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Sensory evaluation of starch-free low-fat dairy spread formulations

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Introduction and objective

The growing demand for healthier food products has stimulated the development of fat-reduced dairy spreads with improved nutritional profiles and sensory acceptance.

This study aimed to evaluate the sensory properties of low-fat butter formulations without the use of modified corn starch.

Methodology

Table 1. Low-fat spread formulations in % of each ingredient

Formulation	water	fatty butter	xanthan gum	Mono- and diglycerides of fatty acids	Milk protein	salt	Lipids in 100g
f12	58,9	30	1	1,4	7,5	0,8	~ 24,6
f22	58,9	30	1	1,4	7,5	0,8	~ 24,6
f23	58,9	30	1	1,4	7,5	0,8	~ 24,6

f12 – Add 100 µL/100g of beta-carotene (B1NO 1%) and natural butter flavor (100 µL/100g).
f22 – Add 100 µL/100g of beta-carotene (B1NO 1%), natural butter flavor (50 µL/100g), oregano essential oil (15 µL/100g) and oregano leaves (0.01g/100g).
f23 – Add 100 µL/100g of beta-carotene (B1NO 1%), natural butter flavor (50 µL/100g), oregano essential oil (15 µL/100g), oregano leaves (0.01g/100g) and garlic powder (0.01g/100g).

21 formulations were developed

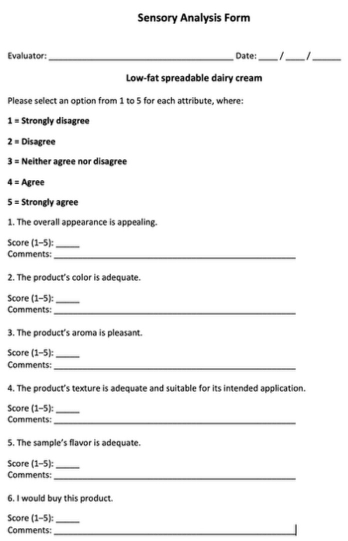
Sample preparation

Selection of the best formulations

- Internal sensory evaluation with the company
- three formulations as the most promising

34 butter consumers participated

Sensory evaluation



Sensory Analysis Form

Evaluator: ______________________ Date: ___/___/____

Low-fat spreadable dairy cream

Please select an option from 1 to 5 for each attribute, where:

1 = Strongly disagree

2 = Disagree

3 = Neither agree nor disagree

4 = Agree

5 = Strongly agree

1. The overall appearance is appealing.

Score (1–5): ____
Comments: ______________________

2. The product's color is adequate.

Score (1–5): ____
Comments: ______________________

3. The product's aroma is pleasant.

Score (1–5): ____
Comments: ______________________

4. The product's texture is adequate and suitable for its intended application.

Score (1–5): ____
Comments: ______________________

5. The sample's flavor is adequate.

Score (1–5): ____
Comments: ______________________

6. I would buy this product.

Score (1–5): ____
Comments: ______________________

Results and discussion

Table 2. Means of the evaluators' scores in the sensory acceptance and purchase intention test.

Samples	The overall appearance is appealing	The product's color is adequate	The product's aroma is pleasant	The product's texture is adequate and suitable for its intended application	The product's flavor is adequate	I would buy this product
F12	3.79 ± 0.59	4.08 ± 0.67	3.97 ± 0.63	4.06 ± 0.74	3.88 ± 0.59	3.50 ± 0.71
F22	4.21 ± 0.64	4.32 ± 0.59	4.32 ± 0.59	4.26 ± 0.62	4.21 ± 0.64	4.15 ± 0.66
F23	**4.32 ± 0.68**	**4.38 ± 0.60**	**4.41 ± 0.60**	**4.38 ± 0.65**	**4.32 ± 0.68**	**4.41 ± 0.61**

Sensory analysis revealed high scores: the formulation **F22**, 54.5% of panelists agreed (score 4) with all parameters, and for the formulation **F23**, where 45% of panelists strongly agreed (score 5) with all parameters. In order of preference, **F23** stood out with 63.6% preference.

Conclusion

This study highlights the potential of using natural hydrocolloids, dairy proteins, and emulsifiers as fat replacers and modified corn starch in the design of healthier dairy spreads. Further studies are underway to optimize shelf-life stability and explore consumer acceptance in broader markets

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