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BF P21. COMPARATIVE STUDY OF FLOCCULENT AND NON-FLOCCULENT YEAST STRAINS FOR ETHANOL PRODUCTION

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The gradual depletion of crude oil and the biological environmental deterioration resulted from both the fuels over consumption and petroleum-derived transportation have gained attention again, making urgent to develop renewable and environmentally friendly alternatives. Ethanol is an important industrial chemical with emerging potential as a biofuel to replace vanishing fossil fuels, whose utilization could improve energy security and decrease urban air pollution. The entry into force of Law 26,093 of biofuels in Argentina from 2010 will mean an opportunity for the sugar sector to expand ethanol production in order to supply 5% of this alcohol to all the naphthas.

Our work proposes a microbiological approach to use fermentative microorganisms with high tolerance to alcohol in order to increase the currently obtained ethanol concentration (11%) by the alcoholic fermentation of molasses and compare the results when using flocculent or non-flocculent yeast strains for fermentation. To take up this, isolation and identification of ethanol hyper-producing yeasts strains from sugar cane molasses was carried out. Samples of molasses were taken from different mills of Tucumán and used to inoculate YPS (w/sucrose), YPD (w/dextrose) and molasses media with antibiotics. YPS medium with 50g/L sucrose was used for the propagation of microorganisms by incubating in a thermostatically controlled bath at 30ºC with agitation. Fermentations of selected isolates were performed in duplicate in flasks with 200 ml of YPS medium with 250 g/L sucrose and incubated at 30ºC without aeration. Every 8 h, Total Reducing Sugars (TRS), Direct Reducing Sugars (DRS), biomass dry weight and ethanol concentration were determined. Three yeasts isolates showing high ethanol production and named as A2, A10 and A11, which produced 11.74, 12.81 and 13.20% ethanol, respectively, were selected. A10 and A11 were flocculent yeast strains and A2 a non-flocculent yeast strain. These isolates were identified by molecular taxonomy tools according to the sequence analysis of their rDNA intergenic spacers, which allowed assigning identities of 99 and 100% to that of Saccharomyces cerevisiae. Fermentations were carried out with a massive inoculum, which allowed to reduce the time of fermentation, and in the case of the A2 strain an ethanol concentration of 11.95% could be reached after 10 h of incubation, a higher value than the one currently achieved in industry, which is 10%. It was determined that the strain A2 showed an homogeneous growth in liquid media, a feature that is compatible with the technology used in industry. For this reason, the A2 strain could be used in ethanol industrial production without the need for technology investments that would be indispensable for the recycling of flocculent strains. However, the A10 and A11 flocculent yeasts showed a very important potential for ethanol production, and these promising results justify further studies leading to an optimization in the production of bioethanol.

BF P22. OPTIMIZATION OF THE GROWTH OF LACTIC ACID BACTERIA IN DIFFERENT CONCENTRATIONS OF PECTIN EXTRACTED FROM LEMON PEEL

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Probiotics are microorganisms (e.g., bifidobacteria and lactobacilli) that can reach the end of the digestive tract remaining viable and have positive effects on consumer health, whether human or animals.

Pectin is a polysaccharide composed of galacturonic acid monomer units with different degrees of esterification and neutralization. Its applications include elaboration of jams, jellies, candies, essential oils, mayonnaise and cosmetics, among others. It is a protector and regulator of the gastrointestinal system, used in the treatment of hypercholesterolemic individuals.

The aim of this study was to evaluate the growth of probiotic lactic acid bacteria in a culture medium supplemented with different concentrations of pectin.

The studied lactic bacteria, Enterococcus faecium (strain RRC 14) and Enterococcus faecium (strain RRC 38), were provided by the Department of Public Health, School of Biochemistry, Chemistry and Pharmacy of the UNT. Bacteria were grown in LAPTG liquid culture medium, containing yeast extract (1.0 g), peptone (1.5 g), tryptone (1.0 g), glucose (1.0 g), distilled water (100 ml), pH = 7. They were incubated 24 h at 37°C. After that, serial dilutions were performed and 0.5 ml was inoculated in liquid LAPTG medium supplemented with different pectin concentrations (1, 0.1, 0.5%). They were incubated at 37ºC for 24 h and aliquots were withdrawn at different intervals (from 0 to 24 h) to measure the OD_{640} in a spectrophotometer. At the same time, aliquots taken at different times were plated on solid LAPTG medium, supplemented with different pectin concentrations, as before. Plates were incubated for 72 h at 37ºC for viable cell count. The results showed good growth in pectin concentrations of 0.5 and 0.1%, with the advantage to the latter concentration where the lag phase was reduced by 75% for strain RRC38 and 50% for strain RRC14. The viable counting when using 0.1% pectin was 1.03×10^{10} CFU/ml for strain RRC14, and 0.74×10^{11} CFU/ml for strain RRC 38. With 0.5% pectin, 0.82×10^{10} CFU/ml for strain RRC14 and 0.80×10^{11} CFU/ml for strain RRC38 were found. Values were lower when using 1% pectin in the grown medium. These results showed the ability of the assessed lactic bacteria to grow at low concentrations of lemon´s pectin with an adequate number of viable cells and in a short period of incubation, thus giving the possibility for using them in the formulation of a symbiotic diet.