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Full Length Research Paper

Properties of two local herbs on the causative organism of staphylococcal scalded skin syndrome (SSSS)

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ABSTRACT

The antimicrobial activities and phytochemical screening of two local herbs: *Schwenkia americana* and *Vitellaria paradoxa* was investigated against the causative agent by staphylococcal scalded skin syndrome (SSSS). The ethanol, ethyl acetate and aqueous extracts of the plants were investigated against *Staphylococcus aureus*. The ethanol extract of *Schwenkia americana* and *Vitellaria paradoxa* showed the highest zones of inhibition (24±1.19mm) at 100mg/ml. The phytochemical screening of the two plants revealed the presence of flavonoids, tannins, alkanoids and saponins. Antimicrobial activities against the test organism revealed the organism to be resistant to most of the antibiotics discs used except Gentamycin and Ciprofloxacin.

Keywords: Antimicrobial activities, phytochemical screening, schwenkia species, vitellaria species, antibiotics, steroids, argemone species.

INTRODUCTION

The use of plants (herbs) in the treatment of disease is as old as mankind (Hang Sean – Kim, 2005) In Nigeria. Indigenous people traditionally use a wide range of plants as food and medicine (Edeoga and Osawe, 1996). These plants constitute great reservoir of a wide variety of compound which exhibits some medicinal and nutritive properties, this are used as food or medicinal plants. Many of these indigenous plants contain phytochemicals that show physiological activities against microorganisms (Brouwer *et al.*, 2007). In recent times, increase in antibiotic resistance of clinically important pathogens have led to a desperate search for alternatives to these antibiotics.

Vitellaria paradoxa (shea butter) is used traditionally as balm for rheumatic, pains, dislocation, swelling, bruises and skin problems. It is also used as cosmetics (Anon, 2007). *Argemone mexicana* belong to the family Parnpaveracea it is used traditionally in the treatment of tooth ache and coughs. It was also considered as astringent, antispasmodic, aphrodisiac, diaphoretic,

expectorant, hypnotic and sedatives. It is also used as analgesics, anti diarrhea, anti tussives. The drug derived from this plant can be addictive with toxicological effects. The present study investigated the anti microbial properties of two medicinal plants used in traditional medicine in Nigeria; the chemical composition of the plants was also investigated to confirm their medicinal values.

MATERIALS AND METHOD

Plant sampling

Fresh leaves of *Vitellaria paradoxa* and *Argemone mexicana* were obtained from the private garden of a traditional herbalist in Ibadan, Oyo state, Nigeria, and authenticated at the herbarium unit of the department of plant science and forestry; University of Ado- Ekiti, Nigeria and voucher specimen were deposited at the unit.

Collection of test organism

Clinical strain of *Staphylococcus aureus* was obtained from the culture bank of the Obafemi Awolowo University

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Table 1. Antibacterial activities of the test plants on staphylococcus aureus

Test plants	Test Organisms	Diameter zones of inhibition (mm).																				
		100mg/ml			90mg/ml			80mg/ml			70mg/ml			60mg/ml			50mg/ml			25mg/ml		
		EE	EA	AQ	EE	EA	AQ	EE	EA	AQ	EE	EA	AQ	EE	EA	AQ	EE	EA	AQ	EE	EA	AQ
<i>Vitellaria paradoxa</i>	<i>Staph aureus</i>	24	22	20	22	18	18	18	17	16	15	14	12	14	-	-	10	-	-	-	-	-
<i>Argemone mexicana</i>	<i>Staph aureus</i>	20	-	-	20	-	-	16	-	-	14	-	-	-	-	-	-	-	-	-	-	-

Key – means no activity.

Table 2. Phytochemical screening of test plants

Plant samples	Flavonoids	Glycosides	Tanins	Alkaloids	Saponin	Steroid	Phlo
<i>Vitellaria paradoxa</i>	+	+	+	+	+	-	-
<i>Argemone mexicans</i>	+	-	+	+	+	-	-

Teaching Hospital Annex, Ilesa. Nigeria. The bacterium was maintained of culture slant of nutrient agar. The organism was stored at +4°C until required for use.

