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Microbial Production of Natural 2-Phenylethanol

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Thanks to its pleasant rose flavor as well as antibacterial and antifungal properties, 2-phenylethanol (2-PE) has huge market demand. After vanillin, it is the second-most-used additive in perfumery, while also being a component in the food and pharmaceutical industries. Although nowadays most 2-PE originates from chemical synthesis, biotechnological production with yeast is becoming increasingly more attractive since it gives a final product classified as natural.

The presented work is focused on microbial production of natural 2-PE. The first stage of the study was the search for yeast strains, isolated from the natural environment, that will efficiently produce 2-PE. With the best producer, we have developed a complete technology of 2-PE production - starting from the biotransformation stage and ending with pure product. In a batch culture conducted in a 5-l bioreactor, we obtained 3.6 g/l 2-PE after 72 h. As 2-PE titer of 2-4 g/l in broth is toxic for yeast, we achieved maximum concentration in a simple batch-culture. Therefore, to enhance productivity we tested extractive fermentation as one of several *in situ* product removal (ISPR) techniques. We showed for the first time that rapeseed oil can be successfully applied for this purpose. In addition, it is also an excellent biomaterial with promising use in the food or cosmetic industries. Recently, our work has focused on reducing the production costs and, to this end, we tested organic waste from agriculture and food processing as cheap feedstock. This approach has two advantages: lowering the price of the culture medium and better management of harmful wastes. Currently, we are working on downstream processing to combine all stages in one complete technology.

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Biography

Karolina Chreptowicz is currently a Ph.D. candidate at the Warsaw University of Technology. She earned her Bachelor and then Master degree in Industrial Biotechnology at the Warsaw University of Technology, Faculty of Chemistry, Poland. Since 2013, she has been working with Dr. Jolanta Mierzejewska in the field of yeast biotechnology. At present, in her Ph.D. thesis, she is involved in the development of a laboratory-scale technology for the production of natural 2-phenylethanol - starting from the biotransformation stage by separating and purifying the final product.