UNIVERSITY OF LIFE SCIENCES ”KING MIHAI I” FROM TIMISOARA
”YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH IN APPLIED LIFE SCIENCES”

05-06 November 2026



From Natural Ingredients to Functional Nutrition: Designing a High-Energy Bar for Prolonged Physical Effort

Tereza DAN[1], Anda-Maria CREȚU[1], Ioan PEȚ[1], Mirela AHMADI[1]
[1]*University of Life Science ”King Mihai I” from Timișoara, Faculty of Bioengineering of Animal Resources, Department of Biotechnology, Calea Aradului, no. 119, Timișoara – 300645, Romania*

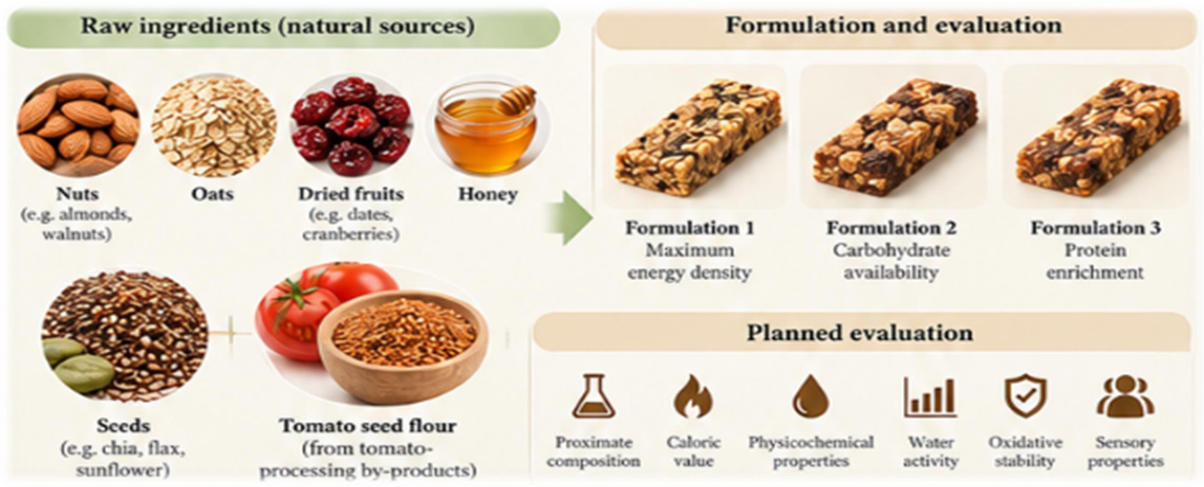
Abstract:This study proposes a nutrigenomic energy bar incorporating tomato seed, oil, proteins, whole grains, and natural antioxidants. A biorefinery approach valorizes tomato seeds into functional ingredients, supporting circular economy principles. Nutritional quality, digestibility, bioaccessibility, sensory acceptability, and storage stability require experimental evaluation.

• Introduction

Prolonged physical effort in challenging environments requirements requires compact, nutrient-dense and stable food solutions. Natural ingredients offer a valuable source of energy, macronutrients and bioactive compounds, while the valorization to tomato seeds supports the development of functional foods and the reduction of agro-industrial waste.

• Material and method

Characterize the recovered fractions and assess the bar’s nutritional composition, physicochemical properties, water activity, sensory quality, in-vitro gastrointestinal digestion, bioaccessibility and oxidative stability.



• Results and discussions

The proposed formulation is expected to combine energy-providing macronutrients with fiber and selected bioactive compounds. Tomato-seed fractions offer a route to recover value from a processing by-product, while spices such as clove and Ceylon cinnamon may contribute phenolic compounds and flavor. These are expected benefits yet to be determined. Experimental measurements are needed to establish nutrient composition, antioxidant activity, bioaccessibility and sensory acceptance.



• Results and discussions



• Conclusions

A natural, high-energy bar incorporating tomato seeds and other nutrient-dense ingredients could provide a functional food solution for individuals engaged in prolong physical activities. The proposal approach links functional nutrition with the circular use of agro-industrial resources. The nutritional quality, digestibility, sensory acceptability, oxidative stability and overall suitability of the product require experimental validation.