Preparation of Extracts

Twenty grams of dried plant powder were suspended in 100ml of 95% ethanol, ethyl acetate and distilled water in 250ml flasks for 120h at 27°C to obtain aqueous extract. Thereafter, the extracts were filtered through Whatmann No1 filter paper after which the extracts were evaporated to dryness in a fume cupboard. The extracts were reconstituted in 50% Dimethyl sulphoxide.

Antibacterial Susceptibility test

The agar diffusion technique as described by

Mitscher *et al*, (1992) was employed. Sterile nutrient agar (NA) contained in Petri dishes were inoculated with the standardized bacterial inocula using sterile cotton swabs. Wells of 9mm diameter were cut and filled with 1ml of each extract at concentrations ranging from 25mgml⁻¹ to 100 mgml⁻¹. Fifty percent Dimethyl sulphoxide was used as control. The extracts were allowed to diffuse into the medium for 1hr after which the plants were incubated at 37°C. The zone of inhibition was measured in mm after 24hr. The antimicrobial test of conventional antibiotics against test organisms was carried out using the method of Cheeseborough (2004).

Phytochemical Screening

The methods of Sofowora (2005) and Obdoni and Ochuko, (2001) were used in the screening of the plants extracts for phytochemicals such as

flavonoids, glycosides, tannins, alkaloids, saponins, steroids and phlombatanins.

RESULT

Ethanol extracts of the plants studied showed appreciable antibacterial activities against the test bacterium.

Aqueous extracts and ethyl acetate extracts of *Argemone mexicana* showed no activities against *Staphylococcus aureus*, however, ethanol extract of both plants were active against the test organisms at concentrations as low as 50mg/ml of *Vitellaria paradoxa* and at 70mg/ml of *Argemone mexicana* (Table 1).

In the phytochemical screening of the plants, glycosides, steroids and Phlombatanin were not detected in *Argemone mexicana* while *Vitellaria paradoxa* had all the phytochemical constituents tested for except steroids and Phlombatanin (Table 2).

DISCUSSION

This study has demonstrated that the ethanol extracts of the plants were more potent against the test organisms than aqueous extract and ethyl acetate extract (Table 1). This indicates that ethanol was a better extraction solvent than the other solvents. In addition, *Vitellaria paradoxa* showed better activity than *Argemone mexicana*. However, both plants showed activity against the test organisms although the aqueous extracts and ethyl acetate extract showed reduced or no activities against the test organisms. This could be that these solvents cannot extract the active components of the plants Mbata and Salkia (2008) reported that zones of inhibition decreased with decrease in concentration, this explains why activity decreased with decrease in concentration of the extracts.

The Phytochemical screening revealed the plants to contain flavonoid, Tannin, Alkaloid and Saponin while Glycoside present in *Argemone mexicana* was not observed in *Vitellaria paradoxa*. Flavonoid has been reported to be used in medicine as antimicrobial, antiinflammatory and antioxidant (Philison, 2001). Alkaloid has been found useful in the treatment of bruises and superficial wound, it has also been found to interfere with cell division in micro organisms (Kumar *et al*, 2007). The presence of these phytochemicals is possibly responsible for the activities of the plants used in this study. The use of plants as medicine to cure illness and to lubricate the wheels of social interaction at the interpersonal level is a behaviour that predates civilization. It is therefore a duty to continue investigation into the use of plants in preparing drugs especially in the face of increasing threat of resistant disease causing microorganisms.

The antimicrobial testing using conventional antibiotics showed that the test organism was resistant to most antibiotics confirming the emergency of resistant strains of this organism (Mbata and Salkia, 2006). Further investigation into this work could be carried out using these plants as alternative anti microbial to otherwise ineffective antibiotics.

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