

Phytochemical Investigation of Antimicrobial Activity Leaves Extract of *Kigelia africana*

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Abstract: The leaves of *Kigelia africana*. The family of Bignoniaceae and commonly called the ohm shutter as important source for treatment in complementary medicine. The Sudanese varieties are one of the best in the market, which prompted investigation of leaves extracts. The 96% ethanolic extract exhibited significant antimicrobial activity and highlighted the biological monitoring of activity in order to isolate the active metabolites from the chloroform extract of the leaves. The presence of sterols and triterpenes, carotenoids, coumarins, alkaloids, saponins, tannins, flavonoid and carbohydrates was confirmed by phytochemical screening of the diethyl ether, methanolic and aqueous extracts. The leaves extract was monitored by analytical and preparative TLC. From the above mention extract we prepare cream and ointment as antibacterial and antifungal dosage forms.

Keywords: phytochemical screening, extract, *Kigelia africana* leaves, antimicrobial activity, Minerals content.

1. Introduction

The family of Bignoniaceae is comprising about 650-750 species in 116-120 genera. and commonly called the ohm shutter rich in volatile oils and terpenoids, glycosides and alkaloids, many of them with remarkable antimicrobial activities. The leaves of comprising species showed wide range of biological activities, specially the *Kigelia africana* leaves, The Sudanese variety is considered amongst the best in the market and is used traditionally in treatment of different ailments, and were selected for further phytochemical and antimicrobial investigations.

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The leaves were extracted with 96% ethanol, chloroform and methanol and the extracts were tested against Gram positive and Gram negative bacteria, and the four extracts exhibited significant activity and the methanolic extract gave the highest activity and was selected for further phytochemical investigations.

The results of phytochemical screening and antibacterial assessment of activity along with chemical analysis of the leaves are reported in the present work.

2. Materials and Methods

The leaves of *Kigelia africana* were collected from fruits purchased from the local market and were identified at the medicinal and Aromatic plants Institute, the National Centre for Research, Khartoum, Sudan. The following microorganisms were used for Assessment of antimicrobial activity: *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli*, *Proteus vulgaris* Media: agar, Nutrient borth.

Preparation of Esxtracts

The powdered leaves (25g) were extracted separately in a soxhlet apparatus and after removal of solvents. The percentage yields were determined the extracts were used for phytochemical screening and antimicrobial activity assessment and chromatographic analysis for isolation and identification of active constituents.

Assessment of Antimicrobial Activity

Antibacterial activity was studied by agar- diffusion method. Each of the inocula of the test organism (1ml) was poured in to sterile petri-dish. Amedium (about 45c) was poured in to each of the petri dishes (20ml). The medium was left to stand to allow it to set. caups were bored on the media with the aid of a sterile cork borer of 10mm diameter and removal of the agar disc. The cups were marked, and then different concentration of the plant extract were pipetted in to the cups using sterile syringes. plates were then incubated at 37c for 24c hrs. The sensitivities of the test organism to the plant extracts were indicated by clear zones of growth inhibition around the cups containing the plant extract and the diameter of the clear zone was taken as an index of the degree of sensitivity (Kavangh, 1972).

Phytochemical Screening

The powdered plants were screened for the presence of alkaloids, carotenoids, coumarins, alkaloids, saponins, tannins carbohydrate and phlobannins according to the methods described by Sofowora (1993).

Chromatographic Analysis

The extracts were screened in different solvent systems by thin layer chromatography.

Minerals content:

Minerals content were determined by atomic absorption spectrometry (Agilent, Perkin Elmer AAS Device Model GBC 932, U.S.A. 1996).

Nitrogen:

Nitrogen content was determined by a semi-micro Kjeldahl method (AOAC; 1984).

Protein:

Crude protein % = N% x 6.6 (Anderson, 1986).

Creams:

Creams are viscous emulsions of semi – solid consistency , which may be of an oil – in – water type (aqueous creams) or water – in – oil type (oily creams).

Preparation of Creams

The apparatus used in the preparation of creams and the final containers should, before use, be thoroughly cleansed, then rinsed with purified water which has freshly boiled and cooled, and finally dried. Freshly boiled and cooled purified water should be used in the preparation of all creams, and hygienic precautions should be taken throughout the preparation and subsequent filling into containers. Dissolve the extract of plant in a portion of the alcohol , add Emulsifying Wax; Olive oil and Vaseline (Ansel, H.C 2009).

3. Results and Discussion

The powdered leaves were extracted with 96% ethanol, chloroform and methanol, the total ethanolic extract was screened against Gram positive and Gram negative bacteria. The antimicrobial activity was significant and gave grounds to fractionate the extract and biological monitoring of its fractions Table (1).

Table 1. Results of antimicrobial activity screening of the 96% ethanolic, chloroform and methanolic extracts of *Kigelia Africana* leaves:

Organisms	Concentration (mg/ml)	Inhibition zone (mm) of extract		
		96%ethanol	Chloroform	Methanol
<i>Bacillus subtilis</i>	1.00	20	28	28
	0.75	16	27	23
	0.50	20	15	22
	0.1	16	25	23
<i>Staphylococcus aureus</i>	1.00	23	23	26
	0.75	17	17	25
	0.50	21	28	28
	0.1	20	25	25
<i>Escherichia coli</i>	1.00	25	22	28
	0.75	30	24	38
	0.50	28	21	35
	0.10	20	20	40
<i>Proteus vulgaris</i>	1.00	22	25	35
	0.75	19	20	33
	0.50	15	23	32
	0.10	0	25	30

Phytochemical screening of extracts revealed the presence of sterols and triterpenes, carotenoids, alkaloids, tannins, saponins, coumarins and carbohydrates. The results were in agreement with published data in the current literature (Evans, 1989).

