STUDY OF THE ENZYMATIC PROPERTIES OF FUNGI IN THE "LA IZVOR" AQUATIC ECOSYSTEM

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The physiological adaptability of fungi and the multi-enzyme metabolic system is the basis of their amazing ability to develop in various environmental conditions, considered the engines of natural ecosystem restoration. They are natural decomposers of organic matter to absorb their nutrients, thus allowing recycling, mineralization and release of compounds for the community and ecosystems. Extracellular enzymes of fungal origin, both redox and hydrolytic, have been reported for various industrial and biotechnological applications, such as the medical, agricultural, pulp and paper, textile, detergent, food processing and biofuel industries; as well as bioremediation. In addition, fungal enzymes have a significant advantage over those derived from plants or animals due to their ease of handling, rapid production in low-cost media, higher yields, and catalytic activity.

The purpose of the research was to study the enzymatic properties (amylase, catalase, cellulase, lipase) of 93 strains of micromycetes representing the genera *Aspergilus*, *Penicillium*, *Trichoderma*, *Fusarium*, *Mucor*, *Rhizopus*, isolated from the "La izvor" aquatic ecosystem. Strains were isolated from water (35 strains), biofilm (28 strains) and silt (30 strains). Express tests were performed to determine the enzyme capacity: amylase, catalase, cellulase, and lipase. When determining the enzyme capacity, specific indicators were used for each enzyme: amylase - Lugol's solution, catalase - H_2O_2 (3%), cellulase - carboxymethylcellulase and Congo red, lipase - Tween 80. The enzyme activity was assessed as: (+++) – high; (++) – average; (+) – weak; (-) – missing.

As a result of the research on the strains isolated from the water, it was found that, in 12 strains, the activity of catalase was at an average level (++), in 11 strains - weak (+), and in 12 strains this activity was missing (-). Amylase, lipase, and cellulase activities were also weak in most strains tested. Only 4 strains registered an average enzymatic activity (++) of the 3 enzymes. In the rest of the strains, the activity of these enzymes is weak (+) or absent (-). The activity of amylase was not manifested in 10 strains, of lipase in 13 strains, and of cellulase in 12 strains. None of the tested strains showed medium-level activity of the studied enzymes, and medium-level enzymatic activity of 3 enzymes did - the strains isolated from water: A 12 and A 14.

In the strains isolated from the biofilm, the enzymatic capacity of the 4 enzymes was presented as follows, catalase activity: average (++) - 3 strains, weak (+) - 15 strains, missing (-) - 10 strains. Amylase activity: 2 strains – medium, 11 strains – weak, 15 – missing. Lipase and catalase activity in the tested strains was also weak or absent. None of the strains isolated from the biofilm showed moderate lipase and cellulase enzyme activity. Lipase activity was missing in 9 strains, and cellulase activity in 18 strains.

Thirty strains isolated from the silt were tested. From the 30 strains tested, catalase activity at a medium level (++) was recorded in 20 strains, at a weak level (+) in 8 strains and absent (-) in 2 strains. Amylase activity at a medium level - 18 strains, at a weak level - 10 strains, and missing in 2 strains. Lipase activity at a medium level - 18 strains, at a weak level - 9 strains, missing (-) in 3 strains. Cellulase activity: medium level - 6 strains, weak level - 19 strains, missing in 5 strains. Thus, we can state that from an enzymatic point of view the most active strains are the strains isolated from the silt. In 4 strains, the enzymatic activity of catalase, amylase, lipase and cellulase was recorded at medium level (++). These are strains N 5, N 7, N 12, N 14.

According to the obtained results, we can mention that the aquatic strains of micromycetes possess selective enzymatic properties. The most active ones possessing significant enzymatic properties (A 12 and A 14, N 5, N 7, N 12, N 14) were selected for further research.

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