האוניברסיטה העברית - הפקולטה לחקלאות
המכון לביוכימיה, מדעי המזון והתזונה

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הנושא:

Beyond Beer and Bread: Rose Smelling Yeast

המפגש יתקיים
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Abstract:

2-Phenylathanol (2-PE) is an aromatic substance with a rose-like fragrance. This feature makes 2-PE a highly requested product in the perfumery and food industries. Today, most of the production is by chemical means that involves toxic reagents such as benzene and styrene oxide under harsh production conditions. 2-PE is also produced in Nature by many organisms such as yeast and plants, however, efficiency is low for commercial exploitation.
In this research we aimed to accomplish an effective biotechnological process for the production of 2-PE. For this purpose three parallel approaches were studied:
Process Engineering: Saccharomyces cerevisiae is one of the organisms that can produce 2-PE via the Ehrlich pathway. The main drawback of this process is the inhibitory effect caused by 2-PE accumulation during fermentation. Therefore, in situ product removal was employed using hydrophobic polymethylmethacrylate (PMMA) microspheres of narrow size distribution. Fermentation with the addition of 8% (w/v) of PMMA microspheres resulted in a total 2-PE concentration of 7.05 g/L, from which 5.40 g/L were incorporated inside the resin, implying 76% encapsulation.
Natural selective breeding of S. cerevisiae: Using genetic breeding of S. cerevisiae strains, a highly 2-PE-producing strain was isolated. The final 2-PE concentration obtained by the selected strain following ten rounds of breeding was 5.61 g/L in a 2-L fed-batch fermentation, the highest level reported to date by any microorganism.
Genetic engineering of Escherichia coli: The Rosa hybrida cv phenylacetaldehyde synthase (paas) gene was cloned into E. coli. A small scale biotransformation system based on whole-cell catalysis was successfully used to transform L-phenylalanine to 2-PE with a yield of 90% (on a molar basis).
This study created a good basic platform that in our opinion can lead to future integration between the different approaches in order to maximize the effectiveness of environmentally friendly biotechnological processes for the production of 2-PE.

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