Anti-microbial activity of Kapukinissa (*Abelmoschus angulosus* Wall. ex Wight & Arn.) and Ambul ambiliya (*Oxalis stricta* L.) plant extracts

D.M.S.U.K. Senanayake

Girls' High School, Kandy, Sri Lanka

1. Introduction

Use of medicinal plants for their potential anti-microbial activity is an alternative strategy to overcome problems of multiple drug resistance and undesirable side effects of certain antibiotics. The same phenomena can also be used to control plant pathogens. Ambul ambiliya (*Oxalis stricta* L.) and Kapukinissa (*Abelmoschus angulosus* Wall. ex Wight & Arn.) are two important native medicinal plants used in the treatments and cure for various maladies in Ayurvedic medicine in Sri Lanka. Therefore, a study was carried out to examine the antimicrobial activity of plant extracts of *Oxalis stricta* and *Abelmoschus angulosus*.

2. Research Methods

Crude sap was extracted from the whole plant of *Oxalis stricta* and leaves of *Abelmoschus angulosus* using water as the medium under aseptic conditions. The solid media of Potato Dextrose Agar and Nutrient Agar were used for fungal and bacterial cultures, respectively. Sterilized leaf extract was mixed with autoclaved media in a ratio of 1:5 before pouring in to plates. Negative control was maintained by adding sterilized water. Standard pure cultures of bacteria *Escherichia coli* and *Staphylococcus aureus* were used as human pathogens and bacterium *Ralstonia solonacearum*, fungi *Sclerotium rolfsii* and *Fusarium oxisporum* were used as plant pathogens. Anti-microbial activity of plant extracts was studied using agar dilution method [1]. Four drops of 10µl of concentrated bacteria were inoculated in each culture plate and one sclerotium of *S. rolfsii* and 1cm diameter mycelium of *F. oxisporum* fungi were inoculated. The plates were incubated at 37 º C for 16 hours. Three replicates were maintained for each treatment. Diameters of the growing cultures were measured and growth inhibition % was calculated in 48 and 72 hours after inoculation [2]. Experiments were repeated two times.

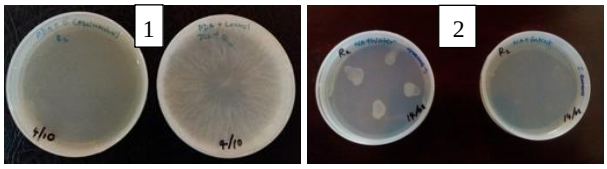
3. Results

Medium with leaf extract of *O. stricta* and *A. angulosus* showed zero or very low bacterial growth for tested bacteria. (Table 1, Figure 1). Growth of *S. rolfsii* was completely controlled while *F. oxisporum* was moderately controlled by leaf extract of *A. angulosus*. However, no significant difference was observed in fungal growth in medium with *O. stricta* leaf extract.

Table 1. Mean anti-microbial activity of leaf extracts against different tested pathogens 72 hour after inoculation

Pathogen	*O. stricta*			*A. angulosus*		
	Mean culture growth (Diameter in mm)		GI *	Mean culture growth (Diameter in mm)		GI
	Control	Extract		Control	Extract	
R. solonacearum	42	0	100	32	12	62.5
E. coli	18.4	1.3	92.9	16.8	7	58.2
S. aureus	15.8	0	100	13.8	6.3	54.3
S. rolfsii	90	88	2.2	90	0.0	100
F. oxisporum	29	26	10.3	27	13	51.8

* GI = Growth inhibition %



A B C D

Figure 1. Growth of microbial cultures 72 hours after inoculation (1- *S. rolfsii*, 2- *S. aureus*, A & D- control, B- *O. stricta*, C - *A. angulosus* leaf extracts)

4. Conclusion

The results showed that plant extracts of *A. angulosus* has high anti-bacterial and antifungal activity. *O. stricta* has a very high antibacterial activity and low antifungal activity. The results suggest the possibility for use of these leaf extracts to control tested plant and human pathogens. Further studies are needed to identify the minimum inhibitory concentration and phytochemicals in these extracts, which are capable of controlling the growth of bacteria and fungi.

5. References

1. Balauiri, M., M. Sadik, S.K. Ibnsouda. 2016. Methods for *in vitro* evaluating antimicrobial activity: A review. Journal of pharmaceutical analysis. 6: 71-79.
2. Aye, S.S., M. Matsumoto. 2011. Effect of some plant extracts on *Rhizontonia* spp. and *Sclerotium hydrophilium*. Journal of medicinal plants research. 16: 3751-3757.