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## Flavor enzymatic synthesis



Researchers at the Department of Chemical Engineering at UAB have carried out successfully a flavor enzymatic synthesis. This synthesis allows to obtain a "natural" flavor compound without the high cost of the natural product directly extracted compound. Scientists have synthesized enzymes that are used to produce flavors and also have stated the parameters, such as temperature or the concentration of enzyme, that will provide the optimal conditions for the industrial production of these flavorings.

Flavours are compounds that provide smell and flavor. For this property, these molecules are very attractive as additives for food and cosmetic industries.

Flavours can be extracted from plants and fruits by physicochemical processes. Nevertheless, these direct extraction processes entail high costs because after the physic treatments that have to be applied to the solid feedstock (pressing, filtration, etc), a set of steps are required for the subsequent purification of the desired compound. Despite this disadvantage, flavours obtained

by direct extraction can be commercialized as natural products.

Chemical synthesis is considered as an alternative pathway to the direct obtaining of flavours, reducing this method the cost of the process. However, this methodology of synthesis has the disadvantage that obtained flavours can not be labelled as "natural", reducing this fact the final prize of the product.

The enzymatic synthesis comes up as a biotechnological solution since flavors synthesized by this methodology can be labeled as "natural" but without taking on costs as high as those of the direct extraction.

Most of flavors are esters, and they can be synthesized from the corresponding acid and alcohol by the catalytic action of lipases.

The Bioprocess Engineering and Applied Biocatalysis group of de Chemical Engineering Department from UAB have carried out successfully a flavor enzymatic synthesis. The reaction is based in the ester formation, the ethyl butyrate, which has pine-apple smell, from ethanol and butyric acid. The biocatalysis allows the transformation of the food odor of the acid into the pine apple smell of the ester. The applied enzyme was a recombinant *Rhizopus oryzae* lipase produced by the research group in *Pichia pastoris*.

In the study, the optimal conditions of the flavor synthesis were determined by studying the effect of different parameters on productivity, such as temperature, speed shaking or enzyme concentration.

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## References

Marina Guillén; Maria Dolors Benaiges; Francisco Valero. "Biosynthesis of ethyl butyrate by immobilized recombinant *Rhizopus oryzae* lipase expressed in *Pichia pastoris*" Biochemical Engineering Journal 2012;65:1-9.

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