Abstract No. 15

PaperTitle

Effect of Exogenous Proteolytic Enzymes on the Efficiency of Brewing with Un-Malted Sorghum Grain

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ABSTRACT

In tropical countries, brewing lager beer with sorghum grain can be used as a major cost saving measure because importation costs of malted barley are eliminated. Using un-malted sorghum grain with the aid of exogenous enzymes as opposed to malted grain also cuts out the cost of malting.

The objective of this study was to determine the effect of different exogenous proteases and different mashing conditions on the breakdown of the sorghum grain endosperm protein matrix (EPM) into free amino nitrogen (FAN) which is essential for yeast growth and function.

FAN was determined using the ninhydrin assay. Hot water extract was determined using the specific gravity method (ASBC). Physical damage to the EPM was observed using confocal laser scanning microscopy and transmission electron microscopy.

Different proteases produced different levels of FAN at different mashing temperatures over a short period of time. It was also observed that mashing over a long period of time at a lower temperature increased FAN substantially. Proteolytic enzymes increased extract levels significantly. Confocal laser scanning microscopy and transmission electron microscopy showed more extensive protein matrix degradation in samples treated with proteolytic enzyme and reducing agent compared to samples treated with proteolytic enzyme only.

From the findings of this work, it can be concluded that different proteolytic enzymes will differ in terms of their effectiveness to break down sorghum endosperm matrix protein. A low temperature long time incubation period with exogenous proteolytic enzymes is the most effective way to enhance sorghum protein degradation. Optimal extract levels are dependant on the extent of sorghum grain EPM degradation.

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