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Phytochemical Screening of Sudanese *Leptadenia pyrotechnica*, *Acacia polyacantha* and Antimicrobial Activity of *Acacia polyacantha*

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Abstract
Phytochemical screening of *Leptadenia pyrotechnica* leaves revealed the presence of alkaloids, steroids, flavonoids, carbohydrates, tannins and saponins, while phytochemical screening of *Acacia polyacantha* stem revealed the presence of alkaloids, steroids, flavonoids, carbohydrates, and saponins. Tannins and glycosides were not detected. In the antimicrobial assay the n-butanol fraction of *Acacia polyacantha* stem showed significant activity against *Bacillus subtilis* and *Pseudomonas aeruginosa*, while the ethanol extract exhibited significant activity against *Pseudomonas aeruginosa* and *Staphylococcus aureus*. The ethyl acetate fraction showed significant activity against *Pseudomonas aeruginosa.* All fractions of leaves exhibited significant activity against *Pseudomonas aeruginosa*.

Keywords: *Acacia polyacantha*, *Leptadenia pyrotechnica*, phytochemical screening, antimicrobial activity

Introduction
Acacia species find various applications in traditional medicine. Acacia is a large genus containing trees and shrubs in the family Fabaceae.
Acacia bark has been used traditionally against gonorrhea, haemoptysis and leprosy [1, 2]. *Acacia catechu* has been used in the treatment of leucorrhoea, piles, fever and diarrhea [3]. It is also used against throat infections [4]. The plant is also used against diabetes [5]. It has antipyretic and hepatoprotective properties [6, 7]. *Acacia polyacantha* is an attractive tree growing in Africa. It may reach 10-15 m in height. This tree gives gum which is used in confectionery as adhesive.
The bark is used in tanning. Root is used traditionally against snake bite [8].
Leptadenia pyrotechnica is a shrub (1.5-3m in height) in the family Asclepiadaceae [9, 10]. Some flavonoids and sugars were detected in the stem and root [11, 12]. Alkaloids were reported from the aerial parts [13], while some pregnane glycosides [14], flavonoids [15], terpenes and sterols were reported from aerial parts [14]. Three cardiac glycosides were reported from the methanol extract of the aerial parts [16]. It has been documented that the methanol extract of the aerial parts exhibited a free radical scavenging capacity [17]. The extract also showed hypolipidemic and anti-atherosclerotic effect [18]. The *in vivo* antidiabetic potential of *Leptadenia pyrotechnica* has been demonstrated [19]. It has been shown that the ethanol extract of the aerial parts exhibited antiinflammatory properties [20].

Materials and Methods
Materials
Plant material
Leptadenia pyrotechnica and *Acacia polyacantha* were collected from a forest reserve around Folla, western Sudan. The plants were identified and authenticated by The Medicinal and Aromatic Plants Research Institute, Khartoum, Sudan.

Bacterial strains
For antimicrobial screening the following standard human pathogens were used:

Gram +ve
Bacillus subtilis and Staphylococcus aureus.

Gram –ve
Escherichia coli, Pseudomonas aeruginosa

Fungal species
Candida albicans: was used for antifungal screening.

Media for bacterial culture
Mueller- Hinton agar.

Media for fungal culture
Sabouraud dextrose agar (Oxoid, England)

Methods
Phytochemical screening
Phytochemical screening of the studied plants was performed according to the method described by Harborne [21].

Antimicrobial activity
The antimicrobial activity was screened via well diffusion bioassay. An inoculum suspension was swabbed uniformly to solidify and then allowed to dry for 5 min. Cups (6 mm in diameter) were made in the seeded agar. Test sample (100 mg/ml) were added into each well on the seeded medium and allowed to stand on the bench for 1 h. and thereafter incubated at 37ºC for 24 h-for bacteria – and for four days at 25ºC for fungi. Diameters of inhibition zones were measured in millimeters. The assays were performed in duplicates and the diameters of inhibition zones were measured and averaged.

Results and Discussion

Acacia polycantha

Phytochemical screening

Phytochemical screening of *Acacia polyacantha* stem revealed the presence of the components shown in Table 1.

Table 1: Phytochemical screening of *Acacia polyacantha* stem

Sample	Alkaloids	Glycosides	Saponins	Carbohydrates	Tannins	Flavonoids	Steroids
Acacia polyacantha	+	-	+	+	-	+	+

Antimicrobial activity

Different fractions of *Acacia polyacantha* stem were assessed for antimicrobial potential against. The diameters of the growth of inhibition zones are shown in Table (2). Ampicilin, gentamycin and clotrimazole were used as positive control (Tables 3 and 4).

The n-butanol fraction showed sifnificant activity against *Bacillus subtilis* and *Pseudomonas aeruginosa*, while the ethanol extract exhibited significant activity against *Pseudomonas aeruginosa* and *Staphylococcus aureus*.

The ethyl acetate fraction showed significant activity against *Pseudomonas aeruginosa*.

Table 2: Antimicrobial activity of stem fractions

Extract	Conc.(mg/ml)	Sa	Bs	Ec	Ps	Ca
Chloroform	100	-	16	15	16	-
n-Butanol	100	-	17	15	19	-
Ethyl acetate	100	-	-	15	17	-
Ethanol	100	17	16	-	18	-

Table 3: Antibacterial activity of standard chemotherapeutic agents

Drug	Conc.(mg/ml)	Bs	Sa	Ec	Ps
Ampicilin	40	15	30	-	-
	20	14	25	-	-
	10	11	15	-	-
Gentamycin	40	25	19	22	21
	20	22	18	18	15
	10	17	14	15	12

Table 4: Antifungal activity of standard chemotherapeutic agent

Drug	Conc.(mg/ml)	An	Ca
Clotrimazole	30	22	38
	15	17	31
	7.5	16	29

Sa: *Staphylococcus aureus* Ec: *Escherichia coli*
Pa: *Pseudomonas aeruginosa* An: *Aspergillus Niger*
Ca: *Candida albicans* Bs: *Bacillus subtilis*

Different fractions of *Acacia polyacantha* leaves were assessed for antimicrobial potential. The diameters of the growth of inhibition zones are shown in Table (5). Ampicilin, gentamycin and clotrimazole were used as positive control (see Tables 3 and 4). All fractions showed significant activity against *Pseudomonas aeruginosa*, while the ethyl acetate and ethanol fractions exhibited significant activity against *Staphylococcus aureus.* The chloroform fraction showed significant inhibitory effect against *Escherichia coli*.

Table 5: Antimicrobial activity of leave fractions

Extract	Conc.(mg/ml)	Sa	Bs	Ec	Ps	Ca
Chloroform	100	-	-	26	21	-
n-Butanol	100	-	-	-	20	-
Ethyl acetate	100	19	-	-	22	-
Ethanol	100	19	16	-	20	-

Leptadenia pyrotechnica

Phytochemical screening

Phtochemical screening of *Leptadenia pyrotechnica* leaves revealed the presence of the components shown in Table 6.

Table 6: Phytochemical screening of *Leptadenia pyrotechnica* leaves

Sample	Alkaloids	Glycosides	Saponins	Carbohydrates	Tannins	Flavonoids	Steroids
Leptadenia pyrotechnica	+	-	+	+	+	+	+

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