

**P37      Biopesticides from Indigenous Marine-Derived  
Actinomycetes**

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The use of synthetic pesticides in crop production, brings the possibility of a nonselective toxicity and accumulation of toxic compounds in the environment. As an alternative, bioactive compounds from actinomycetes can provide a rich source for biodegradable pesticides. A variety of biological activities such as antibacterial, antifungal, herbicidal, insecticidal and anticoccidial are associated with these microbial metabolites. Studies on the production of bioactive compounds from marine-derived actinomycetes have been very few, compared to the terrestrial actinomycetes. With their unique metabolic and physiological capabilities, the marine actinomycetes can be useful producers of novel metabolites.

By realising their potentials, actinomycetes were isolated from leaf litter and mud samples collected from mangrove areas and intertidal zones from the beach of Port Dickson, West Malaysia. Among the fifty four strains isolated in this study, only 25 strains were selected for antifungal screening against some phytopathogenic fungi. Selection was done based on their morphological characteristics on standard culture media. All 25 isolates showed some degree of differences in colony formation, colour of mycelium and pigmentation. Out of which seven isolates (28%) showed good antifungal activity against all test fungi in the 'cross-plug' test. All seven isolates showed very good

inhibition against the rice pathogen, *Pyricularia oryzae*. This fungus was then used as a test organism to monitor antifungal activity during the secondary screening stage.

The seven isolates were studied further for antifungal activity by fermentation technique in shake flasks, using a media which was modified from the 'cross-plug' test agar media. Culture filtrate and whole broth extracts were tested for activity against *P. oryzae* using the paper disc method. Five isolates (G10, G35, G39, G40, G49) showed good antifungal activity even at a lower concentration of 0.5mg extract per disc. One of the isolates, G51, showed good activity against *P. oryzae* in the 'cross-plug' test. However, this isolate did not show any activity in the submerged fermentation technique.

Effect of the extracts on *P. oryzae* spore germination was studied after six hours of incubation in a humid chamber. Two isolates, G10 and G39, appeared to be most effective in inhibiting spore germination. Out of the two isolates, G10 was given much importance because of its high antifungal activity shown in the paper disc test. This isolate was taken up for studying the bioactivity in great detail. Strain identification was done using microscopic and chemotaxonomic techniques. Selection of best carbon and nitrogen sources for optimum production of antifungal compounds, were also carried out.

Table 1. Antifungal activities of the seven isolates on fungal growth and spore germination of *P. oryzae*

Extract sample	0.5mg per disc		2.5mg per disc	
	(A)	(B)	(A)	(B)
G10	19.5	24.7	32.5	2.3
G35	13.2	71.3	34.5	3.0
G39	17.5	1.7	33.7	0.7
G40	13.0	59.0	31.7	0.3
G48	-	99.7	17.7	11.7
G49	14.2	34.3	35.2	0.3
G51	-	99.0	-	96.7

(A) - Diameter of inhibition zone (mm)

(B) - Percentage of spore germination (%)