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Climate-smart grain crops – functionalisation of sorghum milling fractions for application in European cereal-based staple products

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Abstract

As part of a holistic strategy, the potential of climate-smart grain crops - specifically sorghum - is to be identified and subsequently exploited facing the challenge of a sustainable feeding of the growing world population. This is only possible with high-yield and weather-tolerant agricultural raw materials - crops that emit low levels of greenhouse gas while being resilient to heat and drought. Until now, sorghum has not been used as an ingredient in staple foods in Central European countries. However, sorghum shows a high yield and is drought-tolerant. Therefore, bundled research activities and cooperation with industry partners are needed to establish the use of sorghum as a major ingredient in the Western diet and to develop food products of high sensory and nutritional quality. Although sorghum is already used as a staple food in African and Indian regions, its functionality and sensory attributes do not meet the cultural European quality expectations. Unlike wheat, there is still limited understanding of the functional behaviour of different sorghum milling fractions in bakery and pasta products. Thus, it is crucial to investigate the impact of different milling fractions and procedures on technological functionality as well as on nutritional and sensory properties. This will allow the adaption and control of the milling process for producing high-quality sorghum fractions. Furthermore, the functionalisation of grains and milling fractions by several approaches such as germination, enzymatic and hydrothermal processing can improve the functionality in terms of digestibility and gas-holding properties. Evaluating the effects of different pre-processing and processing strategies will enable the production of sorghum-based breads, fine bakery products and pasta of higher nutritional value and sensory acceptability, and thus the implementation of sorghum as a climate-smart grain in the European diet.

Keywords: Bread, environment, functionality, nutrition, pasta, sorghum, sustainability