Growth Stimulatory Effect of Mycelium of Several Coprinoid Mushrooms

Badalyan S.M.[1], Karapetyan H.V.[1], M. Navarro-González[2] and U. Kües[2]

[1]Yerevan State University, Laboratory of Fungal Biology and Biotechnology, 1 A. Manoogian St., 0025, Yerevan, Armenia

[2] Georg-August-University Göttingen, Section Molecular Wood Biotechnology and Technical Mycology, Büsgen-Institute, Büsgenweg 2, D-37077, Göttingen, Germany

The traditional genus *Coprinus* Pers. (Coprinaceae) comprising around 200 species (Coprinoid mushrooms, CMs). Recent phylogenetic data subdivided it into 4 new clades: *Coprinus* (Agaricaceae), *Coprinopsis*, *Coprinellus* and *Parasola* (Psathyrellaceae).

The CMs are producers of several bioactive metabolites (tri-, sesquiterpenes, quinones, glucans, proteins, etc.) and enzymes (proteases, phenoloxidases, etc.) with immune-modulating, antifungal, thrombolytic, hypoglycemic, antiprotozoal, regenerative/mitogenic and other effects, however in terms of biotechnology we are far away from exploiting these organisms. Mainly fungal lectins, terpenoids, phenolic and indolic compounds possess growth stimulatory/mitogenic effect. Up to now, fungal mitogenic lectins and mechanism underlying their growth stimulatory effect have not been sufficiently investigated.

Growth inhibitory and stimulatory effects on epigeal and/or hypogeal parts of wheat and maize plants were detected by cultural liquid (CL) and mycelial extract (ME) samples of CMs obtained after 4 days submerged cultivation of 20 strains 12 species (*Coprinus comatus*, *Coprinellus curtus, C. disseminatus, C. domesticus, C. ellisii, C. flocculosus, C. micaceus, C. radians, C. xanthothrix, Coprinopsis atramentaria, C. cinerea, C. strossmayeri)* in liquid malt-extract medium (pH 6.5, 25^{o}C, 200 rpm).

The CL samples show growth inhibitory, whereas the ME samples growth stimulatory effects on both plants. The highest (80-95%) inhibitory effect was detected by CL samples of *Coprinellus* species (*domesticus, disseminatus, curtus, micaceus, ellisii, flocculosus, radians)*. Effect was relatively weaker (65-85%) in *Coprinopsis* species *(cinerea, strossmayeri, atramentaria)* and 5 strains of *Coprinus comatus.* No significant organotropic inhibitory effect by CL samples was detected. Strong growth inhibition was revealed on hypogeal parts of maize rather than wheat growing seeds. Up to 2.5 fold increase growth stimulatory (mitogenic) effect was observed by ME samples of tested *Coprinellus*, then *Coprinus* and *Coprinopsis* species.

Revealed mitogenic effect in ME samples of tested CMs makes their further screening promising to develop new biotech-products useful in treatment of wounds, burns, ulcers and other conditions. The selected *Coprinellus* species (*disseminatus, domesticus*, *radians)* and Armenian collections of *Coprinus comatus,* particularly strain Cc-IV could be perspective for further study to obtain new mushroom based tissue regenerative pharmaceuticals.