruba) and "Njisi nta" (Igbo) (Neuwinger, 1996). Previous studies have shown that the crude methanol extract of *S. virosa* possesses anticonvulsant activity (Magaji et al., 2007). In an attempt to isolate and characterize the anticonvulsant principles of the root bark of the plant, the crude extract was successively partitioned into petroleum ether, chloroform, ethyl acetate and n-buatnol. In this study, the anticonvulsant activities of the n-butanol fraction and its column fractions are reported.

MATERIALS AND METHODS

Plant

The plant specimen of *S. virosa* used in this work was collected in February, 2009, in Basawa-Zaria, Sabon Gari Local Government Area of Kaduna State, Nigeria. The plant was identified by staff of the Herbarium Section of the Department of Biological Sciences, Ahmadu Bello University, Zaria. Specimen number was obtained (No. 918) and voucher specimen was deposited for future reference.

Extraction and fractionation

The root bark of the plant was dried under shade, size-reduced and sieved to obtain the powdered root bark. About one thousand (1000 g) of the powdered root bark of the *S. virosa* was extracted with 4 L of methanol (70%) in a soxhlet apparatus for 72 h. The resultant extract was then concentrated *in vacuo* affording 9.5% yield and subsequently referred to as crude methanol root bark extract. About 50 g of the crude methanol extract was dissolved in water and filtered. The filtrate was successively partitioned with petroleum ether, chloroform, ethyl acetate and n-butanol. The n-butanol soluble fraction was concentrated *in vacuo* affording a dark brownish extract which was subsequently referred to as n-butanol fraction (NBF). n-butanol fraction (3 g) was subjected to chromatography over silica gel packed column (75 × 3.5 cm). The column was eluted continuously using ethyl acetate and ethyl acetate-methanol by gradient elution technique. The progress of elution was monitored using thin layer chromatography. Forty five fractions of 50 ml each were collected. The fractions were combined based on their TLC profiles to yield three major column fractions coded pooled fractions A, B and C (PFA, PFB and PFC).

Animals

Day old rangers cockerels (34 ± 4 g) were obtained from the National Animal Production Research Institute (NAPRI), Shika, Kaduna State, Nigeria. Swiss albino mice of either sex (20 ± 2 g) were obtained from the animal house facilities of the Department of Pharmacology and Therapeutics, Ahmadu Bello University, Zaria. Mice, maintained on standard rodent feed and water *ad libitum,* were housed in polypropylene cages at room temperature throughout the study.

All experimental protocols were in accordance with the Ahmadu Bello University Research policy; and ethic and regulations governing the care and use of experimental animals as contained in "Principles of laboratory animal care" (NIH, 1985). The experiments were conducted in quiet laboratory between hours of 900 to 1600 h.

Drugs/chemicals and equipment

Methanol, petroleum ether, chloroform, ethyl acetate and n-butanol (Sigma Co. USA), normal saline (Dana, Nigeria), strychnine (Sigma, UK), 4-Aminopyridine (Sigma Co. USA), picrotoxin (Sigma Co. USA), pentylenetetrazole (Sigma, UK), diazepam (Roche, Pakistan), phenobarbitone (Lab. Renaudin, France), phenytoin (Sigma, UK) and sodium valproate (Sigma, UK).

Phytochemical screening

NBF was screened for the presence of alkaloids, tannins, saponins, flavonoids and cardiac glycosides using standard protocols previously described by Silva et al. (1998).

Acute toxicity study

The method previously described by Lorke (1983) was adopted for the estimation of mean lethal dose of NBF. Briefly, the method was divided into two phases. In the initial phase, 3 groups, each consisting of three mice were treated with the fraction at doses of 10, 100 and 1000 mg/kg body weight i.p. and observed for signs of toxicity and death for 24 h. In the second phase, 4 groups each consisting of one mouse was injected with four more specific doses of the extract based on the result of the 1st phase. The LD_{50} value was estimated by calculating the geometric mean of the lowest dose that caused death and the highest dose for which the animal survived (0/1 and 1/1).

