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RESEARCH ARTICLE

Different Solvent of Phytochemical Screening and antibacterial activity of *Xeromphis nilotica* cortex extract

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Abstract

The species ***Xeromphis nilotica*** belong to family *Rubiaceae* locally known as (Shagarat almafeen),the aims of this study is to determine the phytochemical screening and antibacterial activities of *Xiromphis nilotica* cortex. This present study was carried out in Khartoum state-Sudan, during March 2019. Phytochemical activities were investigated to detect the effects of antibacterial; this plant was collected from El-salihen area, locality of Algoze, South Kordofan State, western Sudan. The dried cortex of ***Xeromphis nilotica*** was extracted successively with (Ethanol, Ethyl acetate , methanol and distil water,). The phytochemical screening carried out on four different extracts of species cortex and it contain amount of secondary metabolize such as (alkaloids, Carbohydrate Tannins, Phenol, Sterols & Triterpenes, Saponin, Flavonoids ,Quinine ,Amino acid and Protein were studied .The antibacterial activity of extracts were evaluated against four standard bacteria (Gram positive; *Bacillus subtilis*, *Staphylococcus aureus*) and (Gram negative; *Escherichia coli*, *Pseudomonas aeruginosa*) and the results showed that there are high inhibition zone (21-19) in ethanol and ethanol extract and low in habitation zone in water extract in all concentration

Keywords: Folk medicine, Elsalihen area, Xeromphis nilotica, phytochemical screening.

1 | INTRODUCTION

Xeromphis nilotica belong to *Rubiaceae* family, is the medicine plant that distributed in tropical and subtropical regions[1], The genus *Xeromphis* is represented in Sudan by one species, namely *Xeromphis nilotica* (Stapf) Keay [2], which is widespread in Central and East Africa as well as in Cameroon and Nigeria [3]. Locally it is known as Shagart-Elmarfaein [4]. It grows as a medium height shrub (usually less than 3 m) with grey globose drupes, stiff spines, and deciduous leaves clustered below the spines[5], it is use in different traditional medicines systems of Sudan for antispasmodic, antidysenteric, anti-inflammatory, immunomodulatory, and antifertility properties.[1-5]. Many species of plants grow abundantly in the Sudan and other African countries and are used by the village populations for treatment of various disorders [6][7] , and are the main medicinal source to treat infectious

diseases [8] , in many rural area, the medicinal plants had been an important methods in the treatment of diseases. The medicinal plants contain a number of secondary metabolises compounds such as alkaloids, flavonoids, tannins, saponins, Amino acid, Protein, Carbohydrate, Phenol, Sterols & Triterpenes [7],the traditional medicinal plants are increase in both developing and industrialized countries. [9]reported that both literate and illiterate people still use local plants as drugs in many conditions[10].

1-1-Objective:

The objective of this study is to determine the phytochemical screening and antimicrobial activities of *Xiromphis nilotica* cortex .

2 | MATERIALS AND METHODS

All the chemicals and reagents used in this study were of analytical grade such as chloroform, distilled water, ethanol, methanol, petroleum ether, acetic anhydride, sulphuric acid, gelatine salt, ferric chloride, reagents (Wagner, Hager, and Dragendorffs), aluminium chloride and potassium hydroxide.

2-1-Plant material, collection and identification:

Xiromphis nilotica cortex were collected from Elsalihen area, locality of algoze, South kordofan State-Sudan, and identified in herbarium of natural research Centre and compared with herbarium of Faculty of Science University of Khartoum.

2-2-Preparation of Crude Extracts

50g of the dried plant was weighted and extracted successively with ethanol , methanol, ethyl acetate and distil water ether by shaker apparatus for four hours at room temperature, each extract was filtrated through Whitman No 1 filter paper, followed by concentrated under vacuum room. The crude extracts were then kept at -20 ºC in sterile universal bottles.

2-3-Phytochemical screening of different extracts crude:

General phytochemical screening for the active constituents was carried out for extract using the methods [11] ,which were described by[12].The detection tests of (alkaloids, flavonoid, Triterpenes and sterols, Tannins , Saponins, Coumarins and Glycosides) were carried out **.**

2-4-Preparation of media

28g of powdered nutrient agar was weighted, dispersed in 1 liter of distilled water and allowed to soak for 10 minutes, swirl to mix then sterilized by autoclaving for 15 minutes at 121c, cooled to 47c, mixed well then poured into petri dishes[13].

