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ANTIBACTERIAL AND ANTIFUNGAL ACTIVITY OF EXTRACTS OF *ALOE VERA*

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ABSTRACT

Due to increasing adverse effects of allopathic drugs and rapidly emerging antimicrobial resistant pathogens, the search is going for new antimicrobial agent, either by the design and synthesis of new agents or through the search of natural sources for as yet undescribed antimicrobial agents. Use of herbal products for the control of microbial diseases is considered as an alternative to most synthetic and pharma products. *Aloe vera*, is well known for its medicinal properties and was evaluated for its antibacterial and antifungal activity against *E.coli, Bacillus* and *Aspergillus flavus* isolated from soil, skin and air. The extracts were prepared by using methanol, ethanol and water as solvent. Antibacterial screening was done by disc diffusion method in which maximum zone of inhibition was shown by methanolic extract against *E.coli* (18mm). Antifungal activity was assessed by Food Poisoned Technique against *A.flavus*, although significant result was not observed. So, it is concluded that *Aloe vera* can be used in the form of herbal formulation against *E.coli* and further studies can be conducted for the use of this herb to control other pathogenic micro-organisms.

INTRODUCTION

Medicinal plants have been used for centuries as remedy for human diseases and offer a new source of biologically active chemical compound as antimicrobial agent. Screening active compounds from plants has lead to the discovery of new medicinal drugs. Use of natural (herbal) products for the control of microbial diseases is considered as an alternative to most synthetic and pharma products, due to their lower negative impact on the environment. Microbial resistance to antibiotics is increasingly becoming a concern to public health. Currently used antibiotic agents are failing to bring an end to microbial infections due to super resistant strains. For, this reason the search is ongoing for new antimicrobial agents, either by the design and synthesis of new agents or through the search of natural sources. Herbal medications in particular have seen a revival of interest due to a perception that there is a lower incidence of adverse reactions to plant preparations compared to synthetic pharmaceuticals.

Aloe vera, a native of Africa, is also known as "lily of desert. There are over 240 different species of Aloe, growing mainly in the dry region of Africa, Asia, Europe and America. It is known to treat burns, skin inflammation, acne, diabetic leg ulcers, shallow wounds, gastrointestinal ulcer and constipation [1].

MATERIALS AND METHODS

Collection of plant material: The fully expanded leaves of *Aloe vera* were collected from the plants, washed with sterile distilled water and were subjected to surface sterilization with 70% ethyl alcohol. The covering of the leaves were peeled off and the gel drained out. It was transferred to mixer to form juice.

Test micro-organisms: The micro-organisms selected for the study were isolated from different sources:

E.coli and *Bacillus* sp.: Both the bacteria known to cause various food borne diseases were isolated from soil.

Aspergillus flavus: known to produce aflatoxin was isolated from air (exposure plate method).

Extract preparation: Juice obtained was diluted in different solvents like methanol, ethanol and distilled water to obtain 200mg/ml of extract. The contents were then filtered using Whatman filter paper no. 1 after 24 hrs and were concentrated in water bath.

Antibacterial sensitivity: The antibacterial sensitivity was investigated by disc diffusion method[2] in which sterilized discs of 5mm were impregnated with 0.1 ml of each extract and were placed on the Nutrient agar plates inoculated with respective bacteria. Tetracycline and Ampicillin were used as positive control.

Antifungal sensitivity: The antifungal sensitivity was investigated by Poisoned food technique[3]. In this technique, 0.1 ml of each extract was mixed with 15 ml of Potato Dextrose Agar medium and poured on petriplates. After solidification, fungal discs were placed on the surface of medium using sterilized cork borer and needle. Flucanozole was used as positive control.

RESULTS AND DISCUSSION

Aloe vera extracts were prepared in three solvents i.e., methanol, ethanol and distilled water. Antibacterial activity was determined by disc diffusion method and antifungal activity by Poisoned food technique.

Antibacterial sensitivity: Maximum zone of inhibition was given by methanolic extract ranging from 06-18 mm, being maximum for *E.coli* followed by ethanol extract with 5mm zone of inhibition for both the bacteria while aqueous extract was found inactive against both the bacterial species (Table 1). Similar results were reported by Tian et al., (2003) [4] and Cock *et* al., (2008) [5].

Antifungal sensitivity: In the present study, all the three solvents did not found effective against *Aspergillus flavus*. Our results are not in agreement with the previous studies carried out by Ali et al., (1999)[6] and Aggary et al., (2005)[7]. It might have been due to difference in test fungi susceptibility, the assay condition or due to difference in extraction process.

Table 1: Antibacterial sensitivity of extracts of *Aloe vera* against *Bacillus* sp. and *E.coli*

Plant extract	Zone of inhibition ± SEM	
	Bacillus sp.	***E.coli***
Methanol	06 ±01	**18 ± 01**
Ethanol	05 ± 1.732	05 ± 0.577
Aqueous	00 ± 00	00 ± 00
Ciprofloxacin (positive control)	30 ± 4.509	28 ± 3.055
Distilled water (negative control)	00 ± 0	00 ± 00

Table 2: Influence of standard antibiotics against *Bacillus* sp. and *E.coli*

Antibiotics	Zone of inhibition ± SEM	
	Bacillus sp.	***E.coli***
Tetracycline	-	28
Ciprofloxacin	30	-
Ampicillin	09	-
Chloramphenicol	-	35

CONCLUSION

Its an era of rapidly emerging antimicrobial resistant pathogens and therefore, a wide search for alternative remedies to prevent and cure infection are needed. Due to good antibacterial activity of *Aloe vera* against *E.coli*, it can be used in the treatment of *E.coli* infection in the form of herbal formulation and further studies can also be done for the control of other pathogenic micro-organisms so as to establish the new drug therapy in controlling some common pathogens causing ill effects in human beings. It can also be used in combination with allopathic drugs as herbo-allopathy combination.

REFERENCES

1. Taiwao V.O., Olukul O.A., Ozar I.C., Oyejobi A.T.,"Consumption of aqueous extract of raw Aloe vera leaves: histopathological and biochemical studies in rat and tilapia." Afr. J. Biomed. Res. 2005, 08, 169-178.
2. Bauer A.W., Kirby W.M., Turck M., "Antibiotics susceptibility testing by a standardized single disc method". American Journal of Clinical Pathology. 1996.,45, 493-496.
3. Nene Y., Thapliyal L., "Poisoned food technique of fungicides in plant disease control" (3rd edition).,2002. New Delhi, Oxford and IBH Publishing Company.
4. Tian B, Ma XQ, Wang GL., "Relationship between antibacterial activity of aloe and its anthaquinone compounds". Zhongguo. Zhong. Yao. Za. Zhi., 2003.,28(11), 1034-1037.
5. Cock, I.E. ,"Antimicrobial Activity of Aloe barbadensis Miller Leaf Gel Components". Journal of Microbiology., 2008.,Vol.4(2).
6. Agarry O.O., Olaleye M.T., Bello Michael C.O.,"Comparative antimicrobial activities of *Aloe vera* and leaf". African Journal of Biotechnology. 2005.,4(12), 1413-1414.
7. Ali M., Elagamal M.H., Mousa A.S.,"Antifungal effects of different plant extracts and their major components of selected Aloe sp.".,1990,13,401-407.