Bio-efficacy of plant extracts against *Fusarium solani* in *in vitro*

A.S. WABALE[1]*, A.S. PETKAR[1], S.D. PINGLE[2] AND B.J. APPARAO[2]
[1]Department of Botany, Sangamner College, SANGAMNER (M.S.) INDIA
[2]Department of Botany, Padmashri Vikhe Patil College, LONI (M.S.) INDIA

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SUMMARY

Fungi is an important group of microorganisms responsible for various diseases of plants and cause a considerable loss in yield. Plants are the richest source of organic chemicals, which can be used as defensive weapons. Number of plants has been found to possess antifungal properties, which are able to control certain fungal diseases of crops. Effect of *Boswellia serrata* Roxb ex. Coleb., *Gnidia glauca* (Fresen.) Gilg., *Ocimum americanum* L., *Mundulea sericea* (Wild.) A. Chev., and *Woodfordia fruticosa* (L.) Kurz. extracts are tested in *in vitro* by poisoned food technique to know there inhibitory effect on the growth of *Fusarium solani* (Mart.) Sacc. Extracts of *Boswellia serrata* leaves were found significantly superior in inhibiting the mycelial growth 21.06 %, 26.47 % and 41.89 % of *F. solani* at 5 per cent, 10 per cent and 15 per cent, respectively. Extract of *Gnidia glauca* and *Woodfordia fruticosa* were found second best after *Boswellia serrata*, while extracts of *Ocimum americanum* and *Mundulea sericea* were least effective in growth inhibition as compared to other plant extracts at all the three concentrations tried.

Key words : Antifungal, *Fusarium solani*, Plant extracts and inhibition.

Fungi is an important group of microorganisms responsible for various diseases of plants and cause a considerable loss in yield. A number of chemical fungicides are available in market for the crop protection. Some of them are excellent in terms of efficacy and cost benefit. However, their indiscriminate use has created the problems of air, soil and water pollution, development of resistance in target organisms and serious health hazards due to the toxicity of their residues. Efforts are being done for finding alternatives to chemical fungicides to overcome these problems. Plants are the richest source of organic chemicals on the earth and produce a wide variety of secondary metabolites, which can be used as defensive weapons. Plant extracts can be the potential alternatives to chemical agents that are hazardous to human and animal health. Number of plants has been found to possess antifungal properties, which are able to control certain fungal diseases of crops instead of spraying chemical fungicides.

Danej (1980) reported that phenolic compounds are good inhibitors of fungal pathogens and useful in controlling fungal diseases. Garg (1974) studied the antifungal activity of essential oil of *Boswellia serrata* against seventeen pathogenic fungi. From the above reports, it was clear that plants containing natural phenols could be used as biofungicides against the *Fusarium solani*. It is a important pathogen causing wilt of chili, tomato, brinjal, muskmelon, chickpea, pigeon pea etc. Mandhare *et al*., (1989) reported *Fusarium solani* causing wilt of brinjal and also pathogenic to potato, tomato, chickpea, pigeon pea and coriander. Leaves of *Boswellia serrata* and *Woodfordia fruticosa* were used tested for their antifungal properties against the important pathogen *Fusarium solani* (Mart.) Sacc. as they contain natural phenols. In addition *Mundulea sericea, Gnidia glauca* and *Ocimum americanum* were also tested for their fungicidal properties.

MATERIALS AND METHODS

Healthy leaves of *Boswellia serrata, Ocimum americanum, Mundulea sericea, Woodfordia fruticosa* and *Gnidia glauca* collected from the Harishchandragad-Kalsubai Wild Life Sanctuary were tested in *in vitro* by poisoned food technique to know there inhibitory effect on the growth of *F. solani*. Pathogen was isolated from wilted roots of chili. Surface sterilized pieces were placed on potato dextrose agar medium in petriplates. Petriplates were then incubated at 28^0 C to 30^0 C temperatures. Repeated sub culturing was practiced to obtain pure fungal culture. During all these operations perfect aseptic conditions were maintained.

Fifty grams of plant leaves of each plant were cut into small pieces and minced with the help of grinder by adding 50 ml sterilized distilled water. These phyto-extracts were filtered through double-layered muslin cloth in 150 ml conical flasks and plugged with non-absorbent cotton. These filtered extracts were autoclaved at 1.2 kg cm^{-2} pressure for 20 minutes. Autoclaved extract was individually added into previously sterilized PDA @ 5 per cent (*i.e.* 1 ml extract +19 ml PDA), 10 per cent (*i.e.* 2

* Author for correspondence.