Maximum electroshock-induced seizure in chicks

The method described by Swinyard and Kufferberg (1985) as modified by Sayyah et al. (2002) was employed in this study. Fifty 1 day old cockerels were randomly divided into five groups each containing 10 chicks. The first group received normal saline (10 ml/kg) while the second, third and fourth groups received 75, 150 and 300 mg n-butanol fraction/kg body weight, respectively. The fifth group was given 20 mg phenytoin/kg body weight. The drug and extract were administered by intraperitoneal route. Thirty minutes after pre-treatment, maximal electroshock was administered to induce seizure in the chicks using Ugobasile electroconvulsive machine (Model 7801) connected to Claude Lyons stabilizer with corneal electrodes placed on the upper eyelids of the chicks. The shock duration, frequency and pulse width were set and maintained at 0.80 s, 200 pulse/s and 0.8 ms, respectively. A current of about 90 mA, which produced tonic seizures in 90% of the control chicks, was used throughout the study. Seizures were manifested as tonic hind-limb extension (THLE) (Swinyard, 1969). The ability to prevent this feature or to prolong the latency and or onset of the THLE was considered as an indication of anticonvulsant activity (Swinyard, 1969; Sayyah et al., 2002).

Subcutaneous strychnine-induced seizure in mice

The method described by Porter et al. (1984) was adopted in this study. Thirty mice were divided into five groups each containing six mice. The first group was administered with normal saline (10 ml/kg) while the second, third and the fourth group received 75, 150 and 300 mg n-butanol soluble fraction/kg body weight, respectively. The fifth group was treated with 30 mg phenorbarbitone/kg body weight. The drug and extracts were administered by intraperitoneal route. Thirty minutes post-treatment, mice in all the groups received 1.5 mg strychnine/kg, subcutaneously. The proportion of mice presenting convulsions as well as the onset of tonic convulsions was recorded. Abolition of tonic extensor jerks of the hind limbs within 30 min after strychnine administration was considered an indicator that the testing material could prevent strychnine-induced convulsions.

4-Aminopyridine-induced seizure in mice

The method adopted for this study was similar to those described previously (Rogawski and Porter, 1990; Yamaguchi and Rogawski, 1992). Thirty mice were randomly divided into five groups each containing 6 mice. The first group received normal saline (10 ml/kg). The second, third and fourth groups received 75, 150 and 300 mg n-butanol soluble fraction per kg body weight, respectively. The fifth group was treated with 30 mg phenobarbitone per kg body weight. The drug and extracts were administered by intraperitoneal route. Post treatment (30 min) with 4-Aminopyridine was administered at a dose of 15 mg/kg body weight to each mouse, subcutaneously. The mice were observed for 30 min for characteristic behavioral signs, such as hyperactivity, trembling, intermittent forelimb and hind limb clonus followed by hind limb extension, tonic seizures, opisthotonus and death. Ability of the extract to protect the mice from lethality within 30 min observation period was considered as an indication for anti-convulsant activity (Yamaguchi and Rogawski, 1992).

Picrotoxin-induced seizure in mice

The method previously described by Salih and Mustafa (2008) was adopted. Thirty mice were grouped into five each consisting of six mice. The first group received normal saline (10 ml/kg). Mice in groups second, third and fourth groups received 75, 150 and 300 mg/kg body weight of the n-butanol fraction, respectively, while mice in the fifth group received 10 mg diazepam/kg body weight. All treatments were via intraperitoneal route. Post treatment (30 min) with 10 mg picrotoxin/kg body weight was administered to each mouse, subcutaneously. They were then observed for hind limb tonic seizures for 30 min. Absence of tonic hind limb extension or prolongation of the latency of the hind limb tonic extension was considered as an indication of anticonvulsant activity (Navarro-Ruiz et al., 1995).

