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DEVELOPMENT AND CHARACTERIZATION OF A PROTEIN BAR WITH POTENTIAL APPLICATIONS IN POST-EXERCISE RECOVERY

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Abstract: This study aimed to develop and characterize a protein bar with potential applications in post-exercise recovery, using nutrient-rich ingredients and a balanced macronutrient profile. The bar was formulated with oats, whey protein, nuts and dried fruits, and was analyzed for physicochemical properties, nutritional composition and sensory acceptability. The product showed a high protein content, adequate carbohydrates and healthy fats, with suitable texture and flavor. A sensory evaluation conducted with 16 panelists using a five-point hedonic scale indicated high overall acceptability, with a mean score of 4.51 for taste and 4.46 for overall acceptability. The results support the potential of the developed protein bar as a nutritious and convenient snack for post-exercise recovery.

• Introduction

Protein bars are widely consumed by physically active individuals due to their convenience and ability to support post-exercise recovery. A balanced combination of proteins, carbohydrates, healthy fats, fibres, vitamins and minerals can contribute to muscle repair, glycogen replenishment and overall nutritional support. The use of natural ingredients such as oats, nuts, dried fruits and whey protein represents a promising approach for the development of tasty and functional protein bars.


Oats


Whey protein


Nuts


Dried fruits

• Material and method

1. Technological process


Ingredient preparation (mixing) → Bar forming → Baking / cooling

2. Analytical methods

- Moisture content (drying method)
- Protein content (Kjeldahl method)
- Ash content (muffle furnace)
- Lipid content (gravimetric method)

3. Sensory evaluation

16 panelists
Five-point hedonic scale

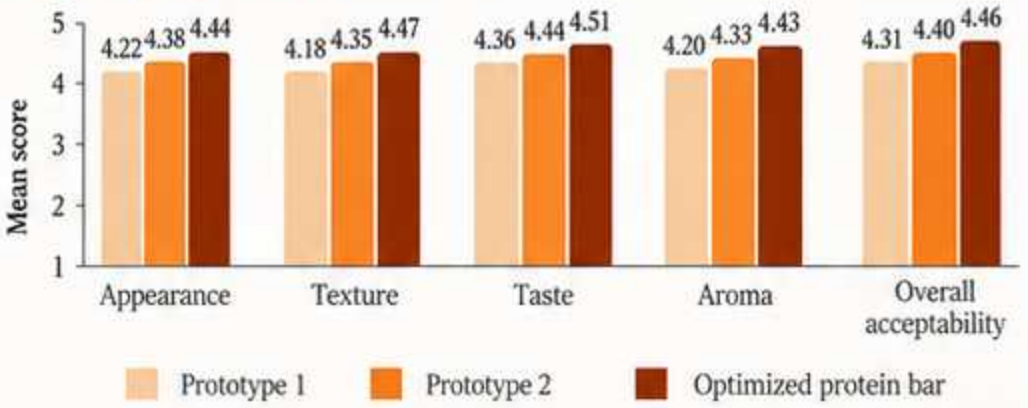
- Appearance
- Texture
- Taste
- Aroma
- Overall acceptability

pH (pH-meter)

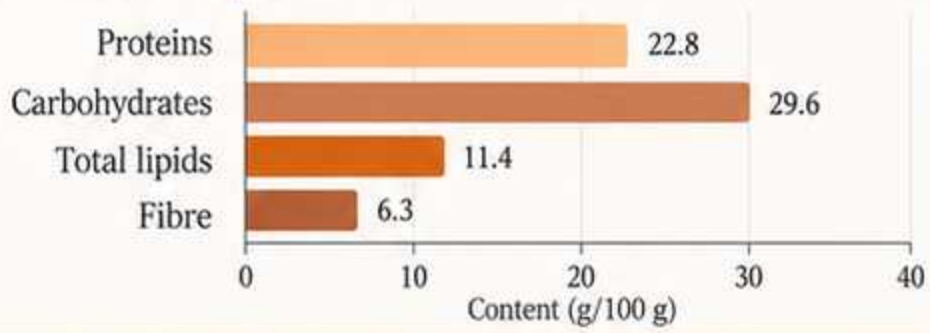


• Results and discussions

Sensory evaluation



Macronutrient composition



Physicochemical characteristics (optimized protein bar)

Parameter	Value (mean ± SD)
Moisture content (%)	8.6 ± 0.4
Ash content (%)	2.1 ± 0.1
pH	6.2 ± 0.1
Water activity (a_w)	0.42 ± 0.02

Estimated nutritional value (optimized protein bar)

Parameter	Value (per 100 g)
Energy	≈ 410 kcal
Proteins	22.8 g
Lipids	11.4 g
Carbohydrates	29.6 g
Fibre	6.3 g

• Conclusions

- A protein bar with high nutritional value and good sensory acceptability was developed, with a mean score of 4.51 for taste and 4.46 for overall acceptability.
- The product provides 22.8 g of protein, 29.6 g of carbohydrates, 11.4 g of lipids and 6.3 g of fibre per 100 g, with suitable physicochemical characteristics.
- The developed protein bar represents a promising option for post-exercise recovery, combining high-quality ingredients with favourable sensory and nutritional properties.