

"Lens sana in corpore sano": a preliminary study on the properties of Lentil protein extract and evaluation as a functional food

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Abstract:

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Malnutrition is one of the hardest challenges of our time, to whom children and the elderly are the most vulnerable population groups. Therefore, it is crucial to develop effective strategies to ensure proper nutrition and reduce the risk of diet-related non-communicable diseases (NCDs), such as diabetes and hypercholesterolemia.

This study aims to evaluate the adoption of plant proteins as dietary supplements in commonly consumed foods. The goal is twofold: to provide an adequate protein intake and to address nutritional deficiencies thanks to plant proteins specific functional properties.

Lentils (Lens culinaris L.), a widely consumed and popular pulse, were chosen as the candidate protein source for the present study. A specific extraction protocol was developed to isolate lentil protein fraction. Diverse analyses were then conducted to assess the functionality of the protein extracts at different levels. Analytical methods included tests to evaluate the inhibition of key enzymes involved in diabetes pathogenesis and lipid metabolism. Further validations were performed on biological systems, both at in vitro (human liver cell line HepG2) and in vivo (the nematode Caenorhabditis elegans as a biological model) level.

The bioactive properties of the protein extract were analyzed both in its raw form and after a simulated digestion process. This approach considers that, unlike most food components where digestion reduces bioactivity, the enzymatic action on proteins may enhance their functionality.

The ultimate goal of the project is to develop a high-quality protein extract suitable for the formulation of supplemental foods. These products would ensure proper protein intake while offering comprehensive nutraceutical support to counteract the negative effects of NCDs.