

Anti-bacterial, anti-fungal and phytopathogenic properties of the fungus *Penicillium purpurogenum*

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The phytopathogenic fungus *Penicillium purpurogenum* was initially isolated from infected fruits of *Averrhoa bilimbi*, showing red spots. Literature searches suggest that this is the first documental record of *P. purpurogenum* from Sri Lanka.

P. purpurogenum cultures growing in Czapek-dox liquid medium (CDLM) were harvested at 1-7 day intervals and the filtrates were tested for anti-bacterial activity against the bacteria *Staphylococcus aureus*, *Streptococcus* sp., *Pseudomonas aeruginosa*, *E. coli* and *Bacillus subtilis* using the well-method. The clear zone around each well filled with the fungal filtrate was measured. The fungus showed anti-bacterial activity against all the bacteria, and the activity was maximum at the sixth day of harvest except in *B. subtilis*.

The fungus upon growing in CDLM showed a bright red color due to a secretion by the fungus. The colored metabolite, if non toxic, may find application as a food color. But the fungus, *P. purpurogenum* is known to produce a toxic metabolite, rubratoxin B in which toxicity has been vascular congestion and haemorrhage in various organs and tissues. The fungal mycelia grown in CDLM was filtered and dried. The dry extract was stirred with n-Hexane, Dichloromethane and Methanol respectively. The extractives were concentrated and spotted on a preparative thin layer chromatography plate. The samples were developed using 1% Methanol in Dichloromethane and plates were then sprayed with a spore suspension of *Cladosporium cladosporioides* and *Aspergillus niger*. The plates were observed after 3 days for any anti-fungal spots. The colored substance (methanol extract) tested for anti-fungal activity showed no activity against *C. cladosporioides* and *A. niger*. However, both Hexane and Dichloromethane extracts showed anti-fungal activity against *C. cladosporioides* and *A. niger*.

In addition to its anti-bacterial and anti-fungal properties, *P. purpurogenum* caused damages to the fruits of Billing (*Averrhoa bilimbi*), Kamaranga (*Averrhoa carambola*) and Amberalla (*Spondias dulcis*) showing red spots and later fruit spoilage, indicating that the fungus cause damages to fruits with a high oxalic acid content. However, the fungus did not cause damages to the fruits of Orange (*Citrus sinensis*), Mandarin (*Citrus reticulata*), Lime (*Citrus aurantifolia*) and Tomato (*Lycopersicon esculentum*) with a high citric acid content or fruits of Capsicum (*Solanum integrifolium*) and Banana (Kolikuttu) with a low acid content. This suggests that the fungus, *P. purpurogenum* prefers to grow in a oxalic acid rich medium. However, no spoilage was observed in *A. bilimbi* leaves and petioles indicating that the fungus could live as a saprophyte when susceptible fruits are not found.