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Effect of fenugreek and seed mix addition on the physicochemical and sensory properties of bread

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Abstract: The study assessed the impact of adding fenugreek powder and a seed mix (sunflower, pumpkin, flax, sesame, chia) at 5% on wheat bread. The additions did not affect dough elasticity but improved crumb uniformity. Physicochemical and sensory analyses showed enhanced nutritional value and sensory quality, supporting the development of a functional bread product.

Keywords: fenugreek, bread, seed mix, physicochemical analysis, sensory evaluation, functional foods

• Introduction

Wheat bread is a widely consumed staple product, and its formulation can be enriched to improve nutritional and functional properties. Ingredients such as fenugreek powder and mixed seeds are valued for their content of fibres, proteins, and bioactive compounds that can enhance the health profile of bakery products. When incorporated into bread dough, these components may influence technological behaviour, crumb structure, and overall sensory quality. Evaluating their effect supports the development of functional bread varieties with improved nutritional attributes.

• Material and method

The following materials were used for bread preparation: wheat flour, water, yeast, salt, fenugreek powder, and a seed mix of sunflower, pumpkin, flax, sesame, and chia. Two variants were prepared: S5 – 5% fenugreek (50 g/1000 g flour) and S10 – 10% fenugreek (100 g/1000 g flour), with the seed mix at 5% of flour mass (45 g/1000 g). All ingredients were thoroughly mixed, and bread was baked following standard procedures.

Sensory characteristics (appearance, crumb uniformity, aroma, taste, acceptability) and physicochemical properties (moisture, texture, nutritional composition) were assessed to characterize the bread samples.

• Results and discussions

The bread with 5% fenugreek (S5) received the highest sensory scores for appearance, color, aroma (4.7/5), consistency (4.6/5), and taste (4.4/5), indicating good overall acceptability. The 10% fenugreek bread (S10) showed similar visual and aroma scores (4.6–4.7/5), but consistency decreased to 4.4/5 and taste to 4.0/5 due to increased bitterness.

Physicochemical analysis showed a slight increase in moisture (43.6 → 44.2%), acidity (3.0 → 3.3 °T), and a small decrease in porosity (79.1 → 77.5%), while salt content remained similar (~0.85%). These results suggest that moderate fenugreek addition maintains sensory quality and texture, while higher amounts negatively affect taste and consistency.

• Conclusions

Bread with 5% fenugreek (S5) showed the highest sensory acceptability with balanced taste, aroma, and texture. Increasing fenugreek to 10% (S10) reduced taste acceptability due to bitterness and slightly firmer texture. Moderate fenugreek addition improves nutritional value without compromising overall sensory quality. Physicochemical properties showed minimal variation between samples.

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