REVIEW ON SCREENING OF ANTIMICROBIAL COMPOUNDS IN MEDICINAL PLANTS

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Abstract- **The antibacterial activity of various solvents is extracted by Invitro method. The extraction of *Aloe vera, Punica granatum, Azadirachta indica and Acalypha indica* was taken and was assessed against gram positive bacteria *S. aureus*. The solvent used for extraction was assessed against the organisms using agar well diffusion method and zone of inhibition was determined. In contrast, water extracts did not hinder the growth of tested bacteria. While testing the solvent with *S. aureus* the methanol and ethanol exaction has shown more capability on exertion inhibitory activity. This review conclude that the final results showed that the result obtained from both agar diffusion method and inhibitory concentration test more over the same was reported in the paper.**

Keywords: **Antibacterial activity, zone of inhibition, *Aloe vera, Punica granatum, Azadirachta indica, Acalypha indica***

INTRODUCTION

A significant global threat to public health and modern medicine has been the emergence of antibiotic resistant bacterial strains in recent years. The *Staphylococcus aureus* bacteria often found on skin and mucous membranes of humans and animals has developed resistance to multiple antibiotics, including methicillin-resistant *Staphylococcus aureus* (MRSA). As a result of this development, alternative strategies for combating bacterial infections are increasingly needed.

The therapeutic properties of medicinal plants, including antimicrobial activity, have been used for centuries in traditional medicine systems [1]. The phytochemical diversity of these plants could provide new antibacterial compounds that could be harnessed to counteract antibiotic resistance [2] [3]. Therefore, screening medicinal plants for their antibacterial potential against *S. aureus* have become a significant topic of natural product research in recent years.

In order to screen medicinal plants for antibacterial compounds, bioactive constituents are extracted from the plants using different solvents. The inhibitory effects of these compounds *on S. aureus* are then assessed using well-established bioassay methods [8] [9]. Furthermore, the screening of antibacterial compounds in medicinal plants against *S. aureus* can
contribute to the conservation of traditional knowledge [4]. This can help to ensure that knowledge is shared and used for society's benefit. This type of screening can provide an alternative to traditional antibiotics and reduce antibiotic resistance risk. Promote plant resource sustainability by identifying plants with significant antibacterial potential [15], it becomes possible to prioritize conservation efforts and establish strategies for their cultivation and sustainable harvesting.

BACKGROUND OF STUDY:

Currently in developing countries, low income people such as farmers, and people living in small villages uses folk medicines for curing infectious diseases. For infections and health issues, plants are ingested as decoctions and consumed through tea, coffee, juices, etc. They have applied these poultice (plant extracts or these medicinal valued plants) directly on the wound and It was cured faster than the modern medicines. When people from tribal community get a disease they were treated by folk medicines by shamans or natural healers. These people have expertise in making diagnosis making herbal medicines and treating wounds. They also claim that their medicines are cheaper and effective. These people treated by the healers does not have a chance of causing nosocomial infections.

The best way to prevent antibiotic resistants of infectious species are trying a new compound from unfamiliar antimicrobial agents. We chose 4 species (*Aloe vera, Punica granatum, Acalypha indica and Azadirachta indica*) used in folk medicines by ancient people to determine the microbial activity *Azadirachta indica* was identified to fight against fever and diabetes. *Aloe vera* also used to resist many infections caused by *S. Aureus*.

This review article explores the antimicrobial properties of four different plant extracts commonly used as traditional medicines in Nepal. The extracts were tested against twelve pathogenic microorganisms and two reference bacterial strains. The results showed that most of the extracts exhibited antimicrobial properties, with the highest potential observed in the extract of *Oxalis corniculata* against several bacteria [3].
The paper investigates the antibacterial and antifungal activity of *Aloe vera* plant extract against various pathogens. The study shows that *Aloe vera* has potential as a natural and safer source of antimicrobials. The results indicate that the extract has varying degrees

of inhibition of growth of the used bacterial and fungal pathogens. The study explores the antimicrobial properties of *Aloe vera* extract, which contains saponin, tannins, alkaloids, lactine, and anthraquinones. These compounds have been shown to have antibacterial and antifungal properties [7]

