

TITLE: Efficiency of Sweet sorghum fermentation by selected *Saccharomyces cerevisiae*

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ABSTRACT:

Sweet sorghum (*Sorghum bicolor* (L.) Moench), as well as sugar cane, is a plant able to accumulate high levels of sugars in its stalk. It has a short planting period and harvest between March and April. In addition, machinery already present in distilleries can be used to produce sweet sorghum distilled spirit. These characteristics enable to use sweet sorghum as an alternative substrate during the off-season of sugar cane, period in which distilleries are usually paused.

Beyond high ethanol production, a glycerol content is also desired when producing fermented beverages because it contributes to its organoleptic characteristics. This study aimed to evaluate the fermentative capacity of *Saccharomyces cerevisiae* CA11, a yeast already used at distilleries in Brazil, in two sweet sorghum genotypes (BRS506 e BRS508). A population of 10^7 cells mL^{-1} was inoculated into 100 mL of sweet sorghum ($121^\circ\text{C}/15\text{min}$) and incubated at 28°C for 24 h without agitation. Yeast growth was measured by direct counting in Neubauer Chamber. Sucrose, glucose, fructose, glycerol and ethanol were quantified by HPLC (LC-10Ai - Shimadzu Corp., Japan - detector RID-10A; column Supelcogel 8H operated at 30°C and elution with 5mM sulfuric acid at a flow rate of $0,5\text{mL min}^{-1}$). Genotype BRS506 had initial sucrose, glucose and fructose concentration of $65,42\pm 0,73\text{ g L}^{-1}$, $19,27\pm 0,26\text{ g L}^{-1}$, $18,00\pm 0,37\text{ g L}^{-1}$ and consumption of 99,87%, 96,00% e 66,21%, respectively. Similarly, BRS508 presented initial sucrose, glucose and fructose concentration of $63,89\pm 0,68\text{ g.L}^{-1}$, $21,20\pm 0,89\text{ g.L}^{-1}$, $19,06\pm 0,55\text{ g.L}^{-1}$ and consumption of 98,51%, 95,39%, 68,94%. It was produced $88,47\pm 1,6\text{ g L}^{-1}$ ethanol at BRS506 and $90,04\pm 0,61\text{ g.L}^{-1}$ ethanol at BRS508. Both genotypes did not showed considerable differences during fermentation. The yeast was able to consume most sugars, produce high ethanol and glycerol concentrations using sweet sorghum as substrate, showing the possibility to use it as an alternative substrate in distilleries.

Keywords: sweet sorghum juice, CA11, distilled beverage, sugar cane spirit

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