

Optimization of extraction, purification and stabilisation of biologically active compounds from yeast and microalgae biomass

S. Šimanský, M. Szotkowski, J. Holub, H. Obračaj, L. Dzurická, V. Schildová I. Márová

Brno University of Technology, Faculty of Chemistry, Brno, Czech Republic

Nowadays, the rapid growth of biotechnological industry is caused by the flexible capabilities of microorganisms, such as them being able to turn waste materials into valuable compounds. Some of these compounds can be used as vitamin precursors or bio-fuel sources. The practical utilisation of such methods could significantly contribute to waste recovery and circular economy.

The topic of this research is focused on the optimisation of extraction of valuable lipophilic compounds from red yeast biomass, microalgae biomass and a mixture of red yeast and microalgae biomass produced via cocultivation. Solvents used should be suitable for food or pharmaceutical industry, in particular ethanol and hexane. The stability of prepared extracts, while stored at various ambient temperatures, is also tested. The researched microorganisms include strains of yeast from genus *Sporidiobolus*, *Rhodotorula* and *Cystofilobasidium* and strains of microalgae from genus *Chlorella*, *Scenedesmus*, *Desmodesmus* and *Chlamydomonas*. Cultivation of these microorganisms include small-scale fermenter cultivations and cultivations in Pyrex Glass Bottles with profound aeration.

So far, ethanol proved to be better extraction solvent, when it comes to extraction of carotenogenic pigments from the yeast and microalgae biomass, than hexane. However, hexane seems to be more suitable for extraction of lipids. Also, it is worth noting, there have been observed some specific biomass samples, for which both solvents proved to be comparably efficient. Over the course of one month, the prepared extracts exhibited good stability while stored in the freezer and only some of them proved to be stable in the fridge. Compounds in almost all extracts quickly deteriorated, while stored at laboratory temperatures. The future experiments may contain utilisation of mixture of ethanol and hexane of various proportions, which can enhance extraction capacity of the solvents used or a study of addition of tocopherol to the extracts.

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