

Role of malting and fermentation in enhancing bioaccessibility of phenolic compounds and phytochemical-related health-promoting properties of sorghum

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Background: Sorghum [*Sorghum bicolor* (L.) Moench] is well-known as a significant source of bioactive phenolic compounds with health-promoting properties to offer protection against non-communicable diseases. The major phenolic compounds in sorghum are phenolic acids and flavonoids. Both are mostly found in the form of soluble conjugates covalently linked to sugar moieties (glycosides), or insoluble bound forms. The latter are esterified to cell wall components like cellulose and hemicellulose (arabinoxylans) or cross-linked to cell wall polysaccharides within the endosperm. Sorghum phenolics can exert their health-promoting properties if they are rendered bioaccessible by their release from the food matrix for subsequent absorption. Traditional food processes such as malting, and fermentation have the potential to release phenolic compounds in sorghum and make them more bioaccessible.

Objective: The objective of our study is to determine the effect of malting and fermentation on the extractability, bioaccessibility, and radical scavenging properties of phenolic compounds from sorghum porridge, with the aim of achieving improved health-promoting properties.

Method: Malted and fermented sorghum flours from whole grains sorghum type I (non-tannin red and white sorghum) were prepared. Simulated in vitro gastrointestinal digestion and liquid chromatography-mass spectrometry will be used to determine the extractability and bioaccessibility of phenolic compounds followed by their uptake in a Caco-2 cell model. Radical scavenging and cellular antioxidant activity will be used to determine health-promoting properties.

Expected outcome: Malting and lactic acid fermentation will enhance the bioaccessibility and hence, the health-promoting properties of sorghum phenolics.

Keywords: Malting - Fermentation - Bioaccessibility - Health-promoting properties - Phenolic compounds - Non-tannin sorghum.