

Biomass production of carotenoid synthesizing yeasts of genus *Rhodotorula* at cultivation on agricultural wastes

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Abstract

Carotenoids are biologically active substances that play an important role in the course of physiological processes in humans and animals. Besides to plants, many microorganisms are able to synthesize carotenoid pigments, therefore they are used as producers in the industrial production of carotenoids. The yeasts of genus *Rhodotorula* can synthesize carotenoids, the cultivation of which can be carried out using various sources of carbon, including components of plant raw materials. The possibility of using secondary plant raw materials (by-products of the agricultural and food industry, substandard raw materials) allows solving the problems of their processing, that is actual at the present time.

This research work is devoted to evaluating the bio-potential of various types of plant raw materials for the cultivation of carotenoid synthesizing yeasts *Rhodotorula rubra*.

It is found that pretreatment of plant raw materials, as well acid hydrolysis as enzymatic, allows increasing the availability of nutrient components, while the content of total carbohydrates in hydrolysates reaches 30.0-40.0 g/L. The degree of assimilation of carbohydrates by yeast *Rhodotorula rubra* is 60.0-80.0%, the accumulation of biomass varies in the range from 8.0 to 10.5 g/L.

Analysis of the carotenoid composition of the biomass showed that the amount of pigments and their ratio varies depending on the type of substrate, on the method of its processing, and ranges from 50.0 to 550.0 µg/L. The greatest potential for microbial synthesis of carotenoids by yeast *Rhodotorula rubra* is beet molasses and acid hydrolysates of deproteinised sunflower meal and of Jerusalem artichoke tuber, the maximum yield of pigments from a liter of culture fluid being 507.0, 545.0 and 180.3 µg, respectively.

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