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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
Sensory experience
Nutritional value

Molecular Gastronomy Principles
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

YP 31m
GP 31m
FB 31m

Overall Appearance
Colour

P < 0.05
Colour: Instrumental vs Sensory

**a* value**

**b* value**

**Colour acceptance**

**P < 0.05**
Hardness & Mouthfeel

Graph showing the comparison of hardness and mouthfeel across different conditions. The bars and lines represent different samples labeled as Control, FB 21m, FB 31m, YP 21m, YP 31m, GP 21m, and GP 31m. The y-axis represents hardness (N) and consumer acceptability, while the x-axis represents different time points (21m, 31m). The graph indicates significant differences at P < 0.05.

Symbols and legends:
- Control
- FB 21m
- FB 31m
- YP 21m
- YP 31m
- GP 21m
- GP 31m

Hardness (N):
- Hardness: Consumer acceptability

P < 0.05
Nutritional value

Flour type & bake time

<table>
<thead>
<tr>
<th></th>
<th>C 31m</th>
<th>FB 21m</th>
<th>FB 31m</th>
<th>YP 21m</th>
<th>YP 31m</th>
<th>GP 21m</th>
<th>GP 31m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>8.86</td>
<td>12.76</td>
<td>14.25</td>
<td>12.14</td>
<td>11.6</td>
<td>12.21</td>
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<tr>
<td>Fibre</td>
<td>5.26</td>
<td>10.63</td>
<td>5.49</td>
<td>9.4</td>
<td>5.12</td>
<td>8.11</td>
<td>4.78</td>
</tr>
</tbody>
</table>

Flour type & bake time
Antioxidant activity

TPC mg GAE/100G

DPPH mg AAE/100G

Flour type & bake time

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

P < 0.05

P < 0.05
Consumer value

Overall Appearance, Colour, Hardness, Mouthfeel

P < 0.05
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
Acknowledgements

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How will you celebrate?