

# 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

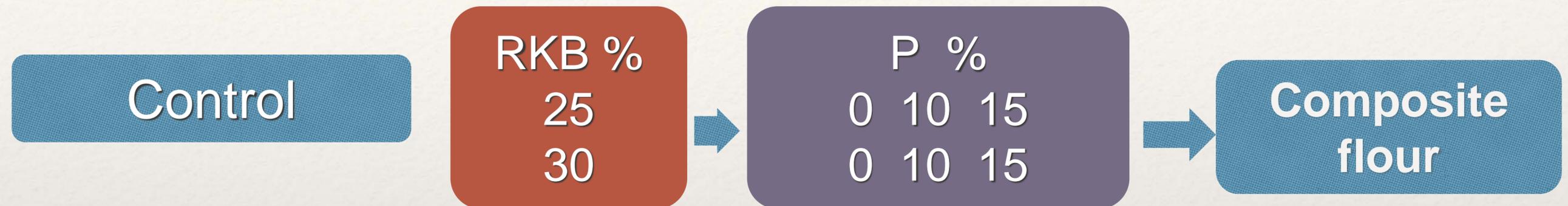
- To select **appropriate precooked flours** from previous study: time-temperature treatments
- To determine the **effect of selected precooked RKB and P-flour on the physicochemical properties** of dough and bread

