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Screening of Anti-Phytopathogenic Activity of *Terminalia thorelii*

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ABSTRACT

The anti-phytopathogenic activity of crude and methanol extract of leaves, Stem bark, seed and dry fruit of *Terminalia thorelli* was tested by disc diffusion method, against four phytopathogens. Crude aqueous extract of plant parts taken of 5mg concentration showed zone of inhibition ranging from 11-22 mm. *Xanthomonas axanopodis pv*. *malvacearum* was found to be highly susceptible with highest zone of inhibition suggesting the strong inhibitory activity of these extracts towards the selected bacterial pathogens. These pathogens were more sensitive to the methanol extracts forming 13- 28 mm zone of inhibition suggesting that the methanol extract is little more effective than crude extract. These results indicate that these extracts can be exploited for the biocontrol of phytopathogens.

Key Words: Antimicrobial activity, Phytopathogens, *Terminalia thorelii*, *Xanthomonas axanopodis* pv. *Malvacearum*.

INTRODUCTION

The use of synthetic chemicals to combat the problems of phytopathogens causes various problems including reduction in soil fertility. Moreover some phytopathogens were found to develop resistance against these antimicrobial chemicals. Development of herbal antimicrobial compositions might be a solution to this problem. Therefore, an attempt was made to investigate the anti-phytopathogenic activity of *Terminalia thorelii*, an exotic immigrant of Combretaceae.

MATERIAL AND METHODS:

Fresh leaves, stem bark, dry fruits and seeds of *T. thorelii* were collected from the PDKV campus, Akola, India. The leaves were sterilized in running water and extracted in distilled water (15 gm in 100 ml) and methanol (15gm 100ml). Similarly the stem bark, dry fruits and seeds ground to fine powder, mixed in sterile distilled water to give

the concentration of 1gm/ 5ml stock solution separately. Then the extracts were stored in refrigerator until further use. The methanol extracts of stem bark, dry fruit and seeds were prepared by pulverizing 1 kg of material in 2.5 L of absolute methanol for 48 h. Later the solution was collected and subjected to several cycles of distillation until a thick brown paste was obtained. One gram of residual methanol extract was mixed in 5 ml of methanol to give concentration of 1ml = 0.2 mg of *T. thorelii*.

The plant pathogens were isolated from the infected plant parts directly. The infected leaves were surface sterilized and then made disc of infected parts so that it contain some part of healthy tissue and kept on suitable nutrient media. The phytopathogenic isolates *Xanthomonas axonopodis* pv. *Malvacearum, Xanthomonas axonopodis* pv. *Citri, Xanthomonas compestris* pv. *Viticola, Xanthomonas compestris* pv. *Azadirachta and Erwinia carovora* subsp. *Caratovora* were isolated from infected cotton, citrus, grape, neem leaves and infected tomato fruits respectively. The isolated pathogens then characterized biochemically and identified taxonomically.

For testing antimicrobial activity, disc diffusion method was used as given by Elizabeth (5). For this nutrient agar /or broth was used to culture bacteria. Fresh overnight inoculums of each culture (0.1 ml) containing 108 cells was spread on the agar plate, three sterile paper discs (5mm diameter) were placed in each agar plate and on two of them crude and methanol extract of leaves (5mg in 20ml volume) was placed and on third 20 ml of absolute methanol as a control.

RESULT AND DISCUSSION

The results were summarized in Table 1. In the present study both crude and methanol extracts of leaves and dry fruit of *T. thorelii* were strongly inhibitory to *Xanthomonas axonopodis* pv. *malvacearum* forming large zone of inhibition, closely followed by *Xanthomonas compestris* pv. *Viticola* and *Erwinia carovora* subsp. *caratovora*. However, the methanol extract of both leaves and dry fruit is found more effective than crude aqueous extract. The methanol extracts of leaves and dry fruit showed high degree of inhibition towards above pathogens, indicating the presence of antimicrobial principle in the extract. Moreover, crude and methanol extract of both leaves and dry fruit of *T. thorelii* showed moderate inhibitory activity against *Xanthomonas compestris* pv. *Azadirachta* (Table 1).

Table 1. Antimicrobial activity of T. thorelii and zone of inhibition in mm.

Organism	Leaf extract		Fruit extract		Streptocyclin
	Aqueous	Methanol	Aqueous	Methanol	
X. axonopodis pv. *Malvacearum*	21.0	26.0	22.0	28.0	22.0
X.compestris pv. *Viticola*	16.0	20.0	18.0	23.0	24.0
E. carovora					

subsp. *Caratovora*	17.5	19.0	14.0	18.0	15.0
X. compestris pv. *Azadirachta*	14.5	16.0	11.0	13.0	19.5

These results show homology of the phytochemicals and active antimicrobial principles present in other *Terminalia* species (4, 5). The similar activity from other plant extracts was reported where the extracts showed high inhibition of phytopathogenic bacteria and other microbes (6, 7, 8 & 9). The inhibitory activity of *T. thorelii* leaf extract can be attributed to the phytochemicals present in them (5, 6). It has been reported that the phenolics, tannins and propyle gallate were strong microbial inhibitors. The similar kind of action is predicated in *T. thorelii*. From the present study, it can be concluded that *T. thorelii* leaves as well as fruits also possess broad spectrum antimicrobial activity. Moreover, methanol extract showed high antiphytopathogenic activity than the crude extract. It can also be used as substitute for other Indian *Terminalia* species at commercial level.

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