

Protease activity for identification of *Colletotrichum* species causing chilli anthracnose in Thailand

W. Winyarat, R. Pongpisutta, C. Rattanakreetakul

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Abstract

Protease activity of *Colletotrichum* species causing chilli anthracnose was tested on casein hydrolysis medium (CHM) and casein from bovine milk medium (CBM). Fifty eight isolates of *Colletotrichum* species were identified to three species as *C. acutatum*, *C. capsici*, and *C. gloeosporioides*. Each isolate produced an enzyme digest in both substrates with clear zones developing around the fungal colonies. When the clear zones were assessed on CHM, *C. acutatum* produced the greatest diameter of 10.10 mm, while *C. gloeosporioides* and *C. capsici* produced clear zones of 2.78 and 1.85 mm diameter, respectively. When the clear zones were assessed on CBM, *C. acutatum* and *C. gloeosporioides* produced clear zones of 4.62 and 0.93 mm diameter, respectively, whereas *C. capsici* produced no clear zone. Protease activity was detected in 1% CBM. This result indicated that *C. gloeosporioides* produced the greatest protease activity of 6.67 units/mg, while with *C. capsici* and *C. acutatum* the activity was 4.03 and 3.63 units/mg, respectively. Inoculation tests were carried out on two varieties of chilli fruits, 'Bangchang' and 'Jinda', with mycelial discs (MD) and conidial suspensions (CS). The results showed that MD inoculation with *C. acutatum* and *C. gloeosporioides* on 'Bangchang' fruits resulted in 100% disease incidence, whereas *C. capsici* showed 96.67%. Inoculation tests on 'Bangchang' using MD inoculation with *C. acutatum*, *C. capsici*, and *C. gloeosporioides* showed diseased areas of 16.55, 16.06, and 3.85%, respectively, while percent of diseased area using CS inoculation was 7.44, 6.27, and 3.76%, respectively. There was no relationship between clear zone production and protease activity, and disease severity. Fungal enzymes may not increase disease severity but may be a minor factor in causing fungal infection in the host plant. Moreover, CHM is recommended to be used for simple identification of the three species of *Colletotrichum* affecting chilli.