Pentylenetetrazole-induced Seizure in mice

The method of Swinyard et al. (1989) was employed. Thirty mice were divided into five groups each containing six mice. The first group received normal saline (10 ml/kg). The second, third and fourth groups received 75, 150 and 300 mg n-butanol fraction/kg body weight. The fifth group was given 200 mg sodium valproate per kg body weight. The drug and extract were administered by intraperitoneal route. Post treatment (30 min) mice in all the groups received 85 mg pentylenetetrazole/kg, subcutaneously (sc). Mice were observed over a period of 30 min. Absence of an episode of clonic spasm of at least 5 s duration indicated a compound's ability to abolish the effect of pentylenetetrazole on seizure threshold. The same procedure was repeated for the three column fractions; PFA, PFB and PFC.

Statistical analysis

Results were expressed as mean ± standard error of mean (SEM). Statistical analysis was performed by analysis of variance (ANOVA); when a statistically significant result was obtained with ANOVA, a post hoc Dunnets t-test was performed for multiple comparisons. Values of $P < 0.05$ were considered significant.

RESULTS

Acute toxicity test

The intraperitoneal and oral mean lethal dose values of n-butanol fraction in mice were found to be 1257 mg/kg. The animal presented with hypolocomotion and respiratory depression before death.

Preliminary phytochemical screening

The n-butanol fraction was found to contain similar phytochemical constituents as the crude methanol root bark extracts. However, the fraction tested negative for triterpenes (Table 1). All the three major column fractions tested negative for alkaloids. Only PFC tested positive for saponins (Table 2).

Anticonvulsant studies

The n-butanol fraction did not protect the mice against maximal electroshock seizure (MES) at all the doses tested. Similarly, there was also no significant reduction in the recovery time compared with control group. Phenytoin, the standard drug used protected 100% of the chicks against MES. The mean recovery time was found to increase from 5.86 to 6.86 min at the highest dose tested (Table 3). Against strychnine, 4-Aminopyridine and picrotoxin induced seizures in mice, the n-butanol fraction did not afford significant protection. The fraction was also found to decrease the mean onset of seizure against 4-Aminopyridine from 14.4 to 8.5 min (Tables 4, 5 and 6). Conversely, the extract offered about 66.67% protection against pentylenetetrazole induced seizure at the highest dose tested (Table 7). PFA did not afford significant protection of the mice against pentylenetetrazol (PTZ)-induced seizure. However, it significantly protected the mice against mortality. It increased the mean onset of seizure in unprotected animals from 2.67 to 5.4 min at the dose of 10 mg/kg. However, the effect was not dose-dependent. PFB, at the highest dose (10 mg/kg), protected 50% of the mice against PTZ-induced seizure. However, there was no significant increase in the mean onset of the seizure. PFC protected 50% of the mice against PTZ-induced seizure at the lowest dose (2.5

Table 1. Phytochemical constituents present in the methanol root bark extract of *S. virosa* n-butanol fraction.

Constituent	MRBE	NBF
Tannins	+	+
Saponins	+	+
Flavonoids	+	+
Alkaloids	+	+
Cardiac glycosides	+	+
Cyanogenic glycosides	+	+
Resins	+	+
Steroid/Terpenoids	+	-
Anthraquinone	-	-

MRBE: Methanol root bark extract; NBF: n-butanol fraction; + Present, -Absent.

Table 2. Preliminary Phytochemical screening on Sub-fraction obtained from n-butanol soluble fraction of *Securinega virosa*.

Constituent	PFA	PFB	PFC
Flavonoid	+	+	+
Saponins	-	-	+
Alkaloids	-	-	-
Triterpenes	-	-	-

PFA: Column fraction A; PFB: Column fraction B; PFC: Column fraction C; + Present;-Absent.

mg/kg). However, there was also a significant increase in the mean onset of seizure in unprotected animals at the higher doses (5 and 10 mg/kg) (Table 8). Sodium valproate, the standard agent used protected 100% of the animals against PTZ-induced seizure.

