SOLID STATE FERMENTATION OF OIL CAKES WITH YARROWIA LIPOLYTICA FOR LIPASE PRODUCTION

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Body

Vegetable oil industries are very relevant in the Portuguese agro-food sector, with around 350 thousand tonnes of vegetable oils produced in 2017 (INE, 2018). The extraction of these oils from seeds or fruits is associated with the production of high amounts of solid by-products, named oil cakes, and the development of new and eco-friendly strategies for their reuse and valorization is essential (Lomascolo et al., 2012). The high content in nutrient compounds in oil cakes makes these materials a suitable environment for microbial growth, resulting in substrate biotransformation and production of added-value biocompounds (Sadh et al., 2018). In fact, oil cakes have been selected as a solid substrate for solid-state fermentation (SSF) processes and the presence of the residual oil in these by-products induces lipase production (Farias et al., 2014).

Likewise, the aim of the present work was to evaluate lipase production through SSF of different oil cakes with the oleaginous yeast *Yarrowia lipolytica*. Olive, sunflower and rapeseed cakes were used alone or mixed in SSF carried in Erlenmeyers flasks with 10 g of dry substrate during 2 days at 27ºC. A simplex-centroid design was used to evaluate the best substrate for lipase production. Higher lipase activity, 61.5 ± 2.6 U/g of dry substrate, was achieved with a mixture of olive and sunflower cakes (1:1). This mixture resulted in a balanced substrate composition since the lack of nitrogen in olive cake was supplied by the sunflower cake. With these results, we can conclude that the mixture of oil cakes is an appropriate solid medium for the production of industrially-relevant enzymes, without the need of other nutrients or inductors supply.

SSF is an eco-friendly technology with potential for the development of alternative routes for oil cakes applications besides their use as animal feed or fuel.

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