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PHYTOCHEMICAL SCREENING AND ANTIMICROBIAL ACTIVITY OF *Aloe vera* L.

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Abstract- The main objective of the study was to investigate the *Aloe vera* Phytochemical compounds and antimicrobial activity of different extracts. The Phytochemical compound screened by qualitative method. Qualitatively analyzed Tannin, Saponin, Flavonoids and Terpenoids gave positive results and phlobactanins and Steroids and Steroids gave negative results. In the bioactive compounds from the leaves of *Aloe vera* to screen the antimicrobial activity selected human clinical pathogens by agar diffusion method. The maximum antibacterial activities were observed in petroleum extracts (24mm) other chloroform extract. Antifungal activity of *Aloe vera* was analyzed strains *Aspergillus Niger, Aspergillus fumigates and Neurospora crassa.* The maximum antifungal activity was observed in petroleum ether and ethanol extracts (22mm and 22mm) when compared to chloroform extracts. *Aloe vera* plant extract with petroleum ether and ethanol can be used as antimicrobial agents .
Keywords- *Aloe Vera,* Phytochemical, Antibacterial, Antifungal activity.

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Introduction

Plants have been an important source of medicine for thousands of years. Even today, the World Health Organization estimates that up to 80 percent of people still rely mainly on traditional remedies such as herbs for their medicines. Its civilization is very ancient and the country as a whole has long been known for its rich resources of medical plants. Today, Ayurvedic, Hoemoeo and Unani physicians utilize numerous species of medicinal plants that found their way a long time ago into the Hindu Material Media [1]. *Aloe vera* has been used to treat various skin conditions such as cuts, burns and eczema. It is alleged that sap from *Aloe vera* eases pain and reduces inflammation. Evidence on the effects of *Aloe vera* sap on wound healing, however, is contradictory [2]. Screening techniques of biologically active medicinal compounds have been conducted on well-known species of plants used in traditional medicines and most plants have shown antibacterial activity [3]. *Aloe vera* is a member of liliaceae family. *Alove vera* (L.) Burm. Fil (Synonym *A. brobadensis* Miller) (Tamil- Southakathalai, Hindi- Gikanvar) is a cactus like plant with green, dagger- shaped leaves that are fleshy, tapering, spiny, marginated and filled with a clear viscous gel [4]. The name was derived from the aeabic 'alloeh' meaning 'bitter' because of bitter liquid found in the leaves. It is also known as 'lily of the desert' the plant of immortality and the medicine plant with qualities to serve as alternate medicine.

Aloe vera is as old as civilization and throughout history it has been used as a popular folk medicine. It is present in the arid

regions of India and is believed to be effective in treating stomach ailments, gastrointestinal problems, skin diseases, constipation for radiation injury, for its anti-inflammatory effect, for wound healing and burns, as an anti-ulcer and diabetes. Currently the plant is widely used in skin care, cosmetics and as nutraceuticals [5].In this present study *Aloe vera* phyto chemical compounds analysis (Qualitative method (Screening), also analyzed antibacterial and antifungal activity (extracts of petroleum ether, chloroform and ethanol).

Materials and Methods

Collection of Plant Material

The plant of *Aloe vera* (leaves) was collected from in and around the area of Bidar, Karnataka. The plant part (leaves) was identified by a taxonomist in the Department of Botany, B.V.B. college of UG and PG Bidar, Karnataka INDIA.

Preparation of Plant Extract

The leaves of *Aloe vara* was air dried and crushed to small piece using Mortar and Pestle and powdered in an electric grinder. Twenty grams of powdered plant materials mixed with 100ml of various solvents (Petroleum ether, Chloroform and Ethanol solvents). The extracts preparations were done as previously described by Alade and Irobi [6]. The plant extracts were prepared by using soxhlet apparatus collected and stored in a vial for further studies.

Screening of Phytochemical Components

Phytochemical components were analyzed qualitatively [7, 8].

Disc Preparation

The 6mm (diameter) discs were prepared from Whatmann No. 1 filter Paper the discs were sterilized by autoclave at 12°C.After the sterilization the moisture discs were dried on hot air oven at 50° C.Then various solvent extract discs and control discs were prepared.

Antibacterial and Antifungal Activity of *Aloe Vera*

The antibacterial and antifungal activity studies were carried out by disc diffusion technique [12]. The sterile nutrient agar plates and potato dextrose agar plates were prepared. The bacterial test organisms like *Escherichia coli, Staphylococcus aureus, Klebsiella pnemoniae, and Bacillus aereus* and were spread over the nutrient agar plates by using separate sterile cotton buds. Then the fungal test organism like *Aspergillus Niger, Aspergillus fumigates and Neurospora crassa* were spread over the potato dextrose agar plates After the microbial lawn preparation three different extracts of plant disc were placed on the organism inoculated plates with equal distance control discs were also prepared. All bacterial plates were incubated at 27°C for 24 hrs and fungal plates at 24°C for 72hrs. The diameter of the minimum zone of inhibition was measured in mm. For each test, three replicates were performed.

Results and Discussion

The present study carried out on the *Aloe vera* revealed the presence of medicinal active constituents. The phytochemical active compounds of *Aloe vera* were qualitatively analyzed and the results are presented in Table 1. In analysis of Tannin compounds brownish green colour developed to indicate the presence of Tannin. Similarly based on the presence or absence of colour change indicate positive and negative results are indicate. In this screening process Tannin, Saponin Flavonoids and Terpenoids gave positive results and phlobactanins and Steroids' gave negative results.