## ❖ 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



## Fundamental viscoelastic properties of dough

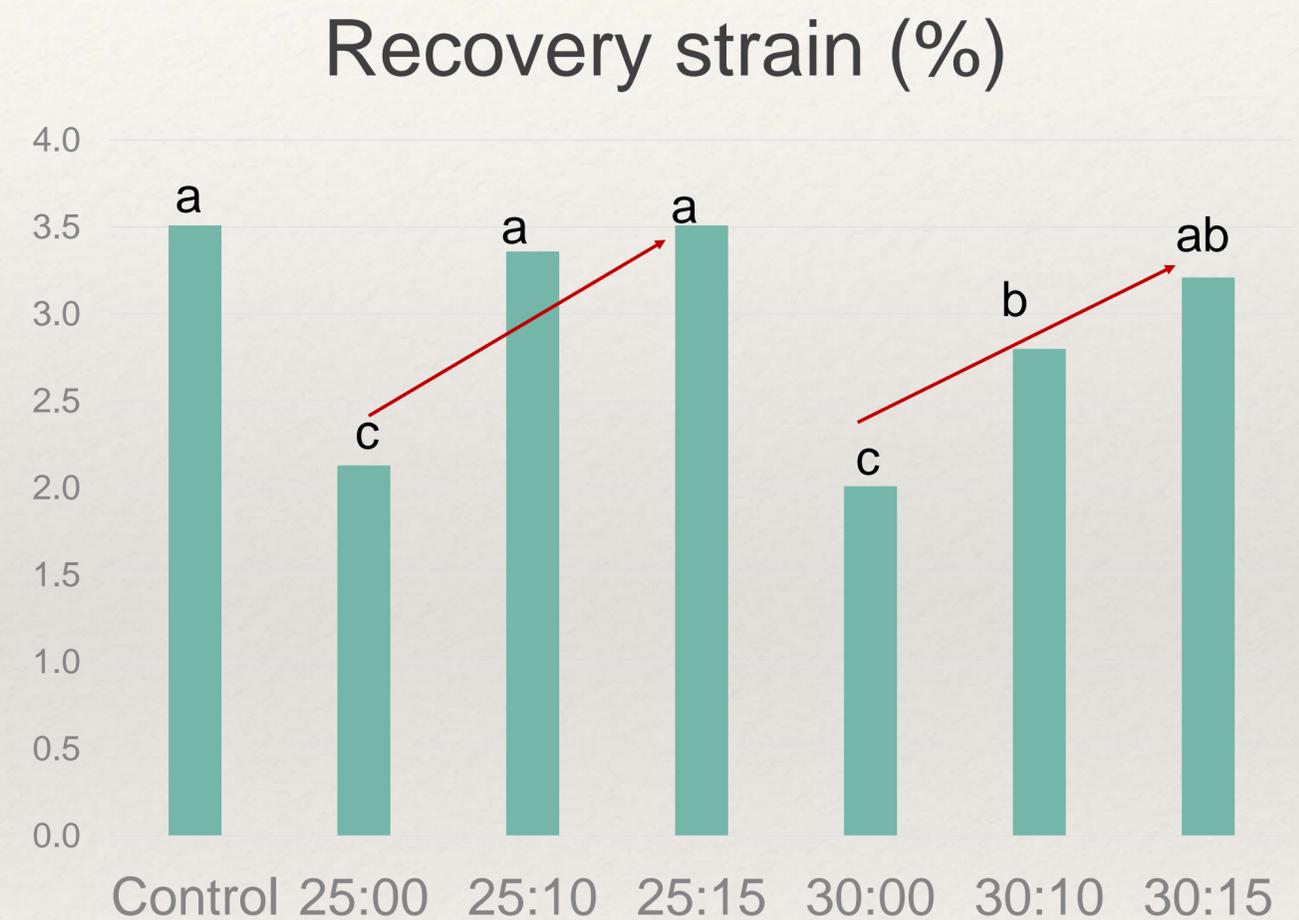
