



Effect of Sourcing and *In-Vitro* Gastrointestinal Digestion on Antioxidant Properties of Sorghum Porridges

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Abstract

Introduction: Sorghum is an important staple cereal food crop in sub-Saharan Africa. Soured sorghum porridges are popular in many communities in sub-Saharan Africa and prepared by either spontaneous fermentation at household level or by exogenous acidification in instant soured sorghum porridges available commercially in urban areas. Sorghum is also regarded as an important source of bioactive phenolic compounds which offer potential health benefits associated with protection from non-communicable diseases.

The aim of this research was to determine how souring (through spontaneous fermentation and exogenous acidification) and *in vitro* gastrointestinal digestion affect antioxidant properties of sorghum porridge in order to evaluate its potential health promoting properties.

Methodology: Soured sorghum (red and white) porridges were prepared by spontaneous fermentation and exogenous acidification using citric acid and subjected to simulated *in vitro* gastrointestinal digestion. Total phenolic content (Folin-Ciocalteu method), ABTS and DPPH radical scavenging properties and ability to protect against oxidative DNA damage of the sorghum flours, porridges and porridge digests were determined.

Results and Discussion: Cooking led to a significant increase in the TPC and free radical scavenging activity against DPPH in both the red and white non-tannin sorghum. The observed increase may be attributed to enhanced extractability of phenolic compounds such as phenolic acids in the sorghum through cell wall disruption and solubilization. Simulated *in vitro* gastrointestinal digestion led to a significant decrease in TPC and radical scavenging activities against ABTS. However, spontaneous fermentation and citric acid acidification led to an increase in TPC and radical scavenging activities in all flours, porridges and porridge digest possibly due to the release of bound phenolic compounds under acidic conditions. All the extracts from uncooked, cooked and digested unsoured, fermented, and citric acid acidified porridge extracts showed some protection of DNA against oxidative damage. This could be attributed to scavenging of the AAPH radical by phenolic compounds present in the extracts.

Conclusions: Soured sorghum porridges have enhanced phenolic extractability and antioxidant properties and show promise in offering protection against diet-related non-communicable diseases.

Biography: Nomfundo Dlamini

Nomfundo Dlamini is a second year Masters student at the University of Pretoria. She is originally from the Kingdom of Eswatini. She graduated from the University of Eswatini in 2015 for a B.Sc. in Food Science Nutrition and Technology where she obtained a first class. As a hard worker, she secured one of the prestigious scholarships (Mastercard Foundation Scholarship). As a mother, eldest sister and the only one in a family of five who got the opportunity to reach tertiary level, her only dream is to be the best she can be and lead by example.