Functional bread: Effect of red kidney bean and peanut flour on dough and bread characteristics

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Introduction

- **Modern consumers** are more conscious of low calories and high protein vegetable sources
- Interest in Red Kidney beans (RKB) and Thai peanuts (P): high in dietary fiber and protein
- **Precooked legume flour processing**: Convenience for processors; precooked flour process previously developed in our laboratory
Objectives

**OBJECTIVES**

- To select **appropriate precooked flours** from previous study: time-temperature treatments
- To determine the **effect of selected precooked RKB and P-flour on the physicochemical properties** of dough and bread

**PRELIMINARY STUDY**

- Selected **25-30% RKB flour and 10-15% P flour**
- Determined **levels in bread formulation** using acceptable flavor, aroma and appearance
Material & Methods

Levels of substitution RKB:P bread flour ratio (w/w) in wheat flour base

- Control
- RKB %: 25, 30
- P %: 0, 10, 15
- Composite flour

Fundamental viscoelastic properties of dough
- Creep recovery test (100 Pa)
- Strain sweep test (0.01 - 0.1% strain at 1 Hz)
- Frequency sweep test (0.1-10 Hz)

Bread properties
- Proximate analyses
- Volume
- Color
- Moisture content
- Texture properties
- Sensory evaluation
Dough viscoelastic properties

Fundamental rheological tests: Creep-recovery, strain sweep and frequency sweep

- RKB flour alone decrease dough deformation – stiff dough
- RKB with P flour increased dough deformation up to 50%
Bread properties

- 30% RKB flour improved protein and fiber up to 24 and 66%
- P flour decreased bread volume compared to RKB flour
- RKB flour increased darkness up to 9% and redness of bread crumb
- RKB/P flours increased moisture of bread crumb up to 10%
- RKB/P flours increased crumb firmness up to 62%
Sensory properties of bread

![Graph showing sensory properties of bread](graph.png)

Aroma

Crumb smoothness

Taste

Overall

30 RKB – 0 P

Control

- 25:00
- 25:10
- 25:15
- 30:00
- 30:10
- 30:15
Conclusions

- RKB flour at 30% had **overall comparable sensory characteristics** as white flour bread.
- RKB flour at 30% **improved protein and fiber** up to 23.8 and 66% compared to control.
- P-flour **improved dough viscoelastic properties** but not sensory scores.
- Future work: **optimize peanut roasting** to improve potential use as flour enrichment in baked products.