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PRELIMINARY ANTIBACTERIAL SCREENING OF A TRADITIONAL MEDICINAL FORMULATION USED AS MEDICINE IN SOKOTO, NIGERIA

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ABSTRACT

The antibacterial activity of a traditional medicinal formulation also called "komi da ruwanka" used in the treatment of diseases was carried out using the agar well diffusion. The formulations sampled from three different locations exhibited a significant ($P<0.05$) antibacterial activity against *Staphylococcus aureus*: (SOK_1 15.67 ± 0.67, SOK_2 15.00 ± 0.58 and SOK_3 15.00 ± 0.58) while there was no significant ($P>0.05$) antibacterial activity on the other isolates used (*Bacillus subtilis*, *Escherichia coli, Salmonella typhi and Shigella flexnerii*).

INTRODUCTION

The use of medicinal plants to treat human diseases has its roots in pre-historical times (Girish and Satish, 2008). Different parts of the plants such as roots, bark, flowers and seeds are extracted and used as drugs for a variety of medical conditions (Werner *et al.,* 1999). Plants used for traditional medicine contain a wide range of substances that can be used to treat chronic as well as infectious diseases (Evans *et al.,* 2000). Medicinal plants represent a rich source from which antimicrobial agents may be obtained. The antimicrobial activities of plant extracts are related to compounds known as secondary metabolites (Hashim *et al.*, 2010). The beneficial medicinal effects of plant materials typically results from the combinatination activity of the secondary products present in the plants. These secondary products include alcohols, phenols, glycosides, tannins and saponins which are capable of producing definite physiological action on the body (Ghani, 1999). Over the past twenty years, there has been a lot of interest in the investigation of natural materials as sources of new antimicrobial agents (Periyasamy *et al*., 2010). Different extracts from traditional medicinal plants have been tested. Many reports have shown the efficacy of traditional herbs against microorganisms (Samy and Igncimuthu, 2000). The increasing interest in alternative medicine may lead to discovery of new therapeutic agents. The objective of this research was to evaluate the potential of a traditional medicinal formulation on standard bacterial strains.

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MATERIALS AND METHODS

Collection of samples

Samples of the popular traditional medicinal preparation were bought randomly from traditional drug vendors in Sokoto. A total of nine samples were gotten and the bottles of the samples were labeled and transported to the Microbiology laboratory of Usmanu Danfodiyo University, Sokoto for analysis.

Test microorganisms for study

Bacterial cultures of *Escherichia coli*, *Bacillus subtilis*, *Staphyloccus aureus*, *Shigella flexnerii, Salmonella typhi* were obtained from the microbiology laboratory of Usmanu Danfodiyo University Sokoto and used for antimicrobial assay. The bacterial cultures were checked for viability and maintained on nutrient broth at 37^0C. The bacterial isolates were identified and characterized according to standard biochemical methods.

Media used

Nutrient agar (Lab M, International Diagnostic Group (IDG) PLC) and Mueller Hinton agar (oxoid) were used for isolation and microbiological screening. All media were prepared according to the manufacturers' specifications.

Antibacterial assay of samples

Antibacterial activity of the formulation was determined by standard agar diffusion method as described by National Committee for Clinical Laboratory Standard (NCCLS, 1993). Molten Sterile Mueller Hinton agar was poured into sterile plates and allowed to set before being dried in oven. A sterile cork borer was used to make wells (6mm in diameter) into the agar. A 24 hour broth culture of the test organisms was adjusted to 0.5 MacFarlard standard and sterile cotton Swab was used to inoculate the bacterial suspension by streaking onto the agar. About 2ml of the formulation was poured into the wells and allowed to set. Standard antibiotic (tetracycline 10mg/ml) was used as positive control. Incubation of Petri plates was at 37^0C for 24hours after leaving them for 1 hour to enhance diffusion. The assessment of antibacterial activity of the formulation was based on measurement of the diameter of zone of inhibition formed around the well (Hugo and Russell, 1998).

Statistical Analysis

All analyses were carried out in triplicate and the result expressed as mean standard deviation.

RESULTS

The result of the antibacterial activity of the samples is presented in Table 1. The samples had a higher inhibitory activity against *S. aureus* with the highest activity of 16.33mm zone of inhibition using the agar well diffusion method. However, there was no significant difference ($p>0.005$) between activity of the formulation from all locations. There was significant difference ($p<0.05$) between the antibacterial activity of the samples on the other isolates tested as compared with *S. aureus*. *E. coli* was the least susceptible (11.67mm) to the samples although there was no significant difference ($p>0.005$) between the activities on *S. typhi, S. flexnerii* and *B. subtilis*.

Table 1. Result of antibacterial activity of samples SOK_1, SOK_2 and SOK_3

	Location		
Bacteria species	SOK_1	SOK_2	SOK_3
B. subtilis	$12.33^b \pm 0.88$	$12.33^b \pm 0.33$	$12.33^b \pm 0.33$
S. aureus	$15.67^a \pm 0.67$	$15.00^a \pm 0.58$	$16.33^a \pm 0.33$
S. flexnerii	$13.33^b \pm 0.67$	$13.00^b \pm 0.58$	$12.67^b \pm 0.33$
S. typhi	$12.33^b \pm 0.88$	$11.67^b \pm 0.33$	$12.00^b \pm 0.58$
E. coli	$11.67^b \pm 0.44$	$11.67^b \pm 0.44$	$11.83^b \pm 0.17$

[a,b,c] Means in a column with the same superscripts are not significantly different (P>0.05)
Values are mean ± standard error of three replications

Key :
SOK_1 =Sample from location1
SOK_2 =Sample from location 2,
SOK_3=Sample from location 3

DISCUSSION

The result of antimicrobial activity of the formulations against the isolates used in this study indicates that *S. aureus* was the most responsive to the formulations. This could be attributed to the fact that all the organisms tested were clinical isolates, which in general have been found to be more resistant to antibacterial agents than non clinical isolates (Lancing *et al*., 1999). This result does not correspond to that of Muhammad, (2008) who reported that the formulation was most active on *S. paratyphi* and *S. typhi*. This implies that the formulation is suitable for infections caused by *S. aureus* thereby confirming the claims of it producers that the formulation is effective for the treatment of skin infections.

Conclusion

The antimicrobial efficacy of "komi da ruwanka" against *Staphylococcus aureus* gives support to their traditional use for treating skin conditions in humans which seems promising for treatment .The results afford background information for the potential use of "komi da ruwanka" in staphylococcal skin infections.

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