

ANTIMICROBIAL PROPERTIES OF CASHEW LEAF EXTRACT AGAINST THE CLINICAL ISOLATES OF *ESCHERICHIA COLI* AND *STAPHYLOCOCCUS AUREUS* FROM WOUND AND UTI PATIENT

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ABSTRACT

The plant extract of *Anacardium occidentale* plant leaves have very good antibacterial properties. Cashew leaf extracts inhibited the growth of *Staphylococcus aureus* and *Escherichia coli* in wound and urinary tract infection patients, respectively. The various form of the leaf was used like direct leaf extract , sun dried leaf and oven dried leaf with the solvent ethanol. The biochemical test, agar well diffusion, disc diffusion method, and minimum inhibitory concentration were used to determine the antibacterial activity of *Anacardium occidentale* leaf extracts. The activity was analyzed by using paper disc diffusion method at different concentration of the extract. Although all form of leaf extract like direct leaf , sun dried leaf and oven dried leaf with ethanol as solvent were active against all strains, More effective against in the direct extract of leaf in *Staphylococcus aureus* and *E. coli*. The antimicrobial activity due to presence of ancardic acid ,flavonoids and tannins.The largest zone of inhibition on the two test organisms, measuring 3.5mm and 5.1mm . These findings suggest that *Anacardium occidentale* could be an effective treatment for infections caused by the test organisms.

KEYWORDS: *Anacardium occidentale*, antibacterial property, ancardic acid,tannins, flavonoids,*S.aureus*,*E.coli*.

INTRODUCTION

The medium-sized cashew tree is a tropical tree that is often planted for its fruit and pseudo-fruit.The cashew tree f qualities broaden their use in the medical industry. Cashew nut liquid (CNSL), obtained from the

seed coat irst came to India four centuries ago

fantastic source of extremely resistant acids and alkalis as well as unsaturated long chain phenols. These resins are suitable for the agricultural area because of their resistance to termites and insects. The antibacterial in isteam extraction,

or heat extraction, has made significant contributions to industry.Cashews are a priceless edible nut that yields two different types of oils.

Staphylococcus mutans, *Staphylococcus aureus*, *Escherichia coli*, *Enterococcus faecalis*, and *Candida albicans* can all have their growth

States where it grows. The tree can reach a height of 6 to 12 meters.A doublewa-ruit with a hard epicarp, a toxic mesocarp, and a thin endocarp, the ture fruit is a nut.The elliptic shape and spiral arrangement of the leaves.

The cashew apple, a pseudo-fruit with a testa and a pear or apple shape, is an edible

inhibited by the leaves. The antibacterial activity of several edible portions revealed that cashew leaf extract was more effective against *Escherichia coli* and *Staphylococcus aureus* than rumfu, madachi, and hararrabi leaf extracts (*Cassia goratensis*, *Khaya senegalensis*, and *Boswellia dalzielli*). Medicinal plants are believed to be an important source of new chemical substances with potential therapeutic effects (Oyesomi and Ajao et al., 2011).

The Anacardic acid, flavonoids, and tannins are phytochemicals that are present in cashew extracts that are responsible for the anti-microbial activities of the extract by inactivating microbial adhesions enzymes cell envelop transport cells. Flavonoids are also responsible for inhibiting DNA gyrase, which prevents DNA synthesis, and phenolic compounds like anacardic acids, cardols, triterpenoids, methylcardols, xanthoprotein.

The extract of the apple and the stem of cashew have inhibitory effect on the causative agent of urinary infection, it is evident that the extract will be useful in treating the infection. Medicinal plants has increased tremendously especially on their effects on human beings (Ojezele et al., 2013). The bark, leaf, nut, fruit apple and the extracts from these plant parts have been used medically (Ijeh et al., 2010).

at 37°C for 24h to observe the zone of inhibition on the test organisms.

Antimicrobial discs from the extract were prepared by perforating paper disc of 8mm diameter

and autoclave at 121C for 15 min. The Disc were there after impregnated with 0.5 ml of the aqueous plant extract .Threeformat.They are direct participation ,sun dried and oven dried

Antimicrobial susceptibility testing ; The antimicrobial capability of the extract on the selected pathogen of clinical importance was determined by the disc diffusion technique (Obob and Abulu et al., 1997).

component of the fruit plant. Due to its distinct chemical characteristics, cashew nut shell liquid is a prominent byproduct of the processing

The anti-microbial activity of the cashew leaf extract has been documented by several researchers (Omojasola and Awe et al., 2004; Agedah et al., 2010; Ifesan et al., 2013)

MATERIAL AND METHODS

Collection of specimens: The *A. occidentale* leaf rinsed with tap water and dried in the sun. Using a mortar and pestle, the dried leaves were ground into a fine powder. After washing the leaf, some of them were ground. A few leaves were baked dry before being ground into a fine powder. All of the glassware rinsed in water and let to air dry. To eliminate the infected bacteria, that was then autoclaved.

