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# Management of rhizome rot of ginger by botanicals

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SUMMARY

Rhizome rot of ginger is a complex disease which is caused by *Pythium aphanidermatum* and *Fusarium solani*. Efficacy of fourteen plant extracts were evaluated against *Pythium aphanidermatum* and *Fusarium solani* at 5 and 10 per cent concentrations. Among 14 plant extracts *Azadirachta indica* showed maximum inhibition of mycelial growth (63.72%) of *P. aphanidermatum*. Among 14 plant extract tested against *F. solani*, maximum inhibition of mycelial growth was noticed in *Ferula asafeotida* powder extract (68.51%) followed by *Ocimum* leaf extract (60.16%).

Key words : Botanicals, Plant extracts, Rhizome rot, Ginger, *Pythium aphanidermatum, Fusarium solani.*

Ginger is obtained from the underground stems or rhizome of *Zingiber officinale* Rosc. a herbaceous tropical perennial belonging to the family Zingiberaceae. The whole plant is refreshingly aromatic, but it is the underground rhizome (raw or processed) which is valued as spice. Among the major constraints for growing ginger is the rhizome rot. Even though important foliar diseases do exist, rhizome rot is very important in view of severe crop losses. It occurs in several parts of India wherever these crops are grown. The term rhizome rot is loosely used for all the diseases affecting the rhizome irrespective of pathogens involved, since the ultimate result is the partial or total loss of rhizome. The pathogens involved decide the nature of damage and also symptoms expression. The major diseases identified are the soft rot resulting in wet rot caused by *Pythium spp.*, yellows caused by *Fusarium spp*. and bacterial wilt caused by *Ralstonia solanacearum* (Smith) Yabuuchi (Sarma, 1994). Hence a systemic survey was conducted in Karnataka to known the etiology of rhizome rot of ginger. *Pythium aphanidermatum* and *Fusarium solani* were found to be most predominant pathogen, so different plant extracts were evaluated in *in vitro* against these pathogens.

## MATERIALS AND METHODS

Fourteen plant extracts were tested under *in vitro* conditions by using Poison food technique. Hot water extract was prepared on w/v basis and incorporated into PDA at 5 and 10 per cent prior to sterilization. 20 ml of sterilized and cooled Potato dextrose agar was poured into sterile Petri plates. All plates were inoculated with 5 mm mycelial disc of *P. aphanidermatum* and *F. solani* separately. Each treatment was replicated thrice, and incubated at 25 ± 2°C till control plates reached the radial growth of 90 mm. The per cent inhibition over control was calculated according to formula given by Vincent (1947).

$$I = \frac{(C-T)}{C} \times 100$$

I = Per cent inhibition of mycelium,
C= Growth of mycelium in control,
T = Growth of mycelium in treatment.

## RESULTS AND DISCUSSION

The per cent inhibition of the growth of the fungus at two concentration over control was calculated and is presented in Table 1 and 2. Among 14 plant extracts evaluated against *P. aphanidermatum, Azadirachta indica* showed maximum inhibition of mycelial growth (63.72%) and was at par with *Ocimum sanctum* (61.10%) and were significantly superior over all other plant extracts. Among the two concentrations, the leaf extracts at 10 per cent were significantly superior to five per cent. In the interaction between plant extract and concentration *Azadirachta indica* showed significant increase in inhibition of mycelial growth at 10 per cent concentration (70.77%) compared to 5 per cent concentration (56.67%) and which was at par with *Ferula asafoetida* powder at 10 per cent concentration (69.13%). *Tridax procumbens* showed least inhibition of mycelial growth (15.90%).

Among 14 plant extracts tested against *F. solani* (Table 2), maximum inhibition of mycelial growth was noticed in *Ferula asafoetida* powder extract (68.51%) followed by *Ocimum sanctum* (60.16%) and they were found statistically significant from each other. The leaf

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