Table 1- Phytochemical analysis of aleovera components

Sr. No.	Phytochemical components	Results
1	Tannin	+
2	Phlobatannins	-
3	Saponin	+
4	Flavonoids	+
5	Steroids	-
6	Terpenoids	

+ Present, - Absent

Antibacterial Activity

Antibacterial activity of *Aloe vera* was analyzed against *Escherichia coli, Staphylococcus aureus, Klebsiella pnemoniae, and Bacillus aereus.*The maximum antibacterial activities were observed in petroleum ether extract (24mm) of *Escherichia coli* other than chloroform extract (12mm) and ethanol extract (14mm). Among the three bacterial organisms maximum growth suppression was observed in *Escherichia coli* (24mm) and *Staphylococcus aureus* (28mm) when compared with *Klebsiella pnemoniae* (22mm) and *Bacillus aereus* (16mm) results are presented in Table 2, Fig 1.

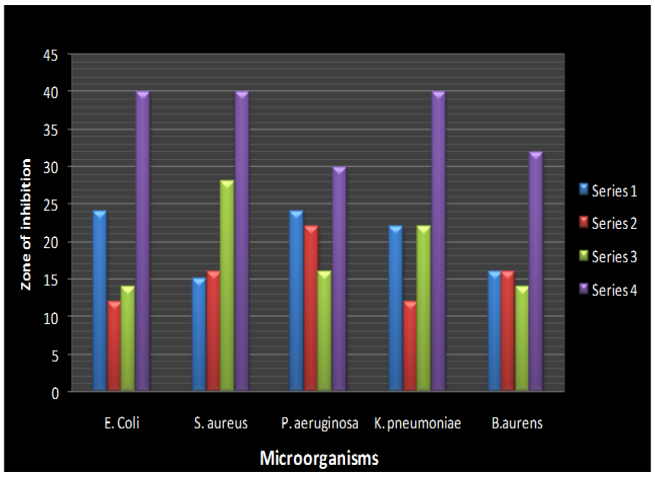

Fig. 1- Antibacterial activity

Series 1- Petroleum ether, Series 2- Chloroform, Series 3- Ethanol, and Series 4- streptomycin

Table 2- Anti bacterial and Anti fungal activity

Sl. No.	Micro-organisms	Petroleum Ether (40mg/ml)	Chloroform (40mg/ml)	Ethanol (40mg/ml)	Strepto Mycin	Flucona Zole
1	*E. coli*	24	12	14	40	---
2	*S. aureus*	15	16	28	40	---
3	*P. aeruginosa*	24	22	16	30	---
4	*K. pnemoniae*	22	12	22	40	---
5	*B. aereus*	16	16	14	22	---
6	*A. niger*	12	12	12	---	20
7	*A. fumigates*	16	18	15	---	26
8	*N. crassa*	22	12	22	---	26

Antifungal Activity

Antifungal activity of *Aloe vera* was analyzed against *Aspergillus niger, Aspergillus fumigates and Neurospora crassa* .The maximum antifungal activities were observed in petroleum extract disc (22mm) other than chloroform extract (18mm) and ethanol extract (22mm). Among the three fungal organisms maximum growth suppression was observed in *Neurospora crassa* (22mm) than *Aspergillus niger and Aspergillus fumigates* (12mm and 18mm). Results are presented in Table 2 and Fig 2. Many previous studies such as that of Ferro *et al.,* [13] have focused on the antimicrobial activity of *Aloe vera* whole gel. *Aloe vera* extracts have been shown to inhibit the growth of fungi that cause dental caries, however evidence for control beneath human skin remains to be established. For bacteria, inner-leaf gel from *Aloe vera* was shown to inhibit growth of *Streptococcus* and *Klebsiella* species in vitro.

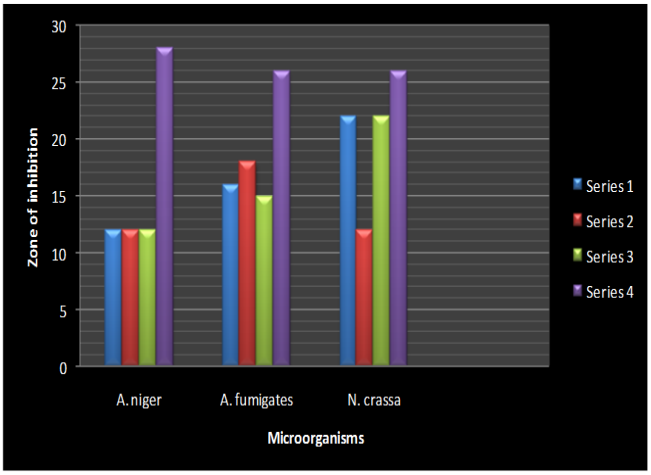

Fig. 2- Antifungal Activity

Conclusion

This study has revealed the presence of many secondary metabolites in the leaves of *Aloe vera*. It has the further confirmed that the plant extracts could be used for the treatment of various infections including skin transmitted infections and dental caries. The results lend credence to the folkloric use if this plant in treating microbial infection and shows that *Aloe vera* could be exploited for new potent antimicrobial agents.

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