

ABSTRACT

An analysis of yam anthracnose by isolation and partial characterisation of phytotoxins of *Colletotrichum gloeosporioides* and tissue culture of *Dioscorea alata* (yam)

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Ninety-seven isolates of *Colletotrichum gloeosporioides* were obtained from diseased leaves of yam, anthurium, avocado, mango, orange, grapefruit, and coffee. Two from yam and one each from anthurium and grapefruit were used to extract phytotoxins from liquid cultures. These phytotoxins were partially purified by gel filtration chromatography and SDS-polyacrylamide gel electrophoresis, and analysed for protein and or carbohydrate by colorimetric assays and gas chromatography. Preliminary results suggest that phytotoxins produced by isolates of *C. gloeosporioides* are composed of carbohydrates ranging from approximately 4-5 kDa in size. Furthermore these are linked to proteins also approximately 4 kDa in size. Tests were conducted on leaves of yam, pepper, and tomato to determine host-selectivity of phytotoxins. Host-selectivity was also determined by screening all the isolates of *C. gloeosporioides* for pathogenicity on several plant genotypes including the respective host plants from which each isolate was obtained. Isolates of *C. gloeosporioides* were pathogenic only towards the host plants from which they were obtained. Also, partially purified phytotoxins induced

foliar necrosis or caused cell death only on plant genotypes from which the isolates producing the phytotoxins had been obtained. Moreover, only the protein moiety of the phytotoxin was able to induce necrosis or cell death of plant tissues.

Genetic tests were conducted to determine the degree of relatedness between isolates of *C. gloeosporioides* by using PCR-PAPDs analysis. Results indicate distinct genetic differences between isolates of *C. gloeosporioides* from yam and non-yam hosts. Generally similarity values (F) between yam isolates were calculated to be 50-86% except for one yam isolate which was 22%, while F values between non-yam hosts were less than 50% ranging from 22-50%. Host-selectivity in isolates of *C. gloeosporioides* is discussed in relation to host-selectivity of phytotoxins and these preliminary PCR results.

Preliminary studies on regeneration of yam by tissue culture were also conducted. Exudation of growth-inhibiting phenolics was minimised by using yam plantlets grown *in vitro* as the source of petiole explants and culturing under yellow light. Root organogenesis was observed in older callus and cell suspension cultures. Viable cell suspensions were established from callus cultures of yam and also used in phytotoxin screening tests.