

PRODUCTION OF EXOPOLYSACCHARIDES BY MEDICINAL MUSHROOM *GRIFOLA FRONDOSA* IN SUBMERGED CULTURE

Vershynina K, Mykhalchuk V, Linovytska V.

National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

e-mail: vershyninakate@gmail.com

Various nutritional, medicinal and prophylactic properties of basidiomycete *Grifola frondosa* (maitake) promote an interest in investigations of that fungus. Pharmacological activity of products obtained from these fungi is conditioned of polysaccharides - beta-glucans having immunomodulation, antitumor, antiviral, antimicrobial and others effects. However, preferably maitake is cultivated on solid plant substrates and thus produce fruiting bodies from which endopolysaccharides are obtained and used. At the same time, these species in the conditions of submerged cultivation is less studied. There are also insufficient data on the peculiarities of exopolysaccharides *G. frondosa* biosynthesis. Therefore, investigation of *G. frondosa* in the cultivation of this fungus in the submerged culture is currently important.

This work is devoted to studying the production of biomass and exopolysaccharides by two strains of *Grifola frondosa* (Dick.) Gray in condition of cultivation in the liquid nutrient media with different pH.

Cultivation was carried in flasks on the shaker (120 rpm) at +28°C, 15 days, in liquid medium: NH_4NO_3 – 3 g/L; KH_2PO_4 - 1 g/L; K_2HPO_4 - 1 g/L; $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ – 0,4 g/L, glucose - 20 g/L and molasses - 10 g/L (Linovytska, Bukhalo, 2007). The most favorable pH values for the accumulation of biomass and exopolysaccharides by *G. frondosa* strains were determined in the above synthetic medium, in which by changing the concentration of KH_2PO_4 and K_2HPO_4 , solutions with different pH values from 4.7 to 8.1 were obtained. Acidity was determined by potentiometric method using a pH meter. Determination of the concentration of exopolysaccharides was performed by the phenol-sulfur method (Varbanets, 2006). Determination of biomasses production was weighing method.

Under the conditions of cultivation on the liquid nutrient media, favorable for the mycelial growth pH values were determined: for strain 1790 — pH=6.0, and for strain 1794 pH 5.4. The acidity of the nutrient media that promotes the biosynthesis of exopolysaccharides was determined: pH 6.0 for strain 1790 and pH 5.8 for strain 1794. The dynamic of biomass production was similar for two strains *G. frondosa* – the highest importance were registered on the 6-7 days of cultivations. The maximal level of exopolysaccharides biosynthesis was on the 10-11 day. The highest level of biomass accumulation was found on media with molasses for strain *G. frondosa* 1790 - 5.1 g/L and for strain *G. frondosa* 1794 – 4.2 g/L.

The highest concentration of exopolysaccharides was 2.8 g/L in strain *G. frondosa* 1790 and 1.3 g/L in strain *G. frondosa* 1794.

Thus, for the promising for biotechnological application strain *G. frondosa* 1790, the duration and conditions of submerged cultivation were determined to obtain the target products - biomass and exopolysaccharides.