Lipid and Metabolic Profiling of the oleaginous yeast *Rhodotorula slooffiae*

Amaral, J.J.; Machado, K.C.C.; Ochs, S.M.; Silva, G.V.; Martins, J.L.

Diretoria de Metrologia Aplicada às Ciências da Vida, Inmetro, RJ. Brasil.

INTRODUCTION

With the depletion of global petroleum and its increasing price, biodiesel has been becoming one of the most promising biofuels for global fuels market. Researchers exploit oleaginous microorganisms for biodiesel production due to their short life cycle, less labor required, less affection by venue, and easier to scale up. Many oleaginous microorganisms can accumulate lipids, especially triacylglycerols (TAGs), which are the main materials for biodiesel production.

OBJECTIVES

With the interest in the use of microorganisms for the production of biodiesel, we aimed to investigate the lipid and metabolic profile of the oleaginous yeast *Rhodotorula slooffiae* in different cultivation conditions.

MATERIALS AND METHODS

In the present work, we induced lipid accumulation by the oleaginous yeast *Rhodotorula slooffiae* by transferring cells into a nitrogen limited medium. Lipid contents were determined by fluorimetry and confocal microscopy using Nile Red staining. For lipid characterization, total lipids were extracted and analyzed by TLC and GC-MS. Finally, we performed a comparative metabolomic analysis of cell samples obtained thereafter by a ESI-QTOF-MS approach.

DISCUSSION AND RESULTS

In this strain, metabolites belonging to lipid pathways were produced in higher amounts when cultivated in a nitrogen limited medium, as compared to the nitrogen rich one. On the other hand, in the latter medium, it produced higher amounts of carotenoid metabolites. Our data indicated that a nitrogen deficiency environment had a key impact on cellular metabolism that likely stimulated the lipid accumulation process by *R*. *slooffiae*.

CONCLUSION

This work provides valuable information for further exploration of the molecular mechanism of cellular lipid metabolism and should be of great interest in oleaginous microorganisms engineering.

Key words: Lipids; Metabolomics; Yeast; Biodiesel.

Supported by: Inmetro, Faperj, CNPq.