



Development of endophyte-based biopesticides for pre and post-harvest soft-rot disease management

Applications

Ginger production is seriously affected by soft rot caused by *Pythium* species (fungus) resulting in absolute production loss, the severity of which is reported every year. The use of *Z. zerumbet* endophyte (ZZE) based biopesticides for managing soft-rot disease is one such case in point. Present innovation offers a solution to control soft rot disease in the field of agriculture. The developed formulation is easy to apply, cost-effective, has no adverse environmental impact and can effectively control the disease during the planting stage. Farmers who lease out land of 200- 300 acreage constitute the prospective buyers.

Inventor

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Categories of this invention

- ▶ Life Sciences (Agriculture, Environment)
- ▶ Research tools (Isolation and purification)
- ▶ Plant Biology (Bio-controllable agents, Herbal formulation)

Intellectual Property

Biopesticide formulation for use against *Pythium myriotylum* causing soft-rot disease of ginger.

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Problem Addressed

Soft-rot disease caused by *Pythium* species is a major productivity constraint for the spice crop, ginger. The pathogen has a broad host range and is a serious economic constraint for many other crop plants such as potato, carrot, papaya and pumpkin etc. There is significant demand amongst farmers for a solution to manage soft-rot disease. Currently there are no biopesticides effective in soft-rot disease control, with disease infestation often resulting in absolute (100% crop loss). Furthermore, available *Trichoderma* based formulations fail to control disease in field causing slump in market price in the event of crop failure.

Publications

Metabolic Profiling of *Zingiber zerumbet* Following *Pythium myriotylum* Infection: Investigations on the Defensive Role of the Principal Secondary Metabolite, Zerumbone.

— Applied Biochemistry and Biotechnology 2013

Molecular phylogenetics and anti-*Pythium* activity of endophytes from rhizomes of wild ginger congener, *Zingiber zerumbet* Smith.

— World Journal of Microbiology and Biotechnology, 2016

Technology

- The formulation is biodegradable and contains metabolite(s) of plant and endophytic origin.
- Film-like formulation contains metabolite mixture(s) of endophytic and plant origin that provides protection to ingress from soft-rot causative *Pythium* species.
- More than one compound in the formulation ensures delay in development of resistance.

Advantages

- Synergistic action of more than one molecule delays the chances for development of resistance to the formulation.
- Film-like biopesticide formulation.
- Environment friendly.
- Simple application procedure at the time of planting rhizome.
- Cost effective.

Potential Value

- 1 Area of ginger under cultivation in India: ~266 thousand acre.
- 2 Loss in the event of soft-rot incidence: absolute.
- 3 Cost of the developed film-based formulation is 1/8th the cost of the commercially available *Trichoderma*-based biopesticides



After 7 days of infection (doi)



After 14 days of infection (doi)

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