The leaf extract was produced using the ethanol extraction method, which involved soaking 10g of the plant material in a conical 50ml of 70% ethanol for 50 minutes. The combination stood for 24 hours at room temperature. Use of a muslin cloth to filter. The filtrate was then evaporating in a water bath.

Then organisms were streaked in the selective medium of the organisms and incubated at 37°C for 24 hrs and observe the morphology of the Proskauer's catalase and urease test but negative result in oxidase, indole and citrate utilization test. The TSI shows A/A no H₂S production. Organisms media for *E. coli* and *Staphylococcus aureus* is Eosin methylene blue agar (EMB agar) and Mannitol salt agar (MSA) respectively.

The medium used is the general purpose medium, Nutrient agar. Stock culture of *E. coli* and *S. aureus* were obtained. These organisms were maintained in nutrient agar slant or broth at 4°C in the refrigerator. Then proceed the gram staining and biochemical test (indole test, methyl red test, Voges-Proskauer's test, citrate utilization test, catalase test, oxidase test, triple sugar ion agar test and urease test) for the identification

The bacterial strains were swabbed on Muller Hinton agar plates. The disc impregnated with the extract were transferred to the plates with the sterile and sufficiently spaced on the medium. The plant were then incubated at 37°C for 24h to observe the zone of inhibition produced by the plant extract. This was carried out on all the test organisms using the Kirby – Bauner’s paper disc diffusion technique (Prescott et al., 1996).

RESULT AND DISCUSSION

The gram staining of *E. coli* and *Staphylococcus aureus* was gram negative rod and gram positive cocci respectively. The biochemical test of *E. coli* shows that the positive result in indole and methyl red test but negative result in oxidase, voges prskauer, simon citrate and urease test. The TSI test shows A/A with gas and no H₂S.

The biochemical test of *S. aureus* shows positive result in methyl red test, voges

Penicillin was better growth retardant even while the extract from *A. occidentale* inhibits the development of the test organisms *E. coli*, *S. aureus* the commercial antibiotic. The morphological properties of the isolated colonies were identify them using gram stain

plates with the sterile and sufficiently spaced on the medium. The plant were then incubated

E. coli in EMB agar produce green metallic sheen. *S. aureus* in MSA agar produce golden yellow colonies.

Zone of inhibition were seen 24 hours after the injection at a constant 37°C. These zone appeared more clearly in *S. aureus* containing plate than in the *E. coli* containing ones. Penicillin is a better growth retardant even while the extract from *A. occidentale* inhibits the development of the test organisms, *E. coli* and *S. aureus*.

The leaves of the cashew plant, *A. occidentale*, was sensitive to both the test organisms, *E. coli* and *S. aureus*. This resulted in inhibition zones developing in the various mediums on the inoculation plates. Zones of inhibition were more pronounced on plates containing *S. aureus* than on those containing *E. coli*, showing that *S. aureus* is more sensitive to the extract than *E. coli*.

The morphological properties of the isolated colonies were identify containing ones.

S. aureus is a Gram +ve organism, whereas Gram -ve organisms do not have an outer membrane in their cell walls; this outer membrane may be the cause of the difference in these organisms’ sensitivity levels to the crude plant extract of *A. occidentale*. This might be because the outer

Table 1; Zone of the inhibition of the plant extract on test organisms (mm)

Test organisms	Direct participation	Sun dried	Oven dried
Escherichia coli	3.5	3.1	2.8
Staphylococcus aureus	5.1	4.5	3.3

Table 2 ; A comparison of the zone of inhibition of the plant extract and penicillin on the test organisms (mm)

Test organisms	Plant extract	Commercial antibiotic Penicillin
Escherichia coli	3.5	2.4
Staphylococcus aureus	5.1	3.9

CONCLUSION

This study emphasizes the cashew leaf extract’s antimicrobial properties. Traditional healers have used this plant to treat wound infections and urinary tract infections because to its exceptional anti-Staphylococcus aureus activity when compared to E. coli in the direct leaf extract

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