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Enhancing the acceptability of Stevia sweetened cookies through the addition of Inulin: A study on texture, chemical attributes, and taste perception

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The increasing consumer interest in reduced-sugar, natural, sustainable options and healthier baked goods has prompted research into alternative non-caloric sweeteners of natural origin, like Stevia, as substitutes for conventional sugar in bakery items(1). However, the bitter aftertaste associated with stevia is a significant challenge in its application as a sugar substitute(2).

This study delves into innovative baking, focusing on developing health-conscious oat-quinoa cookies sweetened with Stevia to evaluate the possibility of using Inulin to enhance acceptability.

Three types of Cookies were formulated using oats and quinoa flour: sugar-based (SuC), steviabased (StC) and stevia+inulin-based (InStC). SuC served as the control. The optimised formulas were tested using physical, chemical, and sensory parameters.

After approval from the Ethics Committee Board, University of Limerick(06098S&E), sensory analysis was conducted to determine consumer preference (n = 89). A 9-point hedonic scale was used to evaluate odour, taste, colour, sweetness, aftertaste, texture, and overall impression(3). The fiber content of the cookies was calculated based on the nutritional information of the ingredients. After baking, water activity (aw) and texture were also measured on days one and five. Antioxidant activity (DPPH, TPC, FRAP and Total Monomeric Anthocyanins) was also evaluated.

All data was statistically evaluated using IBM SPSS Statistics (Version: 28.0.1.1 (14)). One-way ANOVA test- LSD post hoc test was carried out for sensory, antioxidant and aw assays.

Based on the sensory study results, there was no perceived difference between odour and colour for the three formulations. The average evaluation score for Overall Impression was 6.6>5.9>5.4 ($p<0.001$, $p = 0.016$) for SuC, InStC, and StC, respectively. For Texture, 7.0>6.3>5.5 ($p = 0.818$, ($p<0.001$) for SuC, InStC, StC, respectively. For the Taste attribute, it was 6.5>5.9>5.5 ($p<0.001$, $p = 0.087$) for SuC, InStC, and StC, respectively. A statistically significant difference was observed for both overall impression and texture between InStC and StC.

Regarding fibre content, InStC had a significantly higher fibre content, 7.02%, compared to StC 3.36% and SuC 3.11%. A statistically significant difference in a_w was observed between the StC and InStC on day one and day 5 ($p<0.05$), with the StC having a higher a_w. Texture analyser results correlated with the results of aw. No statistically significant difference was observed between the samples for the antioxidant activity ($p>0.05$).

These findings demonstrate the potential of incorporating functional ingredients such as inulin to improve stevia-sweetened baked goods' sensory acceptability and physical properties, aligning with the growing consumer preference for healthier baked products.

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