

A NEW ANTIFUNGAL
ANTIBIOTIC FROM
ASPERGILLUS VERSICOLOR

Sir:

Extensive screening of natural sources including fruits, vegetables, ripe and rotten, and soils resulted in the isolation of an antagonist *Bacillus subtilis*, which produces an antifungal antibiotic named mycobacillin¹. It is a cyclic polypeptide whose amino acid sequence has been worked out². However, it did not prove to be clinically useful³. As a result of a fresh screening, a new antagonist later on identified as *Aspergillus versicolor*⁴ has been isolated which produces an antibiotic highly specific against *Trichophyton rubrum* which causes 90 % of skin infections in Eastern India.

Species belonging to *Aspergillus versicolor* group (as per THOM and RAPER) are known to produce one antifungal antibiotic, *viz.*, humicolin^{5,6} by *A. humicola* and two antibacterial antibiotics⁷, namely versicolorin and sterigmaupsin from *A. versicolor*. This communication reports the isolation of a new antifungal antibiotic from the said species.

Fermentation was carried out in simple glucose-peptone medium. The antibiotic was extracted from the fermented broth by butanol or amyl acetate. After removal of the solvent under reduced pressure the crude material was purified by chromatography on acid alumina column followed by ethyl acetate elution. The eluted material was recovered by evaporation and further purified by sublimation at 110~120°C and 0.01 mm of Hg. The antibiotic was obtained as a white sublimate which was further purified by crystallising from chloroform-petroleum ether mixture (1:4) to give white needle-shaped crystals, m. p. 125±1°C. The homogeneity of the antibiotic was proved by paper chromatography, bioautography and thin-layer chromatography on silica gel.

The antibiotic is highly soluble in water and the solution is acidic. It is also soluble in alcohols, esters, chloroform, and carbon tetrachloride, but insoluble in benzene and

petroleum ether. It is stable in solution at acid pH and is inactivated above pH 7.0. Electrometric titration showed no sharp equivalent point. Elemental analyses show that it possesses the formula C₇H₅O₃ (Mol. wt. 140). And the molecular weight determined by the RAST method is 200. The ultraviolet absorption spectrum in absolute ethanol shows maxima at 288 mμ (E_{1%¹cm} 280) and 206 mμ (E_{1%¹cm} 1760). The infrared absorption spectrum in Nujol mull shows strong peaks at 3345 cm⁻¹, 1600 cm⁻¹ and 1250 cm⁻¹.

The antibiotic gives positive 2,4-dinitrophenylhydrazine, TOLLENS, and ferric chloride tests. It reduces FEHLING'S solution at room temperature. It gives a purple coloration with nickel and copper acetate solution. It decolorises neutral permanganate and bromine in carbon tetrachloride. It gives a permanganate color with NaHCO₃ and ammonia solution. It does not form a picrate. It gives negative tests for steroids.

The antibiotic is active against only a few species of pathogenic fungi, *viz.*, *T. rubrum*, *T. tonsurans*, *T. mentagrophytes*, *Epidermophyton floccosum*, *Microsporium adouini*, etc., and has no activity against *Candida albicans*, *Aspergillus niger* (G₃Br), *Bacillus subtilis*, yeast and other yeast-like fungi and other gram-positive and gram-negative bacteria. The minimum inhibitory concentrations (mcg/ml) as determined by agar streak dilution method are as follows: *T. rubrum* 2.0, *T. tonsurans* 2.0, *M. adouini* 2.5, *E. floccosum* 4.5 etc. Intravenous injection of 150 mg/kg caused no ill effect to mice.

The physical chemical evidence and the antimicrobial spectrum of the antibiotic show that it is new and altogether different from the known antibiotics from *Aspergillus* species.

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