DISCUSSION

The findings of this study suggest that the n-butanol fraction of the methanol root bark extract of *S. virosa* possesses anticonvulsant activity. The intra peritoneal LD_{50} values of the n-butanol fraction found to be 1256.9 mg/kg suggests that it is relatively toxic (Matsumura et al., 1985). However, the doses used for the study were lower than 30% of the LD_{50} which have been shown to be relatively safe for ethnopharmacological research (Vongtau et al., 2004).

The n-butanol fraction did not protect the chicks against maximal electroshock-induced seizure, and neither did it significantly alter the mean recovery time in the convulsed animals. This finding is in contrast with what was obtained with the crude methanol root bark extract which offered some protection against MES (Magaji et al., 2007). The loss activity against MES may be due to fractionation which might have separated constituents that act synergistically in the crude extract. The MES is a model with high reproducibility and consistent end point. Inhibition of the MES test predicts activity against generalized tonic-clonic and cortical focal seizures (Ambawabe, 2002; Ngo-Bum et al., 2009). MES induced tonic seizure can be prevented by agents that either inhibits sodium channel such as phenytoin, valproate, felbamate and lamotrigine (Sayyah, 2004) or agents that block glutamatergic excitation mediated by N-methyl-D-Aspartate (NMDA) receptors (Subramaniam et al., 1995). MES is possibly the most validated test for predicting activity against generalized tonic-clonic seizures (Castel-Branco et al., 2009). The inability of the fraction to inhibit the THLE suggests it may not be beneficial in the management of generalized tonic-clonic and partial seizures.

The ability of the n-butanol fraction and its column fractions to protect mice against PTZ-induced seizure suggests the presence of constituents with protective activity against PTZ-induced seizure. Anticonvulsant effect against PTZ test identifies compounds that can raise seizure threshold in the brain (White et al., 1998). Agents that protect animals against PTZ-induced seizure are worthy of further evaluation as potential agents in the management of petit mal epilepsy (Somani et al., 2010). Drugs that reduce T-type Ca^{2+} currents, such as ethosuximide can prevent seizures induced by PTZ. Similarly, PTZ has been shown to interact with GABA neurotransmitters and the GABA receptor complex (Loscher and Schmidt, 1988; Bum et al., 2010). Therefore, agents that enhance $GABA_A$ receptor mediated inhibitory neurotransmission such as benzodiazepines and barbiturates prevent PTZ- induced seizure. Dopaminergic mechanism has also been implicated in PTZ-induced seizures. Dopamine has been found to reduce the threshold of PTZ convulsions in mice and specific receptor antagonists of dopamine such as pimozide protected experimental animals against PTZ-induced seizures (Dadkar et al., 1979; Amabeoku, 1989). Drugs such as felbamate, which block glutamatergic excitation mediated by NMDA receptors, have demonstrated activity against PTZ-induced seizures suggesting the involvement of NMDA system in the initiation and propagation of PTZ-induced seizures (MacDonald and Kelly, 1995; White, 1997).

Moderate anti-convulsant activity of the fraction and its column fractions against PTZ-induced seizures suggests the presence of bioactive compounds effective in the therapy of absence or myoclonic seizures. It may also be plausible to suggest, therefore, that the anticonvulsant effect of the fraction and the column fractions may be due to reduction in T-type Ca^{2+} current, activation of GABA-ergic neurotransmission, blockade of glutamatergic neurotransmission mediated by NMDA receptor or blockade of dopaminergic system in specific areas of the central nervous system (CNS). Strychnine is a competitive antagonist of the inhibitory amino acid glycine (Larson, 1969). It blocks the inhibitory effects of glycine at

Table 3. Effect of n-butanol fraction of methanol root bark extract of *Securinega virosa* on Maximal Elecroshock test in chicks.

