PRODUCTION, ISOLATION AND CHARACTERIZATION OF TRICHOTHECENES FROM FUNGI

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Dissertation submitted to the Faculty of the Graduate School of the University of Maryland in partial fulfillment of the requirements for the degree of Doctor of Philosophy
1985

ABSTRACT

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Several Myrothecium isolates have been investigated with respect to their ability to produce macrocyclic trichothecene esters. Myrothecium verrucaria CL-72 in liquid culture produces roridin H and isororidin E as the major metabolites. M. roridum isolate 4582 produces no macrocyclic or trichoverroid trichothecenes, in solid or liquid media but instead produces only simple trichothecenes, the principal one of which is 7α-hydroxytrichodermol. On rice substrate, M. roridum CL-514 (ATCC 20605) was found to produce a new class of macrocyclic trichothecenes known as roritoxins. The roritoxins (A-D) contain a tetrahydropyranyl ring fused to a γ-lactone or lactol ring in the macrolide sidechain and are analogous in structure to vertisporin except that the roritoxins contain the Z,E-diene system common to most of the macrocyclic trichothecenes. Roritoxin C is unique in that it possesses a 9β,10β-epoxide group which heretofore has never been

found naturally in trichothecenes isolated from fungal sources. In liquid medium, M. roridum CL-514 (ATCC 20605) produces yet another new antibiotic which was found to be an isomer of epiepoformin and named as isoepiepoformin ((+)-(1R,5S,6R)-5-hydroxy-4-methyl-7-oxabicyclo[4.1.0]hept-3-3n-2-one.)

Fermentation on rice substrate of a S. atra isolate (D1132) led to the isolation of trichoverrols A and B in addition to the expected trichothecenes roridin E and satratoxins F, G and H, strengthening the idea that trichoverrols A and B are biosynthetic precursors to the macrocyclic trichothecenes. The yields of satratoxins also were greatly improved in this fermentation.

Verrucarin B, verrucarin J, satratoxin H and trichoverrins A and B were isolated from a field sample obtained from a house in suburban Chicago, Illinois, where the occupants of the house were complaining of maladies similar to those observed in trichothecene toxicosis. The fact that trichothecenes were isolated from the field sample itself and not from the laboratory growth of the problem-causing fungus makes this isolation important. Also this is the first time that stachybotryotoxicosis has been reported in North America.

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