

Identification of Physical and Chemical Characteristics of Red and White Sorghum (*Sorghum bicolor* L.) Flour as Functional Food Ingredients

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ABSTRACT

Heavy reliance on wheat imports has driven food diversification efforts toward local cereals like sorghum, whose physicochemical characteristics can be enhanced through germination. This study aims to analyze and evaluate the physical and chemical characteristics of germinated red and white sorghum (*Sorghum bicolor* L.) flour as a functional food ingredient. This descriptive quantitative study applied a 24-hour seed germination method, followed by drying using a cabinet dryer at 40°C for 12 hours, milling, and sieving through an 80-mesh screen. Physical parameters analyzed included color, syneresis, swelling power, and peak viscosity, while chemical parameters encompassed proximate analysis, resistant starch, amylose, and amylopectin content. Physical results showed that white sorghum flour exhibited higher brightness ($L^*=81.67$), swelling power (280.42%), and peak viscosity (6,300 cP). Conversely, red sorghum flour had a lower syneresis value (10.39%), indicating better gel stability. Chemically, red sorghum flour possessed higher ash (2.33%), protein (10.88%), fat (3.68%), carbohydrate (72.79%), amylose (16.75%), and resistant starch (10.84%) content than white sorghum flour. However, white sorghum flour had higher moisture (11.01%) and amylopectin (52.04%) content. The moisture content of both flours complied with Codex standards, remaining below 15%. In conclusion, the germination process successfully modified the physicochemical characteristics of sorghum flour. White sorghum flour is better suited for food products requiring high viscosity and expansion capacity, whereas red sorghum flour shows greater potential as a functional food ingredient due to its superior gel stability, macronutrient and micronutrient content, and resistant starch levels.

Keywords: chemical characteristics, functional food germination, physical characteristics, red sorghum, white sorghum.