Treatment	Quantal protection	Mean recovery time (min)
N/Saline	0/10	5.86 ± 1.58
NBF 75	0/10	4.75 ± 1.05
NBF 150	0/10	8.50 ± 1.70
NBF 300	0/10	6.86 ± 0.34
Phenytoin 20	10/10	-

Protection against seizure expressed as quantal protection; recovery time expressed as mean ± SEM; N/saline (Normal saline); NBF (n-butanol fraction); n=6.

Table 4. Effect of n-butanol fraction of methanol root bark extract of *Securinega virosa* against Strychnine-induced seizure in mice.

Treatment	Quantal protection	Mean onset of seizure ± SEM
N/Saline	0/6	6.50 ± 0.43
NBF 75	0/6	7.00 ± 0.52
NBF 150	0/6	7.50 ± 0.85
NBF 300	0/6	6.50 ± 0.50
PBT 30	6/6	-

Protection against seizure expressed as quantal protection; onset of seizure expressed as mean ± SEM; N/saline (Normal saline); NBF (n-butanol fraction); n=6.

Table 5. Fractions obtained from methanol root bark extract of *Securinega virosa* against 4-Aminopyridine-induced seizure in mice.

Treatment	Quantal protection	Mean onset of seizure (min)
N/Saline	0/6	14.40 ± 3.31
NBF 75	0/6	9.67 ± 0.56
NBF 150	0/6	9.00 ± 0.78
NBF 300	0/6	8.50 ± 0.50
PBT 30	5/6	22.33

Protection against seizure expressed as quantal protection; onset of seizure expressed as mean ± SEM; N/saline (Normal saline); NBF (n-butanol fraction); PBT (Phenobarbitone); n=6.

all glycine receptors (Parmar and Shiv Prakash, 2006). The inability of the fraction to protect against strychnine-induced seizure suggests non-involvement of glycine mediated inhibition in its anticonvulsant activity (Aderibigbe et al., 2007)

K^+ channels play a major role in the control of all aspect of neuronal excitability, including resting membrane potential, responsiveness to synaptic inputs, frequency adaptation and neurotransmitters release (Wickenden, 2002). 4-Aminopyridine is a K^+ channel antagonist which induces seizure activity through the enhancement of spontaneous and evoked neurotransmitter (Usman et al., 2008). Drugs like phenytoin which block seizure spread are effective antagonists of seizures induced by K^+ channel blockade while those with specific actions on other cellular targets may be weak or inactive, presumably because they are unable to attenuate the spread of intense (non-NMDA receptor mediated) excitation evoked by 4-Aminopyridine (Yamaguchi and Rogawski, 1992). The inability of the fractions to produce significant activities against 4-AP induced seizure suggests that they may likely not be interacting with k^+ channel in producing their anticonvulsant activities.

Picrotoxin-induced seizure model is a model for elucidating the probable mechanism of action of an anticonvulsant agent. Picrotoxin is a non-competitive $GABA_A$ receptor antagonist which selectively blocks chloride channels. Agents such as barbiturates, benzodiazepines, sodium valproate, vigabatrin, gabapentin and tiagabine which protect against picrotoxin-induced seizure may interfere with the GABAergic pathway thereby enhancing the GABA

Table 6. Effect of n-butanol fraction of Methanol root bark Extract of *Securinega virosa* against Picrotoxin-induced seizure in mice.

Treatment	Quantal protection against seizure	Mean onset of seizure	Quantal protection against mortality	Mean latency of mortality
N/Saline	0/6	9.50 ± 0.85	0/6	13.67 ± 1.11
NBF 75	0/6	9.00 ± 0.37	0/6	13.50 ± 0.50
NBF 150	0/6	6.50 ± 0.22*	0/6	10.83 ± 0.54*
NBF 300	0/6	6.83 ± 0.60*	0/6	11/33 ± 0.72
DZP 20	6/6	-	6/6	-

Protection against seizure expressed as quantal protection; onset of seizure expressed as mean ± SEM; N/saline (Normal saline); NBF (n-butanol fraction); PBT (Phenobarbitone); DZP (Diazepam) *P < 0.05; **P < 0.01; n=6

Table 7. Effect of n-butanol fraction obtained from methanol root bark extract of *Securinega virosa* against Pentylenetetrazole-induced seizure in mice.

