Title: USE OF GRAIN SORGHUM FOR ETHANOL PRODUCTION

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Abstract:

Brazilian ethanol is mainly produced using sugar cane, however, it may be produced from any raw material that presents fermentable sugar such as corn (principal raw material in the world) , which is composed for the most part by starch, that is hydrolyzed and after that is readily available for fermentation. As corn, grain sorghum is another option, costing 20 % less than corn, the implementation price is lower and sorghum plant is more rustic than corn. The fall in the price of corn in many places made cane sugar costs higher than sorghum and corn sugars.So they are a viable option for ethanol production. In this context, this study compared the production of ethanol of four commercial varieties of sorghum and in addition, the study evaluated the optimal time and concentration of enzyme, for hydrolysis of the starch from sorghum and the possibility of remove thel grains solid before or after the hydrolysis by distillation in order to recycle of the yeast on next fermentation cycle and reduce wear caused by solids in the distillation column and the steam consumption. The studies were conducted in Sugar and Alcohol Sector, at the Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ - USP). For hydrolysis, the enzymes alpha-amylase was used for gelatinization (0.047% weight / weight, 85 °C, 3 hours), and amyloglucosidase to saccharification. After saccharification, the temperature of the wort was reduced to 30 ° C and the commercial yeast Pedra-2 was added, the in a concentration of 3% (weight / volume). At the end of fermentation, the wine was centrifuged. Then, supernatant and solids were subjected to analyzes of sugars, starch and alcohol. The results showed no significant differences on alcohol production for, on sorghum studied. The saccharification before fermentation reduced in 15 hours the fermentation time (compared to the literature). However, the saccharification was not complete, preventing the removal of solids before the fermentation. At the end of fermentation solids present in wine was distilled off and the results showed that approximately 30% of the ethanol produced in the fermentation are present in the solid, which prevents the removal of solids prior to distillation.

Keywords: Ethanol, sorghum, fermentation