TRICOTHECENES PRODUCED BY FUSARIUM ACUMINATUM FROM CORN FIELD

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Fusarium acuminatum Ell. et Ev. is a fungus occurring worldwide as a soil saprophyte and as a secondary invader associated with root, foot, and stem rot of a great variety of plants in temperate and tropical areas (ref. 1). Some toxic isolates of this species have been reported to produce T-2 toxin and trichothecenes closely related to it (ref. 1-2).

In this note the production of trichothecenes by F. acuminatum isolated in Italy from corn field is described.

The culture extracts of eight strains of F. acuminatum, isolated from corn stalk (2 strains), corn ear (1 strain) and soil (5 strains), were shown to be highly toxic to Artemia salina larvae (100% mortality at the rate of 5 mg culture equivalent per 0.5 mL), and inhibited the growth of tomato seedlings (about 40% shoot growth inhibition and 83% root growth inhibition at the rate of 100 mg culture equivalent per mL). All the tested isolates, cultured on autoclaved corn kernels at room temperature for 4 weeks, produced considerable amounts of polyacetylated trichothecenes, which carry the major responsibility for the strong biological activity. The main metabolites, produced at rates higher than 100 mg/Kg, were 8-acetoxynesolaniol and "acuminatin" (3 α ,4 β -dihydroxy-8 α ,15-diacetoxy-12,13-epoxytrichothecene), a newly discovered trichothecene (ref. 3). Neosolaniol, NT-1 (4,8-diacetoxy T-2 tetraol) and tetraacetoxy T-2 tetraol were mostly produced in the concentration range 2-20 mg/Kg. Monoacetylated trichothecenes, namely 4-, 8-, and 15-acetoxy T-2 tetraol, were also present as minor metabolites in the culture

extract of one of the tested isolates. Other important trichothecenes, including T-2 toxin, HT-2 toxin, diacetoxyscirpenol, deoxynivalenol, 3-acetyldeoxynivalenol and fusarenone, were not detected at rates higher than 2 mg/Kg.

The isolates of F. acuminatum of the present study differ from those previously reported in literature mainly because 8-acetoxynesosolaniol, instead of T-2 toxin (having an acetate instead of an isovalerate group at C-8_α position), is the major metabolite to which all the other trichothecenes are related. The production of 8-acetoxynesosolaniol, as well as other trichothecenes with an acetate at C-8_α position, seems then to be a peculiarity of this group of isolates originating from corn stalk, ear, and soil in Italy. The use of such a characteristics could be suggested as a chemotaxonomical marker of this particular type of F. acuminatum, although more isolates need to be investigated for toxigenicity in order to establish if there is any relationship between host, substrate or geographical origin and the type of trichothecenes produced.

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