Treatment (mg/kg)	Quantal protection against seizure	Mean onset of seizure (min)	Quantal protection against mortality	Mean time of death (min)
N/Saline (10 ml/kg)	0/6	3.5 ± 0.43	4/6	4.80 ± 0.32
NBF 75	2/6	5.5 ± 0.87	5/6	10
NBF 150	1/6	4.4 ± 0.51	4/6	8.50 ± 0.5
NBF 300	4/6	3.0	5/6	3
VPA 200	6/6	-	-	-

Protection against seizure expressed as quantal protection; onset of seizure and time of death expressed as mean ± SEM; N/saline (Normal saline); NBF (n-butanol fraction); VPA (Sodium valproate); n=6

Table 8. Effect of column fractions of n-butanol fraction of *Securinega virosa* methanol root bark extract against pentylenetetrazole induced seizure in mice.

Treatment	Dose (mg/kg)	Quantal protection against seizure	Mean onset of seizure (min)	Quantal protection against mortality	Mean time of death (min)
N/Saline	(10 ml/kg)	0/6	2.67 ± 0.21	1/6	12.40 ± 2.46
PFA	2.5	1/6	6.40 ± 1.03	6/6	-
	5.0	1/6	4.00 ± 0.89	4/6	9.00
	10	1/6	5.40 ± 1.12	4/6	9.50 ± 0.50
PFB	2.5	1/6	5.40 ± 1.12	4/6	9.50
	5.0	0/6	5.83 ± 1.54	2/6	12.75 ± 1.53
	10	3/6	3.67 ± 1.22	5/6	2.00
PFC	2.5	3/6	1.67 ± 0.33	3/6	8.67 ± 0.88
	5.0	1/6	7.00 ± 1.7*	1/6	12.00 ± 0.95
	10.0	1/6	11.00 ± 1.3**	2/6	11.50 ± 1.56
VPA	200	6/6	-	-	-

Protection against seizure and mortality expressed as quantal protection; onset of seizure and time of death expressed as mean ± SEM; N/saline (Normal saline); NBF (n-butanol fraction); VPA (Sodium valproate); *P < 0.05; **P < 0.01; n=6.

mediated neurotransmission (Ojewole and Amabeoku, 2007; Raza et al., 2010). The inability of the fractions to protect mice against picrotoxin-induced seizure suggests that their anti-convulsant action may not involve

interaction with picrotoxin sites in $GABA_A$-chloride ion channel complex.

Anticonvulsant activities have been reported for saponins and flavonoids (Shibata, 2001; Kavvadias et al., 2004) which were found to be present in the n-butanol fractions and its column fractions. These constituents may be responsible, in part or in combination for the observed anticonvulsant effect of the n-butanol fraction of methanol root bark extract of *S. virosa*.

The non-dose dependent activity of the extract and its column fraction suggests that they may contain phytoconstituents that are antagonistic in their modulation of seizure-induced by pentylenetetrazole. Previously, securinine alkaloids, isolated from the *Securinega* genus have been reported to be CNS stimulants which act by selectively inhibiting the GABA recognition sites (Beutler et al., 1985). Although the non-dose dependency continued with the column fractions found to be devoid of alkaloids. This may be due to the presence of phytochemicals other than alkaloids with CNS stimulant actions.

In conclusion, the findings of this study suggest that the n-butanol fraction contain bioactive principles that may be beneficial in absence seizure and further provide scientific validity for the use of the root of the plant in the management of epilepsy in traditional medicine. Further work will involve purification of the column fractions in order to isolate the compound responsible for observed anticonvulsant activity.

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