EVALUATION OF ORGANIC WASTE APPLICATION EFFICIENCY FOR SYNTHESIS OF CHOLESTEROL OXIDASES

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One of the major challenges in biothechnology is the rational disposal of enormous volumes of organic wastes released by the global industrial sector. Molasses and glycerol are referred to widely distributed types of waste materials.

Molasses is a by-product of sugar refining. Its yield is approximately 4,6% by weight of the processed sugar beet mass. Molasses is distinguished by unpleasant odor and taste making it largely inedible for humans.

Glycerol is one of the main components of organic waste discharged by manufacturers of biofuel, foodstuffs and cosmetics. Significant amounts of glycerol are generated during commercial distillation of alcohol in rectifying columns, bioethanol fermentation from vegetable feedstock and in biodiesel process where glycerol acts as the principal by-product. Each gallon of produced biodiesel is known to be accompanied by output of around 0,3 kg of crude glycerol amassing annually in Europe the stockpile over 60 thousand tons.

In this regard research of methods to utilize wastes containing molasses and glycerol is a vital prerequisite for launching eco-safe biotechnologies.

Aim of the study was to estimate efficiency of organic waste (glycerol and molasses) application on growth of mycelial fungi and synthesis of cholesterol oxidases (ChO).

Earlier we performed screening of new mycelial fungal strains synthesizing ChO and selected the cultures showing the highest level of enzyme production.

It was found in the course of the study that supply into the nutrient medium of 2,5-5,0% molasses increased ChO generation level in *A. aliaceus* F and *A. aliaceus* by 1,8 times, equaling 0,08 U/ml and 0,076 U/ml, respectively. Biosynthesis of enzyme by *A. niger*, *P. kapuscinskii* and *P. chrysogenum* remained on the control level (0,036-0,048 U/ml). Decline of enzyme biosynthesis 2-fold (0,022 U/ml) occurred in *P. roquefortii* culture. As to growth parameters of these fungi, it should be noted that in case of supplementation of molasses biomass accumulation either stayed on the control level (6,06 mg/ml) or rose twice (14,98 mg/ml).

When 2,5-5,0% glycerol was fed to the nutrient medium ChO production fell 2-10 times in *A. aliaceus* (0,004-0,02 U/ml) and was not evident at all in *A. aliaceus* F and *A. niger*. Cultivation of *P. canescens*, *P. kapuscinskii* and *P. roquefortii* with 2,5-5,0% glycerol decreased ChO biosynthesis level by 1,25-1,75 times (0,012-0,044 U/ml). Supply of 5,0% glycerol into the cultural medium with *P. chrysogenum* kept biosynthetic capacity of the strain on the control level (0,028 U/ml). Analysis of biomass accumulation showed that upon supply of glycerol in tested amounts concentration of biomass was comparable to the control (4,23 mg/ml) or rose twice (8,87 mg/ml).

Thus, it was established that in some strains of mycelial fungi producing ChO it is possible to substitute glycerol and molasses as carbon sources in the nutrient media achieving the same level of enzyme biosynthesis (*A. niger*, *P. kapuscinskii*, *P. chrysogenum*) or even increasing it 1,8 times (*A. aliaceus* F, *A. aliaceus*).

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