

COMPARISON OF THE EFFICIENCY OF LIPID RECOVERY FROM SPENT BREWER'S YEAST

Arnulfo Ricardo García Arellano, Luis C. Damas Buenrostro, Katiushka Arévalo Niño, Carlos A. Amaya Guerra.

Departamento de Investigación y Desarrollo, Cuahtémoc Moctezuma. Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León. San Nicolás de los Garza, Nuevo León. 66450. ricardoga_lca@hotmail.com

Keywords: Yeast, Lipids, Byproduct.

Introduction. Industrial production of beer generates a large amount of yeast biomass as a byproduct. In 2009, its global generation reached over 31.5 million hectoliters (1). Methods that allow the use of biological components for obtaining value-added products instead of the direct use of waste material could be a viable option to increase revenue in various biotechnology-based industries. Polyunsaturated fatty acids and other lipids, have many applications in various industries, nonetheless, these molecules are in low concentrations and strongly bonded to other components in yeast biomass, which makes difficult its extraction.

The objective of this study is to compare different methods of lipid extraction and select one that allows greater recovery from spent yeast generated by the brewing industry for future exploitation

Methods. Five different extraction methods were analyzed: 1) Direct extraction (2); 2) Soxhlet extraction; 3) Alkaline extraction; 4) Acid hydrolysis followed by extraction with mixture of petroleum ether - ethyl ether 5) Acid hydrolysis followed by extraction with hexane (3). All assays were done at least in triplicate and compared using ANOVA and Tukey's test on the statistic program SPSS 18.

Results. The comparison of the efficiency of extraction was performed gravimetrically by comparing the amount of total fat removed,

obtaining the following results expressed in g/100g: Direct extraction 0.48 ± 0.09 ; Soxhlet extraction 2.15 ± 0.09 ; Alkaline extraction 1.06 ± 0.07 ; Acid hydrolysis followed by extraction with mixture of petroleum ether - ethyl ether 4.07 ± 0.18 , Acid hydrolysis followed by extraction with hexane 4.2 ± 0.19 . ANOVA test showed that there are significant differences between treatments, and Tukey's test showed that Direct extraction, Soxhlet extraction, and Alkaline extraction, does not present significant differences among them but they do against the other two treatments. Finally, the utilization of different solvents in the Acid hydrolysis method did not show significant differences between them.

Conclusion. Based on the results obtained it was observed that the most efficient extraction method is the acid hydrolysis, and that the solvent used in this method does not affect the efficiency of extraction.

Acknowledgement. For financial support of PAICyT-UANL.

References.

1. Pressnell I. 2010. Plato Logic Limited. World Beer Report.
- 2 Lamacka M, Sajbidor J, y Bohov P. 1998. *Biotechnol tech*, 12(8):621–625
- 3 A.O.C.S. (1998). Official Methods and Recommended Practices of the American Oil Chemists' Society. (5th ed.) Champaign, IL: American Oil Chemists Society Press.