Sorghum and lentil-enriched wheat bread for enhancing nutrition and agricultural resilience in Kenya

This study examines the nutritional quality and structural properties of bread made by partially substituting wheat flour with sorghum and lentil flour. While bread is a popular staple, wheat has high gluten, low nutrients, and low amylose to amylopectin ratio which can contribute to the prevalence of lifestyle diseases. Sorghum and lentil flour are promising due to their high antioxidants, micronutrients, and high amylose to amylopectin content. 8 loaves of bread with different wheat, sorghum, and lentil proportions were analyzed, and compared to control brands of bread from Kenyan supermarkets.

Proximate analysis (protein, moisture, fiber, fat, ash, carbohydrates) and structural assessments (slice area, crumb sizes, amount of crumbling, pore size, and pore count) were conducted using standard methods and Image J, respectively. Statistical analyses were done using ANOVA and Tukey HSD tests.

Composite bread with 7.5% sorghum and 6% lentil flours exhibited desirable nutritional quality and structural stability. Sorghum and lentils increased ($p<0.05$) protein, moisture, and fiber content, and improved the structural integrity of the test bread compared to the control. This suggests sorghum lentil-wheat bread could reduce lifestyle disease risks and promote climate-resilient agriculture. Further research should explore cereal-legume flour composite for baked food products and determine consumer preference.