This research article investigates the antibacterial activity of methanol extracts of three medicinal plants (*Lawsonia inermis, Azadirachta indica, and Achyranthus aspera*) against selected bacteria isolated from wounds of lymphoedema patients. The study found that the methanol extract of *L. inermis* leaves showed high activity against all tested bacterial species, which was comparable to standard drugs. The extracts of *A. indica* showed activity against all tested species, though at higher concentrations, and higher activity was recorded against *Streptococcus pyogenes* isolates at all concentrations [10]

Based on the given subsection, the study explored the use of *Aloe vera and Azadirachta indica* (Neem) as antibiotic replacers and immune enhancers in the brooding management of *Nicobari fowl*. The results showed that the herbal supplementation improved body weight and feed conversion efficiency, and also enhanced the antibody response in the treated groups. The study suggests that *Aloe vera* and Neem could be potential alternatives to antibiotic growth promoters during the brooding period of birds [11].

The article provides a comprehensive review of the pharmacological uses and phytochemicals of *Punica granatum* (pomegranate) peels and seeds. The article discusses the antioxidant and antibacterial properties of the plant, as well as its potential therapeutic uses in treating cardiovascular disease, diabetes, dental conditions, and protection from ultraviolet radiation [6]

METHODOLOGY

Plant Materials:

Plant materials were collected and kept for dry shade for a week to remove the moisture. Afterward, the dried plant materials were powdered.

Preparation of Plant Extract:

For the preparation of plant extract, 100 grams of the dried powdered plant was soaked separately in 500 ml of distilled water, ethanol (98%), and methanol (98%). Each mixture was then refluxed by agitation at 200 rpm for one hour.

Determination of Antimicrobial Activity:

Organism used: The test organism was collected from the lab.

Culture Media:

The medium used for the activation of the microorganisms are tryptone soya agar, tryptone soya broth and muller Hinton agar. The culture media were prepared and treated according to the manufacture guidelines.

Inoculum:

The microorganisms were inoculated into SBCB and inoculated at 35-degree Celsius for four hours. The fervidity of the resulting suspensions was diluted.

AGAR DIFFUSION ASSAY:

Diffusion was performed using a modified Agar Well method. The organisms suspended in SBCB were inoculated into each selective medium. A 6 mm diameter well was punched in the agar and 25 liters of blank material (distilled water, ethanol, methanol) was filled with the plant extracts once they had solidified. It was extracted at a concentration of 20µl/ml. In the case of the positive control, the dilution media were sterilized with distilled water before being used. An expression method was used to calculate the antimicrobial activity of the test in triplicate [6].

$$\frac{\text{(IZD sample - IZD negative control)}}{\text{IZD antibiotic standard}} \times 100\% = \%\text{RIZD}$$

PHYTOCHEMICAL SCREENING:

Martinez and Valenia's method were used to identify the general phytochemical groups in the extracts. For the amino acid test, 10 mg of dry extracts are dissolved in 1 ml of ethanol and 1 droplet of ninhydrin reagent is added [12]. Anthocyanin was identified by adding 1 ml boiling water, 0.5 ml of 37% HCl, and 0.4 ml of amylin alcohol to 10 mg of dry extract [14]. For phenolic compounds, 10 mg dry extract was dissolved in 1 ml of ferric chloride solution. For tannins, 1 ml of filtered aqueous extract was added to 1 ml gelatin reagent.

CONCLUSION

All the plants showed antimicrobial activity in regards to at least four microorganisms tested. The disc diffusion of Punica granatum, Acalypha Indica, Azadirachta Indica and Aloe vera were done and they are active against the microorganisms studied.

In some cases, the three extracts of the same plant had antimicrobial activity against the same microorganisms. For instance, the three extracts of Aloe vera were active against S. Aureus.

This possibly means that the compound responsible for the antimicrobial activity was present in each extract at a different concentration.

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Competing Interests: No interest in competing.

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