

Antimicrobial Activity of *Coprinus* Pers. Isolates

Olga V. Efremenkova, Ekaterina Y. Ershova, Irina V. Tolstych, Valentina A. Zenkova, and Yuri V. Dudnik

Gause Institute of New Antibiotics RAMS, 11 Bolshaya Pirogovskaya, Moscow 119992, Russia

The spread of pathogenic multidrug resistant microorganisms made practical the introduction of new antibiotics into medical practice. Fungi of the genus *Coprinus* (family Coprinaceae) are practically unknown as producers of antibiotics, so our task was to investigate the antimicrobial activity of *Coprinus* representatives.

Antimicrobial activity of 14 strains of this genus: *C. micaceus* (Bull.) Fr. VKM F-2945, VKM F-2946, *C. comatus* Fr. 2957, *C. congregatus* (Bull.) Fr. 2961, 3003, *C. radiatus* (Bolt.) Fr. 2965, 2987, *C. digitalis* (Batsch) Fr. 2956, *C. delicatulus* 3046, *C. sp.* 2958, 2959, 2960-1, 2960-2, 3002 has been studied. Three strains were obtained from cultural collections and a further 11 were isolated from nature (Moscow and Kirov regions of Russia). Spore germination was controlled using a light microscope; four strains formed fruiting bodies on agar media.

Thirteen of the fourteen strains demonstrated antimicrobial activity on submerged cultivation. As test organisms *Bacillus subtilis* AONN 6633, *B. mycoides* 537, *B. pumilis* NCTC 8241, *Leuconostoc mesenteroides* VKPM B-4177, *Micrococcus luteus* NCTC 8340, *Staphylococcus au-*

reus FDA 209P (MSSA), INA 00761 (MRSA), INA 00762 (MSSA), *Escherichia coli* ATCC 25922, *Comamonas terrigena* ATCC 8461, *Pseudomonas aeruginosa* ATCC 27853, *Aspergillus niger* INA 00760, *Saccharomyces cerevisiae* RIA 259, and *Candida albicans* INA 00763 were used. Activity of strains varied and in six strains was found only after extraction and concentration of biologically active substances.

Twelve strains produced substances effective against Gram-positive bacteria, seven strains against Gram-negative bacteria, and six strains against fungi. Predominantly *Coprinus* strains demonstrated a wide spectrum of antimicrobial activity. Activity against only Gram-positive microorganisms (including methicillin-resistant and -sensitive strains) was found in two fungi (NN 2987 and 3002), against Gram-positive and Gram-negative in six; activity against only one Gram-negative bacterium (*E. coli*) was found only in one strain (2870). No *Coprinus* strain revealed antifungal activity only.

According to our data *Coprinus* representatives are prospective sources of antibiotics. Chemical and biological properties of new substances will be the purpose of further studies.