Development of Biopesticide for the Control of Soil-Borne Disease

Sariah Meon

The increasing damage to crops by plant pathogens coupled with public concern about human health, environment and the use of pesticides has resulted in intensive research towards alternative methods of disease control, aimed at low input and sustainable agriculture. *Trichoderma* species have been isolated from rhizosphere of crop plants having strong antagonistic activities against soil-borne pathogens, such as *Sclerotium rolfsii, Pythium splendens, Fusarium oxysporum fsp cubense, Rhizoctonia solani* and *Ganoderma.* They grow tropically towards hyphae of other fungi, coiled around them in a lectin-mediated reaction, and degrade cell wall of the target fungi. This process (mycoparasitism) limits growth and activity of plant pathogenic fungi. In addition to, and in conjunction with mycoparasitism, they produce antibiotics, and are good competitors for nutrients and space.

Biological seed treatment for controlling Rhizoctonia rot

Delivery system of biopesticide-Biological seed treatment

Effect on plant growth

Air-dried preparation of the biopesticide used in seed treatment or as additive to cultivation mixes protect the spermatosphere, roots and subterranean parts of crop plants against infection by soil-borne pathogens. Improved the keeping quality and viability of *Brassica* seeds, and protect the germinating seeds against *Pythium* damping-off, due to its ability to colonize, compete for nutrients and directly parasitizing the pathogen. Losses due to seedling disease were reduced by about 65%. When used as additive to potting mixes, improved vegetative growth of cauliflower and tomato raised in soil less mix under controlled environment. Soilless mixes are inert cultivation substrates (coconut dust, paddy straw, palm oil mill effluent), which lack microorganisms beneficial for plant growth or as bioprotectants against soil-borne pathogens. The microbial preparation has the potential for field application as incorporation into individual planting holes can holes can reduced incidence of *Sclerotium* blight disease by 30% in field grown chilli plants. The microorganisms can proliferate and survive in the rhizospheres and on roots of the tested plants, maintaining an effective population until 5-7 weeks after application. The use of *Trichoderma* preparations, which are

efficacious and environmentally friendly, can provide options for growers to be less dependent on pesticides. They have more specific effects, with only the target pathogen being affected, leaving other beneficial organisms and a diverse biotic community intact to provide for healthier growth.

Reader Enquiry
Department of Plant Protection
Faculty of Agriculture
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor
Malaysia

Tel: +603 8946 7247
E-mail: sariah@putra.upm.edu.my