

Pigments and Citrinin Biosynthesis by Fungi Belonging to Genus *Monascus*

Emiliya Pisareva^a, Valentin Savov^b, and Anna Kujumdzieva^{c,*}

^a National Bank for Industrial Microorganisms and Cell Cultures, 125 Tsarigradsko shouse blvd., bl. 2, p.b.239, 1113 Sofia, Bulgaria

^b Department of Biotechnology, Faculty of Biology, The Sofia University St. Kliment Ohridski, 8 Dragan Tzankov St., 1164 Sofia, Bulgaria

^c Department of General and Industrial Microbiology, Faculty of Biology, The Sofia University St. Kliment Ohridski, 8 Dragan Tzankov St., 1164 Sofia, Bulgaria.

Fax: +35928668619. E-mail: kujumdzieva@biofac.uni-sofia.bg

* Author for correspondence and reprint requests

Z. Naturforsch. **60c**, 116–120 (2005); received September 9/November 15, 2004

Citrinin is a mycotoxin, which is produced by fungi belonging to the genus *Monascus*, known in biotechnology as producers of azaphilone pigments. The relation between biosynthesis of these secondary metabolites was investigated in different species of the genus *Monascus* in batch-culture at the following cultivation conditions: $T = 28\text{ }^{\circ}\text{C}$, agitation 220 rpm, and a medium, which induce citrinin production, containing ethanol as a carbon source.

The screening was carried out with 16 fungal strains and the biosynthesis of citrinin and pigments was monitored quantitatively at the standard conditions mentioned above. Some kinetic parameters of the process have been determined. The values of the growth yield coefficient $Y_{X/C}$ were between 0.32 and 0.57. The amount of the extracellular red and orange pigments at the end of cultivation varied for the different strains between 0.09 and 1.33 OU/mg dry weight, and 0.15 and 0.96 OU/mg dry weight, respectively. The amount of the total pigments measured was between 0.16 and 3.6 OU/mg dry weight, and between 0.21 and 3.39 OU/mg dry weight. The determined ratio 500 nm/400 nm, characterizing the pigment production, ranged between 0.60 and 1.06. Twelve of the investigated strains produced citrinin and pigments, two of them produced only pigments. Two strains were not able to produce neither pigments nor citrinin.

Thus, the biosynthesis of citrinin appeared to be strain-specific and does not correlate with the pigments' biosynthesis by the fungal strains belonging to the genus *Monascus*.

Key words: *Monascus*, Citrinin, Pigments