

O8 - ETHANOL PRODUCTION FROM BREWER'S SPENT GRAINS

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The brewing industry generates large amounts of wastes and by-products that need to be treated, among of which, brewer's spent grains (BSG - the residual solid material obtained after the wort elaboration) are the most abundant. Finding alternatives for the reuse of this by-product is of great interest for economical and environmental reasons. The present study evaluated the use of BSG as raw material for ethanol production. BSG was supplied by Unicer brewery (Matosinhos, Portugal). Part of this material was initially submitted to an hydrothermal process (121 °C; during 10 or 90 min) using a solid:liquid ratio of 1 g BSG/10 mL distilled water. Subsequently, the untreated and hydrothermal pretreated BSG were submitted to an acid hydrolysis reaction using a liquid:solid ratio of 10 g/g and 100 mg sulfuric acid/g dry matter, at 163 °C for 45 min. The hydrolysates then obtained were used as fermentation medium for ethanol production by *Pichia stipitis*. The fermentations were carried out in 250 mL Erlenmeyer flasks containing 100 mL of fermentation medium inoculated with an initial cell concentration of 1 g/L; at 30 °C, 200 rpm for 30 h. Ethanol was produced from all the hydrolysates, but the results were better in the hydrolysate produced from the original BSG. Hydrothermal pretreatment probably removed important components from the raw material, which could be utilized by the yeast during

fermentation, favoring the ethanol formation. Nevertheless, considering that the liquid fraction obtained during the hydrothermal pretreatment was utilized for the production of distilled beverages, the ethanol production from the residual pretreated BSG can be considered an additional alternative for the BSG valorization in a biorefinery concept.