# DETERMINATION OF PARAMETERS OF CO-CULTURE FOR FERMENTATION OF LIGNOCELLULOSIC RESIDUES TO OBTAIN ETHANOL

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**Introduction.** It requires efficient methods to exploit sugars from lignocellulosic residues for ethanol production economically viable. The use of co-cultures in fermentation allows both hexoses avail as pentoses present. The co-culture microorganisms must maintain stable cooperation and be able to grow together. The aim of this work is to achieve high concentrations of ethanol by combining yeast capable of metabolizing pentoses and hexoses simultaneously.

**Methods.** Inoculum for co-culture was prepared from *S. cerevisiae* and *P. stipitis* with a concentration of 2.8 x10 8UFC. Using a Plackett Burman Experimental Design, we examined the effect of the following factors: substrate (corncob and residues Central de Abasto (CEDA) hydrolysates), temperature, agitation, percentage of yeast in the co-culture and trace elements. The consumption of sugars was determined by the DNS method (Miller, 1960) and production of ethanol by gas chromatography.

**Results.** Figure 1 shows the production of ethanol at different times.

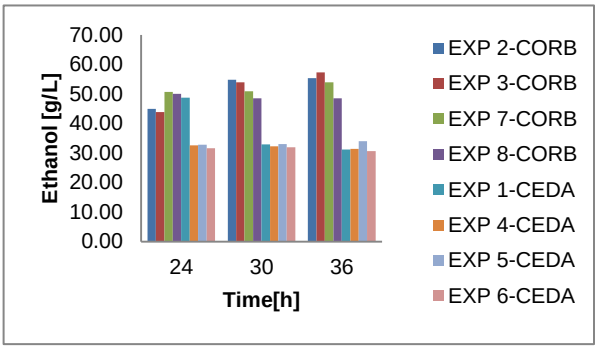


**Fig.1** Ethanol production experiments matrix.

Experiments with the best results; cob hydrolyzate fermented with 75% of *P. stipitis*, 140 rpm agitation at 32 ° C with an efficiency of 82% on theoretical. In CEDA hydrolysates with 75% *P. stipitis*, agitation of 100 rpm at 32 ° C with an efficiency of 81% of theoretical. Figure 2 shows the production of ethanol according to the concentration of sugars and hydrolysis products CEDA cob. Experiments with the best results; cob hydrolyzate fermented with 75% of P. stipitis, 140 rpm agitation at 32 ° C with an efficiency of 82% on theoretical. In CEDA hydrolysates with 75% P. stipitis, agitation of 100 rpm at 32 ° C with an efficiency of 81% of theoretical. Figure 2 shows the production of ethanol according to the concentration of sugars and hydrolysis products CEDA cob.

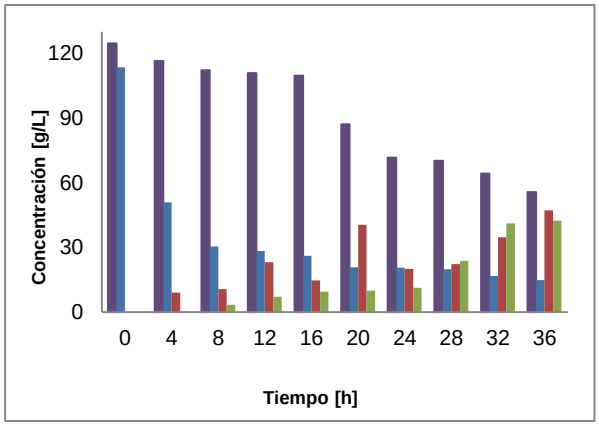


**Fig.2** Purple: olote sugars, blue: CEDA sugars, red: olote ethanol, green: CEDA ethanol

**Conclusions.** With the co-culture is obtained 80% of theoretical yield of ethanol from all sugars present. Using the co-cultivation reduces the waste conditioning steps pretreated using full current. The microorganisms are not inhibited with the residual salts.

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