Texture, sensory property, and marketability of lentil-enriched crackers made from Montana-grown wheat and lentils

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INTRODUCTION
Lentils (Lens culinaris) are a nutritious and sustainable crop that fixes nitrogen back into the soil [1]. Montana is the largest producer of lentils in the United States [2] and utilizing locally produced Montana lentils can support Montana’s local food initiative. Currently, lentil products on the market are rarely labelled as environmentally sustainable. Plus, to the best of our knowledge, there has not yet been a study that utilized lentils to create a cracker product and studied the instrumental texture, sensory property, and overall consumer acceptance with labelling effect.

AIM
This study aims to analyse the overall consumer acceptance related to instrumental texture, descriptive sensory profile, and labelling of lentil-enriched crackers.

METHODS

Instrumental texture analysis

- TA-XT Plus texture analyzer (Texture Technologies Corp., La Cresenta, CA)
- Crackers attacked in threes and compressed in a 25°C probe (10 mm)
- Three roasting times (min): 2, 5, and 10

Quantitative descriptive analysis

- 10R100L
- 5R100L
- 0R100L

Descriptive sensory profile

- Control
- Lentil

LABELLING EFFECT

- “Made in Montana” logo
- “Low Carbon Footprint” label

RESULTS

Instrumental texture analysis

- Figure 1. Principal component analysis of the instrumental texture of the lentil-enriched crackers.
- Figure 2. Mean instrumental texture values. The values marked with the same letters are not significantly different (p < 0.05).

- Increased lentil/wheat ratio increases crackling toughness.
- Pre-roasting lentil flour for 15 minutes decreased hardness and stiffness for the 100% lentil cracker.
- Lentil-enriched crackers (100% lentil) with pre-roasting were significantly higher in crunchiness than the control.

Overall consumer acceptance

- Figure 3. The overall consumer acceptability of the instrumental texture of the lentil-enriched crackers.
- Figure 4. The overall acceptability of the instrumental texture of the lentil-enriched crackers.

Quantitative descriptive analysis

- Figure 5. Principal component analysis of the descriptive sensory profile of the lentil-enriched crackers.
- Figure 6. Principal component analysis of the descriptive sensory profile of the lentil-enriched crackers.

- 100% lentil crackers were attributed with baked, bready, cheesy, roasted legumey, umami, and saturated orange terms. Control was attributed with saltine, floury, thick, and puffy terms.
- Increasing pre-roasting time of lentil flour resulted in higher intensities in gritty and crunchy texture.

CONCLUSIONS

- Figure 7. Cluster analysis differentiated two clusters.
- Cluster analysis
- Clusters 1 and 2

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