Biological Properties of Acmycin, a New Polyene Antibiotic

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ABSTRACT. Acmycin, a new polyene antibiotic, was fungistatic at low and fungicidal at high concentrations. It produced malformations in conidia of Helminthosporium oryzae and Curvularia lunata and caused leakage of yeast cells. Acmycin was fairly nontoxic to germinating seeds. The intravenous LD₅₀ was 300–400 and intraperitoneal maximum tolerated dose 100–500 mg/kg body mass of mice.

A soil actinomycete Streptomyces sp. AC₂ produced a new polyene antibiotic acmycin (Chakrabarti and Chandra 1982). The inhibitory effect of acmycin on fungi and its toxicity to seeds and animals are being presented here.

MATERIALS AND METHODS

Stock solutions of acmycin were prepared in water. Saprophytic and plant pathogenic fungi were grown in Czapek-Dox and human pathogenic fungi and yeasts were grown in Sabouraud’s media. Incubations were made at 30 °C in closed cabinets to minimize the effect of light on the antibiotic.

Effect on filamentous fungi. Inhibitory levels of acmycin were determined by a modified method of Kristic (1967). For fungistatic studies, fragments of fungal mycelia scraped off from 2–8-d slant cultures were washed in sterile distilled water, blotted on sterile filter paper and transferred to liquid media containing acmycin at different concentrations. Growth was noted after 8 d. For fungicidal studies fragments of washed mycelia were transferred to tubes containing acmycin (1 mg/mL) in liquid media. After contact with the antibiotic for different hours the mycelial fragments were transferred to agar plates. Growth was noted after 4 d.

Effect on conidia. Helminthosporium oryzae and Curvularia lunata were grown on slants for 4 d, spores collected in 10 mL sterile distilled water, the suspension shaken vigorously, filtered aseptically through cotton pads, centrifuged and the pellets suspended in sterile distilled water. The spore density was adjusted using a haemocytometer. About 100 conidia were added to 1 mL melted agar containing different amounts of acmycin and the agar was spread into a thin layer on a sterile microslide. The slides were placed in sterile Petri dishes lined with moist cotton and incubated. The effect of acmycin on conidia and hyphae were observed at a 450-fold magnification.
The fungistatic level of acmycin on filamentous fungi ranged from 5.5 to 50 μg/mL (Table I). Curvularia lunata, Helminthosporium sativum and Blastomyces dermatitidis were most susceptible, with inhibition of growth above 75% after 5 days of incubation. The inhibitory effect of acmycin on yeasts was also noted, with inhibitory activity ranging from 5.5 to 50% after 30 min of incubation. The leakage experiments revealed that the compound had an inhibitory effect on the leakage of compounds containing purine and pyrimidine bases, measured at 260 nm. Amino nitrogen and sugars were analyzed with ninhydrin (Block 1956) and anthrone (Dische 1955) reagents, respectively. Toxicity tests of acmycin were conducted on mice by intravenous and intraperitoneal injections. Acmycin was dissolved in saline and injected. Toxic symptoms were observed for 7 d.

RESULTS AND DISCUSSION

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