2-5-Testing of organisms:

2-5-1-The two (gram positive and negative bacteria were tested in table (2)

Bacillus subtitles (NCTC 8236 Gram positive bacteria).

Staphylococcus aureus (ATCC 25923 Gram positive bacteria).

Escherichia coli (ATCC 25922 Gram negative bacteria).

Pseudomonas arginosa (ATCC 27853 Gram negative bacteria).

3 | RESULTS AND DISCUSSION

Key: Concentration of extracts (100, 50, 25, 12.5mg/ml) .Zone of inhibition in (mm), - no inhibition, <9mm inactive, 9-12mm partially active, 13-18mm active, >18mm very active.The methanol and ethanol extracts showed high inhibition zone between (21-18) against four tested microorganisms (E.c, S.a, B.s, and P.s), the water extract was recoded low inhibition zone between (15-11) comparing with other extract .

Supplementary information The online version of this article contains supplementary material, which is avail-able to authorized users.

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TABLE 1: Result of phytochemical screening Xiromphis nilotica cortex

Secondary metabolites	Extract test	Successive method of extraction			
		Water	Methanol	Ethyl acetate	Ethanol
Alkaloids	dragendroffs	+	+	+++	+++
	Winger	+	+	+++	+++
	Hager	+	+	+	+
Flavonoids	KOH	-	++	++	+++
	NH4OH	-	++	++	+++
	ALCL3	-	++	+++	+++
	Mg	-	++	+++	+++
Saponins	Foam test	+++	+++	-	+++
Phenol	Ferric chloride	++	+++	-	+++
Sterols & Triterpenes	Liebermann's	+	++	++	+++
	Salkowski	+	++	++	+++
Tannins	Ferric chloride test	++	+++	+	+++
	Gelatin test	++	+++	+	+++
Quinine		+	+	+++	+
Terpenoide	-	-	-	++	+
Carbohydrate	Molisch,s .H2SO4	+++	+++	+	+++
Protein	Biuret reagent	-	-	+	++
Amino acid	ninhydrin	-	-	+	+

Key: Very high=(++++), High=(+++), Moderate=(++), Trace amount=(+) And absent= (-).

The phytochemical screening were carried out on different extracts of Xeromphis nilotica cortex and they showed to contain high amount of (alkaloids, Carbohydrate Tannins, Phenol, Sterols & Triterpenes, Saponin, and Flavonoids) in ethanol extract, high amount of (Alkaloids, Flavonoids and Quinine) in ethyl acetate extract, moderate amount of (flavonoids, Alkaloids, Tannins, Sterols &Triterpenes, and phenol) in methanol extract, trace amount of (Amino acid, Protein, Carbohydrate, Tannins) in ethyl acetate extract and absences of (Amino acid, Protein , Terpenoide) in water and methanol extract.

TABLE 1: Result of antibacterial activities of Xeromphis nilotica cortex at concentration 100mg/ml

Extract	(Zone of inhibition in diameters (mm				
	Concentration in100 mg/ml	*Escherichia coli;*	*pseudomonas aeruginosa; C*	*staphyllococcus aureus*	*Bacillus subtilis*
Methanol	100	21	20	20	19
	50	18	19	19	18
	25	17	18	18	17
	12.5	15	16	14	15
Ethanol	100	18	19	18	19
	50	17	17	16	18
	25	16	15	15	16
	12.5	15	14	14	15
Ethyl acetate	100	17	17	16	16
	50	16	15	14	15
	25	15	14	13	14
	12.5	14	13	12	13
Water	100	15	15	14	15
	50	14	13	13	14
	25	13	13	12	13
	12.5	12	12	11	12

key: Concentration of extracts (100, 50, 25, 12.5mg/ml) .Zone of inhibition in (mm), - no inhibition, <9mm inactive, 9-12mm partially active, 13-18mm active, >18mm very active.The methanol and ethanol extracts showed high inhibition zone between (21-18) against four tested microorganisms (E.c, S.a, B.s, and P.s), the water extract was recoded low inhibition zone between (15-11) comparing with other extract .

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