

## Extraction of lipids from *Yarrowia Lipolytica*

Juan Milanesio<sup>1,2,3,\*</sup>, Pablo Hegel<sup>4</sup>, Yaocihuatl Medina-González<sup>1,2</sup>, Séverine Camy<sup>1,2</sup>, Jean-Stéphane Condoret<sup>1,2</sup>

1. Université de Toulouse; INPT, UPS; Laboratoire de Génie Chimique; 4, Allée Emile Monso, F-31030 Toulouse, France
2. CNRS; Laboratoire de Génie Chimique; F-31030 Toulouse, France
3. IDTQ; Facultad de Ciencias Exactas Físicas y Naturales, Universidad Nacional de Córdoba, Av. Vélez Sarsfield 1611, 5000, Córdoba, Argentina
4. Planta Piloto de Ingeniería Química; PLAPIQUI, Universidad Nacional del Sur, CONICET Camino La Carrindanga Km 7, CC 717, 8000 Bahía Blanca, Argentina

**BACKGROUND:** Microorganisms have often been considered for the production of oils and fats as an alternative to agricultural and animal resources. Extraction experiments were performed using a strain of the yeast *Yarrowia lipolytica* (*Y. lipolytica*), a high-lipid-content yeast. Three different methods were tested: Soxhlet extraction, accelerated solvent extraction (ASE) and supercritical carbon dioxide (SCCO<sub>2</sub>) extraction using ethanol as a co-solvent. Also, high pressure solubility measurements in the systems 'CO<sub>2</sub> + yeast oil' and 'CO<sub>2</sub> + ethanol + yeast oil' were carried out.

**RESULTS:** The solubility experiments determined that, at the conditions of the supercritical extractor (40 °C and 20 MPa), a maximum concentration of 10 mg of yeast oil per g of solvent can be expected in pure CO<sub>2</sub>. 10% w/w of ethanol in the solvent mixture increased this value to almost 15 mg of yeast oil per g of solvent. Different pretreatments were necessary to obtain satisfactory yields in the extraction experiments. The Soxhlet and the ASE method were not able to complete the lipid extraction. The 'SCCO<sub>2</sub> + ethanol' extraction curves revealed the influence of the different pretreatments on the extraction mechanism.

**CONCLUSION:** Evaluating the effectiveness of a given pretreatment, ASE reduced the amount of material and solvent used compared with Soxhlet. In all three cases, the best total extraction performance was obtained for the ethanol-macerated yeast (EtM). Addition of ethanol to the solvent mixture enhanced the oil solubility. Oil can be extracted from *Y. lipolytica* in two different steps: a non-selective ethanol extraction followed by TAG-selective SCCO<sub>2</sub> purification