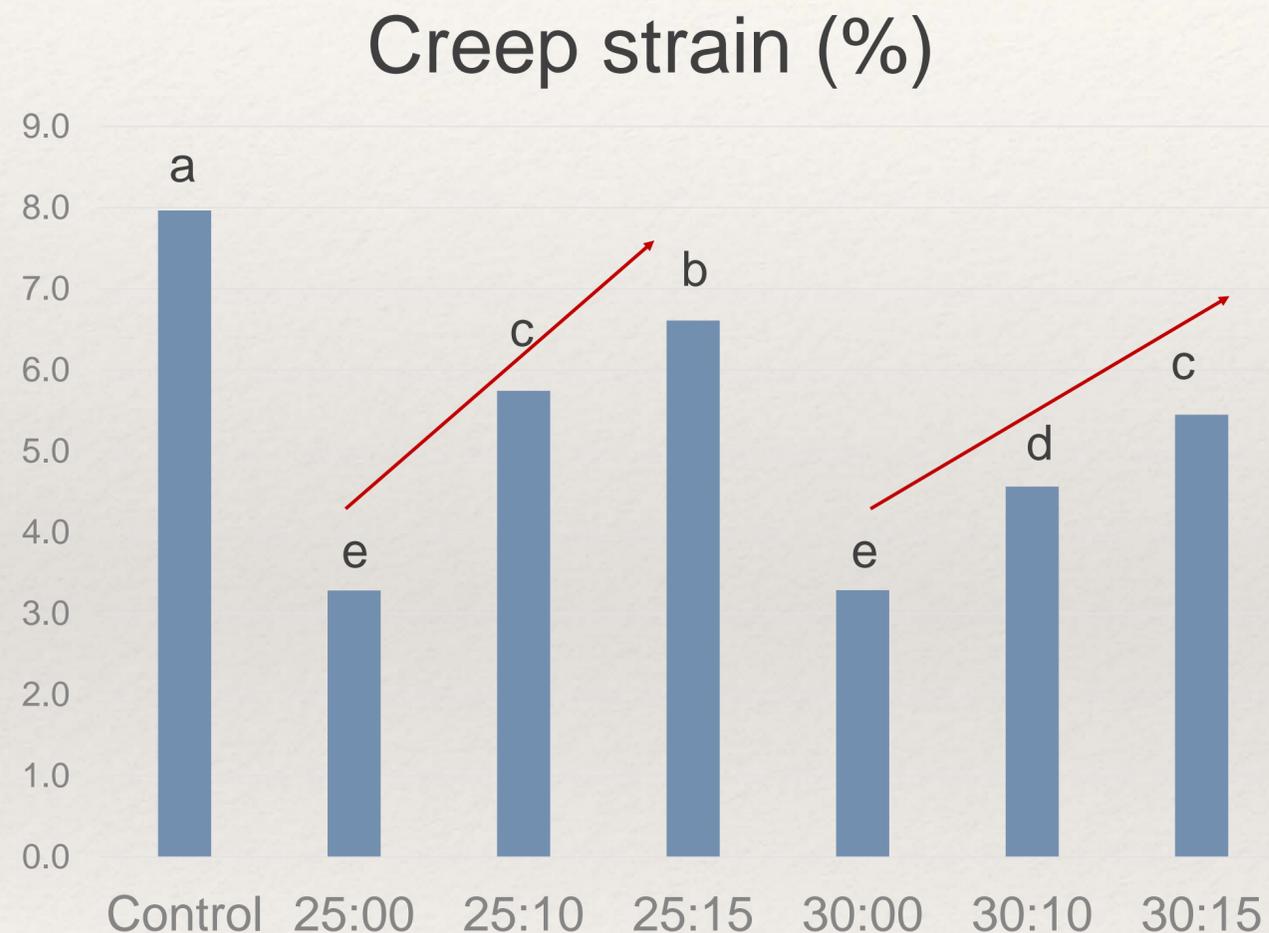
- ✓ Creep recovery test (100 Pa)
- ✓ Strain sweep test (0.01 - 0.1% strain at 1 Hz)
- ✓ Frequency sweep test (0.1-10 Hz)

