CLIMATE-SMART GRAIN CROPS

FUNCTIONALIZATION OF SORGHUM MILLING FRACTIONS FOR APPLICATION IN EUROPEAN CEREAL-BASED STAPLE FOODS

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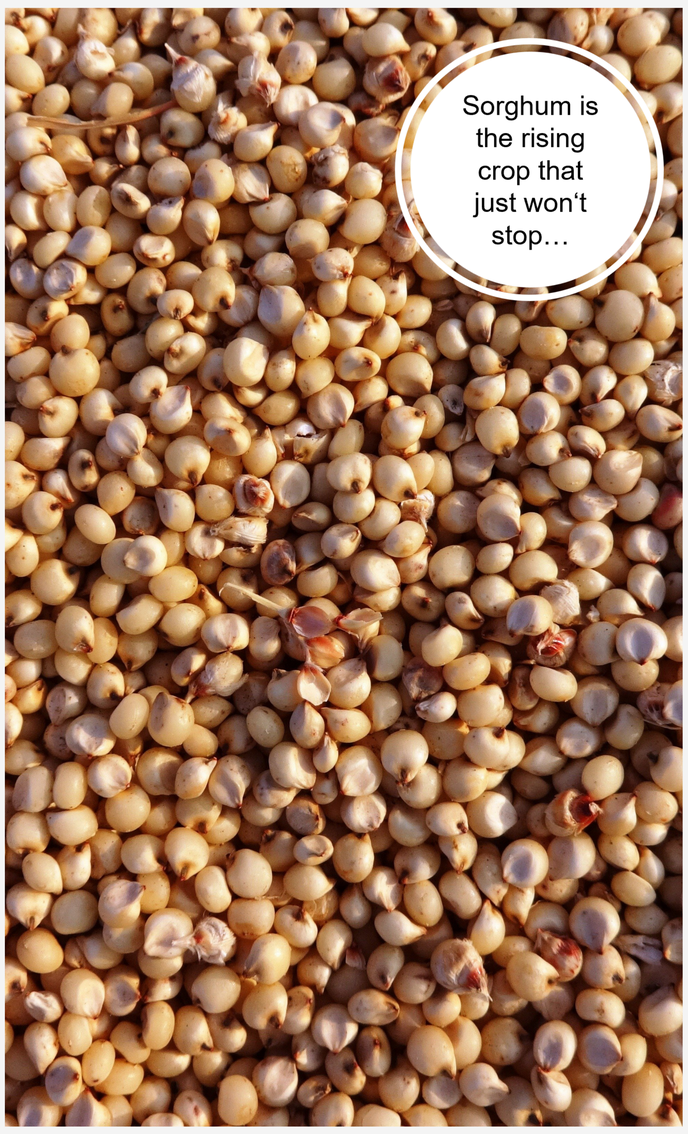
KEYWORDS

Sorghum, bread, pasta, functionality, nutrition

Highlights

- **Focus on crops with high yields, and resilience to heat & drought**
- **Limited understanding of sorghum compared to wheat (particularly in food production)**
- **Gap between sorghum's current attributes and European quality expectations**
- **Urgent need for joint research efforts**
- **Focus on strategies to produce sorghum-based products with high nutritional value and sensory appeal**
- **Potential for sustainable feeding of the growing global population**



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BACKGROUND

As part of a holistic strategy, the potential of **climate-smart grain crops** - specifically **sorghum** - is to be identified and subsequently exploited to address the challenge of sustainably feeding the world's growing population. This is only possible with high-yielding and weather-tolerant agricultural raw materials.

Although sorghum shows **high yields** and a high **resistance to heat & drought**, it has not yet been used as an ingredient in staple foods in European countries. Unlike wheat, the understanding of the functional behaviour of different sorghum milling fractions in bakery and pasta products is still limited.

Therefore, combined research activities & collaboration 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**.

