A kinetic and polymer science approach to evaluate textural stability of red kidney beans during postharvest storage and subsequent cooking

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INTRODUCTION

Beans take longer to cook known as 'hard-to-cook' defect

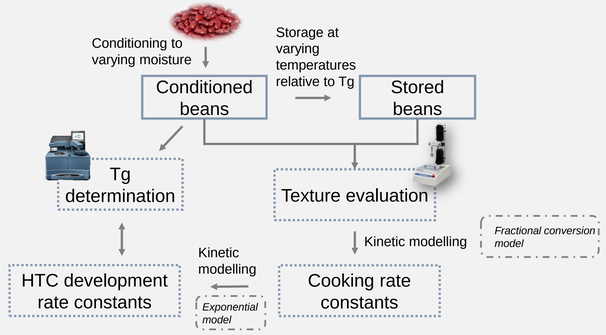
Biochemical reactions — Facilitated by — Extrinsic factors: temp, moisture, time

? *To what rate*
To what extent

Research questions

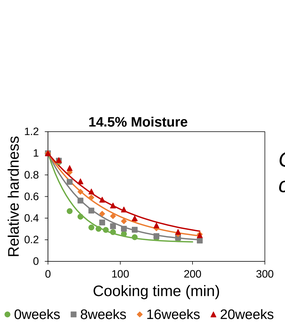
- ✓ How do extrinsic factors (temperature, moisture and time) influence HTC development
- ✓ What is the role of glass transition temperature (Tg) in influencing HTC development

EXPERIMENTAL SET-UP

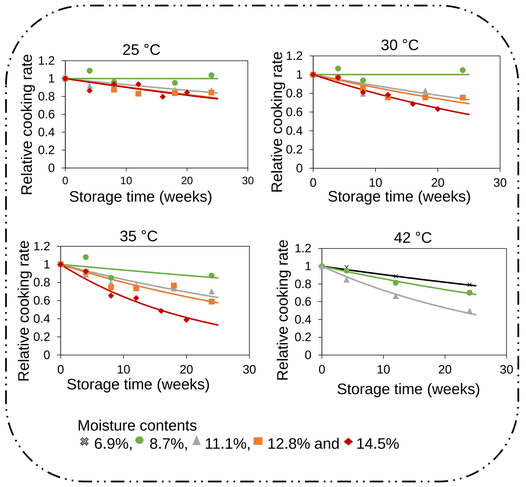


RESULTS

Kinetics of cooking as a function of storage temperature, moisture & time



Cooking rate constants



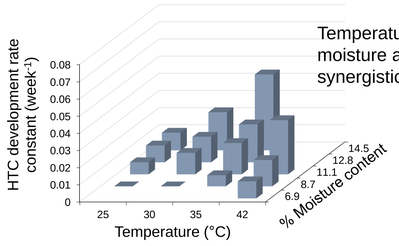
HTC development rate constants

Texture ↓ with cooking time

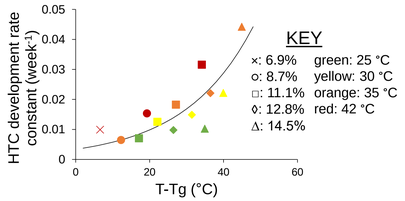
HTC ↑ as a function of storage:

-temperature
-moisture
-time

Effect of storage conditions & storage above Tg on HTC development rate



Temperature and moisture act synergistically



HTC ↑ with storage above Tg

HTC: Hard-to-cook, **Tg**: Glass transition temperature

CONCLUSIONS

- Storage temperature, moisture content and time influence the cooking rate of beans
- Storage temperature and moisture content synergistically influence HTC development rate
- Tg significantly influences HTC development rate: the higher the storage temperature is above the Tg the faster the rate of HTC development
- Tg is a useful tool in establishing suitable postharvest storage conditions of beans to ensure long term textural stability

ACKNOWLEDGEMENTS

vliruos SHARING MINDS, CHANGING LIVES

REFERENCES

This poster is based on the following paper

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