

Phytochemical Analysis and Antimicrobial Screening Of *Moringa Oleifera* Leaves Extract

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-----ABSTRACT-----

Moringa oleifera having been used as medicinal plant was subjected to soxhlet extraction and the extract was used to find the antimicrobial analyses. The result showed that ethanol extract inhibits the action of *staphylococcus aureus* 9mm, *Escherichia coli* 4mm, *salmonella tiphy* 6mm, *mucor* 3mm, and *candida albican* 3mm. *N-hexane* extract inhibits *salmonella tiphy* 4mm, *mucor* 2mm, *candida albican* 2mm, while it had no action on *staphylococcus aureus* and *Escherichia coli*. Ethyl acetate possess the highest zone of 10mm in *staphylococcus aureus* and *salmonella tiphy* followed by *E. coli* 8mm, *candida albican* 4mm, and *mucor* 2mm. Phytochemical analysis showed the presence of tannins and alkaloids in all the three extracts, phlobatannins were found to be present only in *n-hexane* extract, while they were absent in both ethanol and ethyl acetate extracts, also saponins and phenols were present in both ethanol and ethyl acetate extracts and absent in *n-hexane* extract. The quantitative analysis were found to be: tannins (8.22%), saponins (1.75%), alkaloids (0.42%) and phenols (0.19%). *Moringa oleifera* could be used in curing many diseases like typhoid fever, diarrhoea, high blood sugar, hypertension, gastro intestinal disorder. It is advised that this plant be utilized in cooking and making other formulations that are edible.

KEYWORDS: screening, antimicrobial, medicinal ,extract.

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I. INTRODUCTION

For centuries, many plant compounds have an outstanding role in medicine. Their pharmacological and economical values have lost nothing to its importance until date. They are either used directly or after they have been subjected to certain chemical modification processes. These plants which are medicinal in nature however contain physiological active principles ,that over the years have been exploited in ayurvedic medicines for the treatment of various ailments. The primary benefit of using plants derived medicines is that they are relatively safer than synthetic alternatives. The prevalence of bioactive principles such as tannins, terpenoids, flavonoids, alkaloids, steroids etc. underscores the needs for continuous search for bioactive and active ingredients extracted from plant, though some of the active ingredients of crude extracts become obsolete because of the drug resistant problems (Newall et al, 1996). Most of the drugs employed in the treatment of human ailments are obtained by extraction, either by infusion, using water, natural gin of local wine as solvents (Acharya et al, 2008). However, it is important to make a good selection of solvent in the study of activities of plant constituents or active ingredients. In recent days, scientific and technological advancement have made it possible in the investigation of a large number of medicinal plants by employing a systematic screening method using chromatographic techniques and spectroscopic techniques to establish the actual effects (Harbone J.B, 1998). *Moringa oleifera* belongs to the family *moringaceae*, it is the most widely cultivated member of the specie *morina*. The plant is highly nutritional and medicinal. The natural medicine compounds present in the leaves of the *moringa* plant have been proven to reduce the incidence of tumors in laboratory animals (Bharali et al, 2003). Thus the quest for metabolites which help to cure many diseases and ailment of man and give a healthy living prompted a research into this study.

II. MATERIALS AND METHOD

Sample collection and pretreatment

The fresh leaves of *moringa oleifera* plant was collected from Mbara Ala in Ihiala Local Government Area of Anambra State, Nigeria. The plant was identified and authenticated by Mr. C.J. Ukpaka of Biological Science Department Anambra State University, Uli. The leaves were air dried at room temperature and milled with the aid of grinding machine.

Soxhlet extraction

The extraction process was carried out using soxhlet extraction method. 50g each of the plant material was weighed into three different reflux apparatus set up, containing 300ml of three different solvents which include; n-hexane, ethanol and ethyl acetate. The electronic hot plate set according to the boiling point of each solvent. The extraction process was carried out between 8-9hours until the extraction was completed [the refluxing solvent became clear]. The extract was collected by evaporating the solvent using rotary evaporators, which was further poured into an air tight container.

Phytochemical Analysis

The phytochemical analysis was carried out qualitatively and quantitatively using different standard methods in order to establish the secondary metabolites present in the sample such as alkaloids, tannins, saponins, phenols and phlobatannins. The strains of micro organisms used for the experiment were staphylococcus, escherichia coli, and salmonella for bacteria, candida albican and mucor for Fungi. The strains of the organisms were collected from the microbiology department of the Federal Medical Centre, Owerri. The antimicrobial activities of the different extracts were determined by Agar - Well Diffusion Method (Anon, 1996). The antifungal activity was determined using Disk Diffusion Method.

III. RESULT AND DISCUSSION

TABLE 1: THE RESULT OF QUALITATIVE ANALYSIS OF MORINGA OLEIFERA LEAVES.

Constituents	Solvents		
	Ethanol Extract	N-hexane Extract	Ethyl acetate Extract
Tannins	+	+	+
Alkaloids	+	+	+
Phlobatannins	-	+	-
Saponins	+	-	+
Phenols	+	- ve	+

+ Represent present.