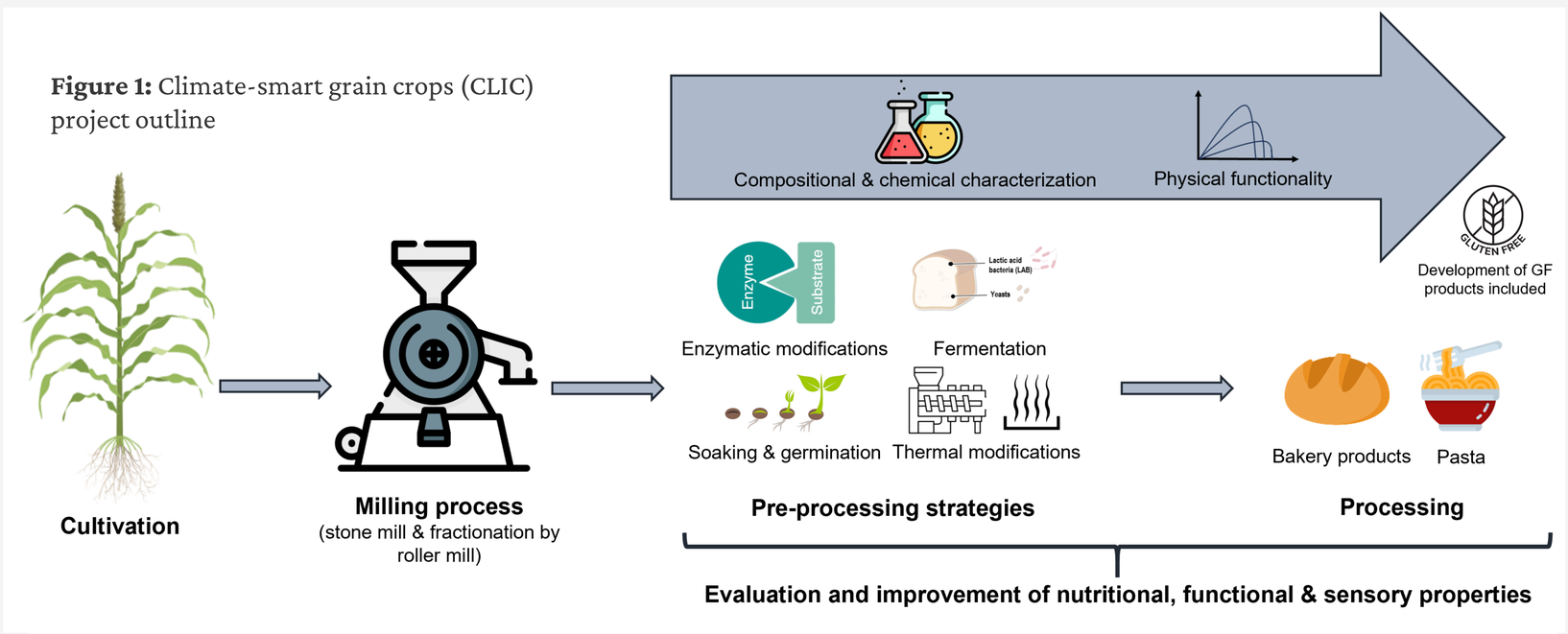

Figure 1: Climate-smart grain crops (CLIC) project outline

OBJECTIVES

I - Improving functional & sensory attributes

Although sorghum is already used as a staple food in African and Indian regions, its functional and sensory properties **do not meet the cultural European quality expectations** and therefore need to be modified.

II - Improving nutritional quality

Sorghum contains substantial amounts of secondary metabolites, in particular **polyphenols**. These are health-promoting in small quantities due to their **antioxidant capacity**, but are antinutritive in (too) high concentrations, as they can bind proteins, minerals & trace elements and thus reduce their bioavailability. If high amounts of sorghum are used, (pre-)processing approaches may have to be applied to reduce the polyphenol content.

In addition, sorghum **proteins (kafirins)** have a **poorer digestibility** compared to other cereals, which is further decreased by cooking with water.

STRATEGIES

To overcome these challenges and establish sorghum in the Western diet, **combined research efforts & industry collaborations** are needed.

It is crucial to investigate the effects of different milling fractions and processes on technological functionality as well as nutritional and sensory properties. This will enable the adaptation and control of the **milling process** for the production of high-quality sorghum fractions.

Furthermore, the **functionalization** of grains and milling fractions through several approaches such as **germination, enzymatic and hydrothermal processing** can improve the functionality in terms of digestibility and gas-holding properties. Evaluating the impact of different pre-processing and processing strategies will enable the production of sorghum-based breads, fine bakery products and pasta with **higher nutritional value and sensory acceptability**, and thus the **implementation of sorghum as a climate-smart grain** in the European diet.