## Bread properties

- ✓ Proximate analyses
- ✓ Volume
- ✓ Color
- ✓ Moisture content
- ✓ Texture properties
- ✓ Sensory evaluation

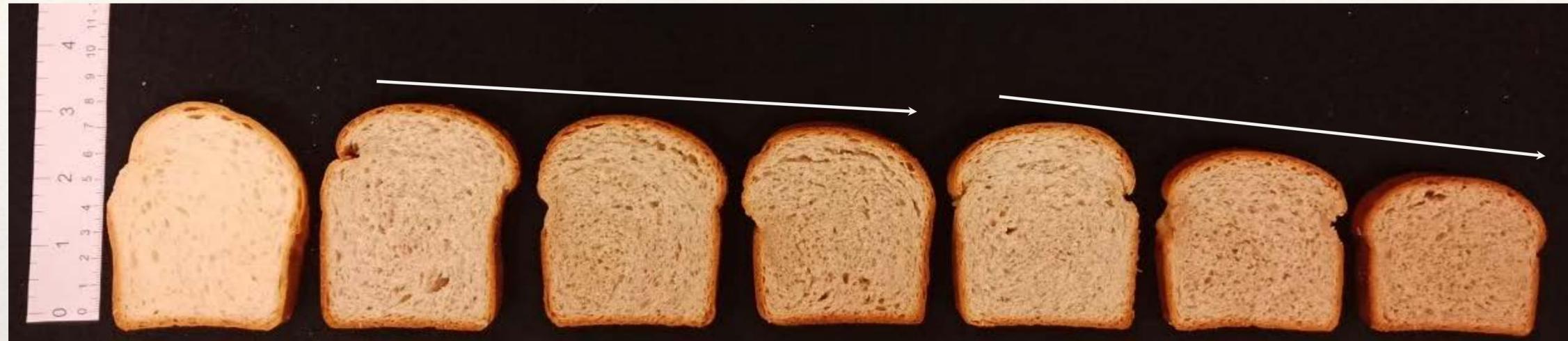
# Dough viscoelastic properties

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

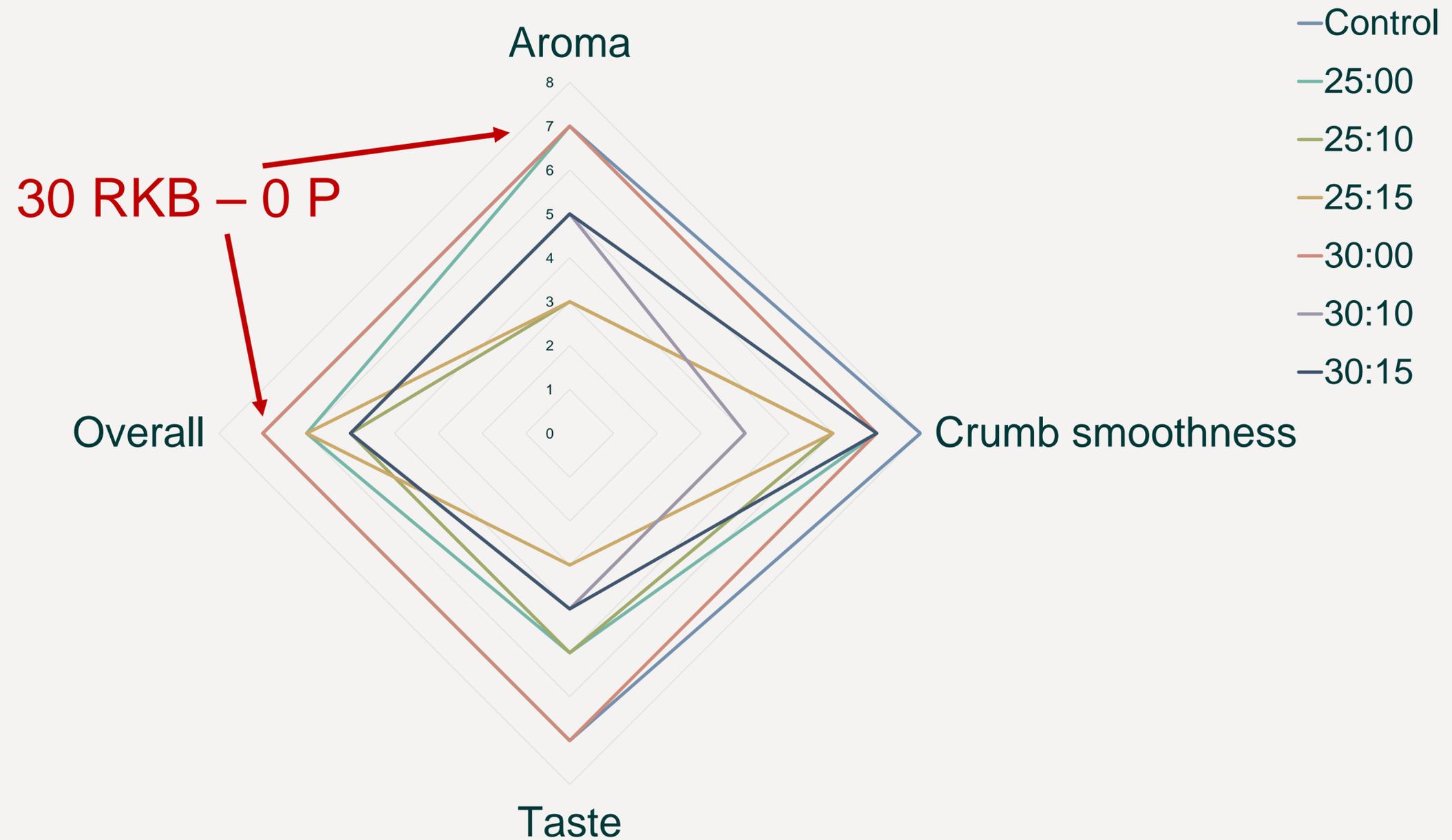


RKB:P Ratio

Control 25:0 25:10 25:14 30:0 30:10 30:15

- 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



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# Conclusions

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- ❖ 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