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Effect of eucalyptus sp ash on amylase activity and fungal flora of red sorghum

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Statement of the Problem: Sorghum grains have been used since time immemorial in the production of African traditional beers. In modern brewing, the use of sorghum is gaining renewed interest, both for the production of gluten-free beers and for its richness in polyphenols. However, its use in brewing is limited due to fungal contamination leading to a risk of mycotoxin production, the low β-amylase and β-glucanase activities of the malt, the filterability of the wort and the subsequent stability of the beer. As part of our efforts to continuously improve the production of sorghum-based beer, we studied the effect of Eucalyptus ash on the quality of sorghum malt. Methodology & Theoretical Orientation: we analyzed the amylase activity (b and a), microbial flora (Total aerobic mesophilic and Total fungi) and total mycotoxins of unmalted and malted red sorghum with eucalyptus center added during malting process (germination step) or without eucalyptus ash. Trials of conventional EBC brews with ash malted sorghum or without ash were also conducted to determine the effectiveness of diastatic enzymes. Findings: the obtained results show that both the total aerobic mesophilic and total fungi decreased by half when eucalyptus ash was added during the malting process. Similarly, the total mycotoxin concentration was very low in the malt with ash (1.2 mg/kg against 5.5 mg/kg in the malt without ash). The β-amylase activities of sorghum malt with eucalyptus ash were much higher than in sorghum malt without eucalyptus ash. The presence of eucalyptus ash radically changes the efficiency of diastatic enzymes, with an EBC wort density reaching 7.3 °P when ash malted red sorghum is used alone, 6.0 °P when it is used at 50%, and 5.0 °P when only 20% is used. While malted red sorghum alone (without ash) only reaches 1.8 °P. Conclusion: the use of eucalyptus ash during the sorghum malting process improves both the fungal-count reduction and the levels of hydrolytic enzymes in the sorghum malts.

Figure 1. Illustration of Rwandan tradition malting process

Biography

François LYUMUGABE, associate Professor at the University of Rwanda (School of Science, College of Science and Technology), is a PhD holder in Agricultural Sciences and Biological Engineering from Gembloux Agro Bio Tech (Belgium). He has over 20 years professional experience and his areas of expertise include; management of research projects, leadership in higher education, Bio-industry and Brewing engineering. He conducted several research projects for improving African traditional beers.