Bio-ethanol production in cheese whey supplemented with rice bran by species of *Kluyveromyces*.

Rivaldi, J.D[1,2], Pavan, D[1], Mancilha, I.M[1,3]

[1]Universidade de São Paulo - Escola de Engenharia de Lorena, Lorena, SP – Brasil;
[2]Universidad Nacional de Asunción - Facultad de Ciencias Químicas, San Lorenzo, Paraguay;
[3] Universidade Federal de Viçosa - Departamento de Tecnologia de Alimentos, Viçosa, MG – Brasil

Cheese whey, a by-product of dairy industry that usually is disposed without any treatment, represents a valuable source of carbohydrate for fermentation. Its utilization along with rice bran, a by-product derived from the rice milling process, rich in nutrients, represents an alternative for the reduction of industrial cost in bio-ethanol production. Thus, the valorisation of agro-industrial by-products in bioprocess is of large interest for economic and environmental reasons. In the present work, five *Kluyveromyces* yeast strains were evaluated on their capability to produce bio-ethanol in a medium containing permeated whey at an initial lactose concentration of 100 g/L. This medium was supplemented with rice bran, inoculated to achieve an initial cell concentration of 0.5 g/L and incubated under micro-aerobic conditions at 30 ^{o}C for 72h. The maximum yields ($Y_{E/S}$) achieved were 0.40 g/g and 0.30 g/g for *Kluyveromyces marxianus* UFV-3 and *Kluyveromyces marxianus* CCT 4086, respectively. Since *K.marxianus* UFV-3 presented a promising potential for bio-ethanol production, a 2^3 full-factorial composite design and response surface methodology was applied to determine the effect of initial pH (4.0 – 7.0), lactose concentration (50 – 150 g/g), and rice bran concentration (10 – 100 g/g) in the production of ethanol. Therefore, the maximum ethanol concentration (61 g/L), yield ($Y_{E/S}$,0.50 $g.g^{-1}$) and productivity (Q_P ,1.27 $g.L^{-1}.h^{-1}$) were attained after 48 h of fermentation, in the medium with an initial lactose concentration of 150 g/L, at pH 7.0 supplemented with 100 g/L of rice bran. A positive correlation was observed when cheese whey was supplemented with rice bran and used as medium for bio-ethanol production.

Supported by CNPq, FAPESP, CNPq