

Title In vitro screening of the antifungal activity of plant extracts as fungicides against rice seed borne fungi

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Citation ISHS Acta Horticulturae 837:223-228. 2009.

Keyword bio-control; eugenol; plant extract; rice seed borne fungi; antifungal activity

Abstract

It is well known that some plants contain secondary plant compounds that are inhibitory to pathogenic fungi. These plant compounds have different structures and actions when compared with conventional fungicides that are used to control microbial growth and survival. The potential antifungal properties of plants is related to their ability to synthesize compounds by secondary metabolism. Several chemical compounds of relatively complex structure with antimicrobial activity have been studied. The antifungal activity of crude extracts of *Acorus calamus* L., *Stemona curtisii* HK. f., *Stemona tuberosa* L., *Mammea siamensis* Kost., *Eugenia caryophyllus*, and an eugenol essential oil were studied in vitro. To establish these antifungal properties, four species of rice seed borne fungi, *Alternaria solani*, *Colletotrichum* sp., *Fusarium moniliforme*, and *Rhizoctonia solani* were used as target organisms. The agar overlay technique and spore inhibition technique were employed for the determination of antifungal activity which were compared with untreated controls. The antifungal activity was lined up into a series from strong to low, as follows; most effective was eugenol > *Eugenia caryophyllus* > *Acorus calamus* Linn. > *Stemona tuberosa* L. > *Mammea siamensis* Kost. = *Stemona curtisii* Hk. f. For the mode of action, above eugenol, lysis of spores and inhibition of mycelial growth were detected. Microscopic analysis exhibited complete lysis of spores after 24h of incubation at a 1.00% (v/v) concentration. Moreover, at this concentration, eugenol completely inhibited mycelial growth after 96h incubation. Thus, it was concluded that eugenol was a promising antifungal agent candidate, showing strong antifungal activity against pathogenic fungi. Further study is required to determine whether it could be used in the management of plant pathogenic or seed borne fungi, with less phytotoxic effects on the plant, seed or on product quality.