Optimization of a process for biomass and lipid production from *Rhodosporidium azoricum* on a 200-litre bioreactor

Marco Maresca¹, Daniela Cucchetti¹, Fabio Oldani², Stefano Palmery² and Rossella Bortolo¹

¹Centro Ricerca Novara, Italy
²Istituto Eni Donegani, Italy

The need to find new sources of energy as a viable alternative to fossil fuels not competing with the food-sector is a major focus of research in recent years. At least 20% of oleaginous yeasts’ dry weight is made up of lipids, and these yeasts can accumulate lipids under nutrient-limiting conditions as much as 70% of their dry weight. These lipids can be used for biodiesel and Green Diesel synthesis. Both biomass and lipid production from the oleaginous yeast *Rhodosporidium azoricum* have been optimized on a 200-litre bioreactor. After establishing the best growth conditions from flask to 20-litre bioreactor, the microorganism has been grown in a 200-litre bioreactor. The fermentative process was carried out under various conditions in order to find a good compromise between cell growth (biomass production) and lipid synthesis. Initially, the difference between batch and fed-batch culture was evaluated. Then, the influence of oxygen diffusion on cell growth was verified, in order to establish the minimum amount of oxygen to be supplied without limiting the growth. Finally, an optimization of the nutrients was made, in order to obtain the highest lipid production. Data collected in this study further encourage the development of the process on an industrial scale in order to obtain both bio-based chemicals and fuel production.

Biography

Marco Maresca graduated in Biology in 2004 and then collaborated with Battelle (Switzerland) on environmental remediation. In 2007 - early 2008 he worked as analyst for Athena S.p.A., near Milan. In March 2008 he began to work as exploration technologist for AgipKCO in Holland and Italy. Since October 2009 he worked in Eni laboratories, near Milan, as experimental geology technologist. In April 2011 he started to work as researcher at the Donegani Institute (Novara, Italy). Within the Institute, he currently works at Versalis’ Green Chemistry Research Center on the production of microbial oils, developing the technology on an industrial scale.

marco.maresca@versalis.eni.com