

Heat Treating Whole Maize Kernels Prior to Milling to Extend the Shelf Life of Whole Meal

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Abstract

Introduction: Maize porridge is one of the most popular products produced from maize grains and there are at least 31 versions of unfermented maize-based porridges throughout Africa (Ekpa, Palacios-Rojas, Kruseman, Fogliano & Linnemann, 2019). Whole grain maize has a shorter shelf life than refined maize due to a higher fat content (Gwartz & Garcia-Casal, 2014). The fat in maize meal causes development of rancid flavours when breaking down as a result of lipolytic and oxidative reactions.

This study investigated thermal treatment of maize kernels and maize fractions as solutions to address the poor shelf life of whole grain maize meal.

Methodology: Whole maize meal was prepared at two different mills, with each mill producing two meal samples, a control (not subjected to any treatment) sample and a heat-treated sample. The samples were sent to the SAGL in South Africa for multi-mycotoxin testing to ensure they were safe for human consumption, prior to doing any consumer tests.

Whole grain maize samples were subjected to an accelerated shelf-life test at 40°C and 65% relative humidity for 20, 40, and 60 days. Day 0 samples were immediately frozen (-20 °C). Anisidine value (AV), peroxide value (PV), and fat acidity (FA) were determined using the cDR FoodLab instrument.

Results and Discussion: The results from the mycotoxin analysis unfortunately showed that the samples contained mycotoxins of unacceptable levels, rendering the product as unsafe for human consumption. In short, the cdR results showed that there was a difference in the AV, PV, and FA values of the control samples versus the heat-treated samples.

Conclusion: In conclusion, heat treatment of whole maize kernels prior to milling does result in a more shelf stable maize meal.

References

Ekpa, O., Palacios-Rojas, N., Kruseman, G., Fogliano, V. & Linnemann, A.R. 2019. Sub-Saharan African Maize-Based Foods - Processing Practices, Challenges and Opportunities. *Food Reviews International*, 35(7):609-639.

Gwartz, J.A. & Garcia-Casal, M.N. 2014. Processing maize flour and corn meal food products. *Annals of the New York Academy of Sciences*, 1312(1):66-75.