Use of castor oil and its derivatives to produce γ-decalactone by the yeast *Yarrowia lipolytica*: optimization of operating conditions

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Castor oil is a natural oil obtained from the seed of the castor plant, *Ricinus communis*. It is non-toxic, biodegradable and a renewable resource. Chemically, it is a triglyceride of fatty acids. Approximately 90% of the fatty acid content is ricinoleic acid (12-hidroxioctadec-9-enoic acid), a hydroxylated C_{18} fatty acid that in its esterified form is the major constituent (about 80%) of castor oil, which makes it an abundant compound.

The yeast *Yarrowia lipolytica* is one of the more intensively studied non-conventional yeast species. This microorganism is not only of interest for fundamental research, but also for biotechnological applications (1). *Y. lipolytica* is able to carry out the biotransformation of ricinoleic acid into γ-decalactone (3), a peach-like aroma compound well known in several food and beverages, reason why the food industry has a high interest in its biotechnological production. Since this yeast has a GRAS status, a natural label is conferred to the aroma which is very important, considering the increasing health- and nutrition-conscious lifestyles (2).

In the present work two different ricinoleic acid sources (methyl ricinoleate and castor oil) at different concentrations were tested as substrates. Although higher amounts of γ-decalactone (≅ 2 gL^{-1}) were achieved with oil concentrations of 3% and 5% (v/v) for each substrate, the productivity of the overall process was small (10 to 14.5 $mgL^{-1}h^{-1}$). Work is now focused on the productivity improvement.

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