

***Rhodosporidium paludigenum* yeasts as a novel biotechnological tool for natural carotenoids production**

E. Sereti, M. Alexandri, D. Tagiou, F. Mpatsolaki, A. Papadaki, N. Kopsahelis*

Department of Food Science and Technology, Ionian University, Argostoli, 28100, Kefalonia, Greece

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Presenting author email: sereti.fani@gmail.com

*Corresponding author email: kopsahelis@upatras.gr; kopsahelis@ionio.gr

Abstract

The growing interest for sustainable and safe food products had directed the scientific interest –among others- towards the microbial valorization of renewable resources for the synthesis of value-added compounds.

In this study, carotenogenesis profile of *Rhodosporidium paludigenum* yeasts was studied using various carbon sources. In particular, two *Rhodosporidium paludigenum* strains (NCYC 2663 & 2664) were evaluated for their ability to produce carotenoids in submerged fermentations, using different carbon sources, such as glucose, sucrose, fructose and a mixture of glucose/galactose, mimicking potential waste streams (e.g. fruit wastes and cheese whey). The results indicated that both strains are oleaginous, since they were able to ferment all tested carbon sources producing not only carotenoids, but also adequate quantities of lipids. The maximum carotenoids (2.5 mg/L) and lipids (6.5 g/L) concentrations, in the case of the NCYC 2663 strain, were obtained using sucrose as a fermentation substrate. On the other hand, the NCYC 2664 strain produced the highest carotenoid concentration (2.9 mg/L) using glucose as a substrate. The highest biomass concentration of 15.9 g/L was achieved by the NCYC 2663 strain, using glucose or a mixture of glucose/galactose as carbon sources. Carotenoids extracts were further characterized by HPLC-DAD analysis, which revealed that β -carotene was the prevalent carotenoid (75-90% of total carotenoids) in all cases, regardless the applied culture conditions. This is the first study exploring the potential of these novel *Rhodosporidium paludigenum* strains to produce carotenoids from different carbon sources, indicating their perspective to exploit a variety of food waste as fermentation substrates.

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