



EVALUATION AND ANALYSIS OF THE FERMENTATIVE CAPACITY AND VOLATILE COMPOUNDS PRODUCTION OF MIXED CULTURES OF YEASTS ISOLATED DURING THE FERMENTATION IN THE MEZCAL ELABORATION

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Key words: yeast, fermentation, volatile compounds.

Introduction. Fermentation has an important effect on the alcoholic beverages, because yeast produce both ethanol and many volatile compounds^[1]. In the present research we will study the variation in biomass and ethanol yields, as well as the different volatile compounds produced during alcoholic fermentation in the Mezcal production process, using as substrate *Agave cupreata* extract and pure and mixed cultures strains of yeast (*Kluyveromyces marxianus*, *Dekkera bruxellensis* and *Clavispora lusitaniae* and *Saccharomyces cerevisiae*) isolated from a mezcal-producing region. A Factorial Design will be applied to each species of yeast in flask level and for the mixed cultures an Experimental Simplex Lattice Design at bioreactor level.

The objective is to evaluate the fermentative capacity and production of volatile compounds with yeasts isolated from artisanal producers of Mezcal in Michoacán to improve the quality of the beverage.

Methods. Once constructed experimental designs we will proceed to perform the fermentation kinetics. During each experimental test, response variables will be evaluated as cell growth by counting in Neubauer chamber, substrate consumption by the technique DNS ($C_7H_4N_2O_7$); the ethanol quantification by gas chromatography (GC) and pH monitoring with a potentiometer. Finally, we will distill the mezcal and shall be analyzed to determine its alcohol concentration (with a breathalyzer), and the composition of ethanol^[2], methanol and higher alcohols (GC), dry extract and ashes. Also will be determine the composition of organic compounds (aldehydes, ketones, esters, furfural) by GC^[2] and HPLC. We will identify the presence of minerals such as Ca, As, Pb, Sr, Cu, Fe, Zn, Mg, Mn and K (by Atomic Absorption Spectroscopy). All this will proceed under the application of the rules governing alcoholic-Mezcal beverages and

others. pH, agitation (150 rpm) and aeration (0.1 vvm) values will be constant for all tests.

Results. The pure cultures of yeasts were cultivated in YPD enriched solid medium, the strains were preserved in liquid YPD medium and glycerol at -20°C. Table 1 shows some of the kinetic parameters of growth of the strain *S. cerevisiae*.

Table 1. Kinetic parameters of the strain *Saccharomyces cerevisiae*.

Yeast	Doubling Time (hr)	Division rate (hr ⁻¹)	M (hr ⁻¹)
<i>S. cerevisiae</i>	2.8028	0.3568	0.2473

This strain has a cell growth of approximately 2.03×10^8 cel/ml, with an ethanol production of 11% v / v.

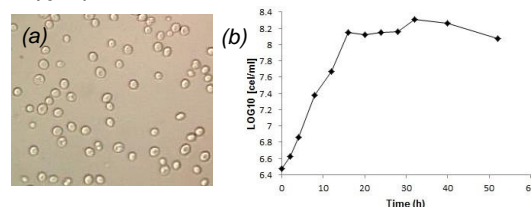


Fig. 1 (a) Micrograph (40 x) of lev. *Saccharomyces cerevisiae*. (b) Growth kinetics of *S. cerevisiae*.

Conclusions. By studying of the pure and mixed cultures of yeasts isolated during fermentation for the elaboration of Mezcal, is possible to analyze the different variables involved in the fermentation process and the influence of each one in the production of ethanol and other volatile compounds, important indicatives for beverage quality.

Acknowledgements. For CONACyT by the funding provided by the grant: 239229, for the Doctorate in Science in Chemical Engineering (U. M. S. N. H.).

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