Some chemical analyses of the leaves have been done such as determination of ash content (0.17%), nitrogen content (10.22) protein content (63.36%), minerals and trace elements (Ca 0.946; Fe 0.0384; Mg 0.27; Mn 0.0022 and Na 0.0203) (Table 2).

Table 2. Chemical analysis of *Kigelia africana* leaves:

Item	Content (%)
1- Ash	0.1706
2- Nitrogen	10.22
3- Protein	63.36
4- Calcium (Ca)	0.946
5- Iron (Fe)	0.0384
6- Magnesium (Mg)	0.2700
7-sodium(Na)	0.0203
8-Manganese(Mn)	0.0022

Recent studies reported important uses of leaves extracts of *Kigelia africana* in complementary medicine and we recommend more studies on the leaves composition of the Sudanese varieties which are one of the best varieties in the market.

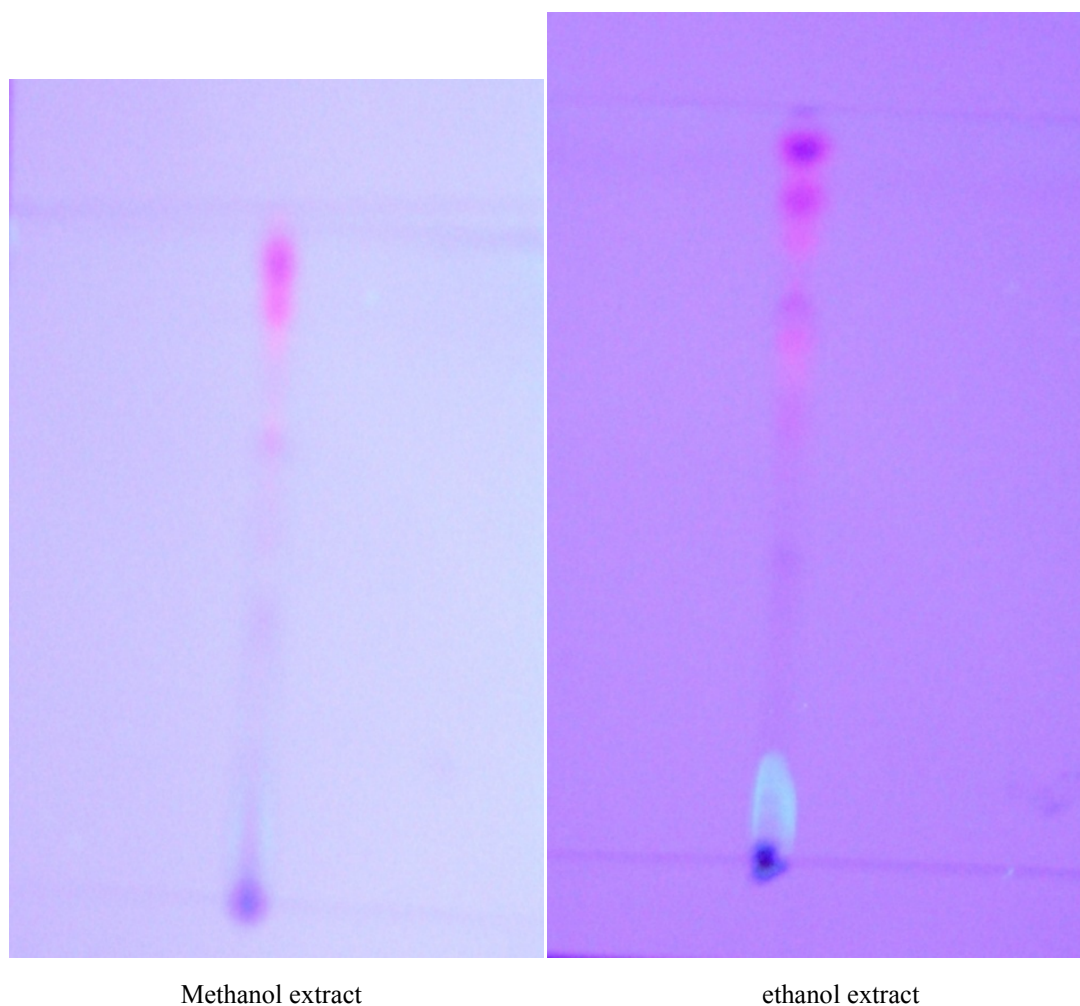


Plate (1): TLC of extract of *Kigelia africana* leaves

B: Methaolic, C: Ethanolic

Stationary phase= **Silica** gel 60 precoated plates, thikeness .20mm

Mobile phase: Toluene: Ethyl acetate : formic acid (5 : 4 : 1)

Detection: UV-light (366nm)

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