Effect of Pulse Flours on the Physiochemical Characteristics and Sensory Acceptance of Baked Crackers.

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Application of Molecular Gastronomy principles in the design of pulse based functional foods

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Overview

- Ingredients - *why pulses?*
- Molecular Gastronomy principles
- Current study
- Observations
  - Sensory attributes
  - Nutritional value
- Further work
Why pulses?

**Nutritional**
- High protein
- High fibre
- Phytonutrients
- Low fat
- Low sugar

**Sustainable**
- Robust
- Nitrogen fixing
- Cost efficient

**Challenges**
- Flavour
- Protein & Fibre
- Physiochemical properties

2016 International Year of Pulses
Holistic food design

Ingredients & Processing

Molecular Gastronomy Principles

Sensory experience

Nutritional value
Methodology

Formulation & Processing
- Bake trials
  - 40% flour
  - 21m & 31m
  - Prepared in triplicate

Physical & Chemical Analysis
- Dough TPA
- Colour & texture properties
- Protein & fibre
- Antioxidant activity

Sensory Analysis
- 9-point hedonics
- Appearance, colour & texture
- Anova ($p<0.05$)
Appearance & Colour

Control 31m

FB 21m
YP 21m
GP 21m

FB 31m
YP 31m
GP 31m

C 31m

Overall Appearance

Colour

P < 0.05
Colour: Instrumental vs Sensory

- **a* value**
- **b* value**
- **Colour acceptance**

**P < 0.05**
Hardness & Mouthfeel

P < 0.05

Hardness (N)  Hardness: Consumer acceptance

Control  FB 21m  FB 31m  YP 21m  YP 31m  GP 21m  GP 31m

P < 0.05
Nutritional value

Flour type & bake time

Protein %

C 31m  FB 21m  FB 31m  YP 21m  YP 31m  GP 21m  GP 31m
8.86  12.76  14.25  12.14  13.17  11.6  12.21

Fibre %

C 31m  FB 21m  FB 31m  YP 21m  YP 31m  GP 21m  GP 31m
5.26  10.63  5.49  9.4  5.12  8.11  4.78
Antioxidant activity

TPC (mg GAE/100G)

- Control
- FB 21m
- FB 31m
- YP 21m
- YP 31m
- GP 21m
- GP 31m

DPPH (mg AAE/100G)

- Control
- FB 21m
- FB 31m
- YP 21m
- YP 31m
- GP 21m
- GP 31m

P < 0.05

Flour type & bake time

*P < 0.05*
Consumer value

OverallAppearance Colour Hardness Mouthfeel

P < 0.05

GP 31m FB 21m FB 31m
YP 21m YP 31m GP 31m

Control 31m YP 31m FB 31m

C 31m
Future work in this area

• Optimisation of baking conditions
  • Nutritional and sensory

• Continued application of MG principles
  • Flavour profiling during processing
  • Flavour optimisation: the sensory experiences

• Further application of pulse flours
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How will you celebrate?