- Represent absent.

TABLE II: THE RESULT OF QUANTITATIVE ANALYSIS OF THE PHYTOCHEMICAL COMPOUNDS PRESENT IN THE LEAF EXTRACT OF MORINGA OLEIFERA

Phytochemical compound	Quantity in percentage (%)
Phenols	0.19
Alkaloids	0.42
Tannins	8.22
Saponins	1.75

TABLE III: THE RESULT OF ANTIMICROBIAL ACTIVITIES OF THE LEAF EXTRACTS OF MORINGA OLEIFERA

Micro organisms	Zone of inhibition (mm)		
	Ethanol Extract	N-hexane Extract	Ethyl acetate Extract
Staphylococcus aureus	9mm	NA	10mm
Escherichia coli	4mm	NA	8mm
Salmonella tiphy	6mm	4mm	10mm
Mucor	3mm	2mm	4mm
Candida albican	3mm	2mm	4mm

NA = No action

IV. DISCUSSION

The phytochemical analysis carried out on moringa oleifera leaves showed the presence of tannins, saponins, phenols, alkaloids, and phlobatannins as the major secondary metabolites present in the plant's leaf as showed in Table 1. Alkaloids can be used in the treatment of malaria, cold, cough, hypertension, diabetes and cancer (Akpuka M.U, 2009). Phenols are used as an antiseptic for surgical instruments, as an oral analgesic, in the production of drugs, in cosmetics, to embalm bodies etc.

The quantitative analysis showed that the presence of tannins and saponins are in appreciable quantity as showed in the Table II of the result and these metabolites can as well be isolated in pure form. Their values were: tannins (8.22%), saponins (1.75%), phenols (0.19%) and alkaloids (0.42%). The major activity of medicinal plant against ailments is a function of the amount of phytochemicals it can produce and as such would produce definite physiological actions in the human body system. Tannins are used as astringent medicine for the treatment of intestinal disorder, such as dysentery and diarrhoea and it occurs in high percentage. They also react with protein to form stable crosslink polymers, which transforms animal skin into leather. They are useful in the food processing, fruit ripening, manufacture of cocoa and wines. Saponins are used medically for the treatment of increased blood cholesterol and are beneficial to patients with arteriosclerosis and hypertension and in the control of post menopausal syndrome (Akpuaka M.U, 2009). Table III showed the antimicrobial sensitivity test of moringa oleifera leaf extract against species of bacteria that the extracts exhibited antimicrobial activity against staphylococcus aureus, escherichia coli, salmonella typhi (bacteria), candida albican, mucor, (fungi). It can be seen that extracts possessed a broad range of activity with the highest zone of 10mm with ethyl acetate. Ethanol extract showed (9mm) with staphylococcus (9mm), E. Coli, 4mm, salmonella typhi 6mm, mucor 3mm and candida 3mm. The n-hexane extract has no zone of inhibition (activity) with staphylococcus aureus and escherichia coli, but showed zone of inhibition with salmonella typhi 4mm, Mucor 2mm, and Candida 2mm. The ethyl acetate extract has its zone of inhibition on all the organisms with staphylococcus aureus and salmonella typhi having the highest zone of 10mm, followed by escherichia coli 8mm, candida albican and mucor have the least zone of inhibition of 4mm. This indicates that the activity of the extract is influenced by the solvent used for the extraction. Escherichia coli is the pathogenic organism responsible for the intestinal disorder, gastroenteritis, meningitis. Salmonella typhi is the causative organism for typhoid fever, food poisoning, pneumonia, toxic shock syndrome and scalded skin while mucor is responsible for zygomycosis, allergis, otomycosis and candida albican causes candidiasis, vaginitis and thrush. This proves that moringa oleifera leaves could be used in the treatment of infection caused by such pathogens as staphylococcus, aureus E. coli, salmonella typhi, candida albican and mucor.

V. CONCLUSION

Moringa oleifera is indeed a very useful breakthrough in the demand of alternative natural medicine for the treatment of various disease activities by pathogenic organisms. This is proved by the good antimicrobial activity and the presence of secondary metabolites showed by the leaf extract. Therefore the plant could be used in the treatment of typhoid fever, diarrhoea, stomach ulcer, tumors, post menopausal syndrome, arteriosclerosis, control of blood sugar level, as anti-inflammatory drugs, gastrointestinal disorder, anti-oxidant, cancer, diabetes etc.

VI. RECOMMENDATION

These findings support the fact that *moringa oleifera* appears in the hierarchy of the medicinal plants used for the treatment of microbial infections. Because of the antimicrobial activity and the phytochemical content of *moringa oleifera*, it is recommended that the plant should be used in the manufacture of antimicrobial drugs. *Moringa oleifera* is ranked among many tribes in Nigeria and the world at large for the treatment of infections caused by micro organisms.

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