

At-line monitoring flow cytometric approach for lipid and carotenoid detection in yeasts

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Microbial oils can be used as feedstock for biodiesel production. Compared to other vegetable oils and animal fats, the production of microbial oil has many advantages: short life cycle, less labor required and easier to scale-up. However, at present, the major obstacle for commercialization of biodiesel obtained from microbial lipids is the high production cost involved. Therefore it is crucial to explore approaches to reduce the price of microbial biodiesel process as the coproduction of microbial lipids and high value added-products.

Biodiesel production from yeasts may have particular interest as these microorganisms may contain a high lipid content which can be extracted and converted into biofuel.

In addition, some yeasts (*Rhodotorula* sp.) contain carotenoids of high commercial interest (beta-carotene, others) which are used as natural food colorants and feed additives in aquaculture. The co-extraction of lipids and carotenoids from the yeast biomass, in a biorefinery concept, will allow the economical sustainable biofuel production since the high-value added products (carotenoids) will support the fuel production.

Therefore it is crucial to monitor the lipid and carotenoid production when producing these compounds from yeast. If at-line information is available, it is possible to change the process control strategy during the process progress, in order to achieve the maximum productivities by changing the operational conditions (agitation, aeration, medium composition, etc.). Such approach is not possible when using conventional microbiology techniques such as optical density, dry cell weight or colony forming units, currently used for process monitoring.

In the present work we used flow Cytometry to at-line monitor the lipid and carotenoid content in some *Rhodotorula* species. Such approach allows the quick process optimization from bench to pilot scale.

Biography

Teresa Lopes da Silva is a Chemical Engineer, done her Ph.D. degree (Biochemical Engineering) from the University of Évora in 2005. She is a Researcher at the National Laboratory for Energy and Geology (LNEG). She is the head of the Flow Cytometry Group at the Bioenergy Unit/LNEG and leads the Biotechnology Process Group of the Iberian Cytometry Society. She was awarded as a postdoc at the Birmingham University (UK) in 2006. She authored over 30 international peer-review scientific publications.

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