

USE OF ALTERNATIVE VEGETABLE PROTEIN FOR NUTRITIONAL ENHANCEMENT OF CEREAL-BASED FOODS

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This Ph.D. research project aims to study the technological, functional and nutritional properties of different source of proteins as raw materials for the development of innovative cereal-based foods. Different technological approaches will be studied, such as the optimization of triboelectrostatic parameters for the concentration of protein from different sources and the optimization of processing parameters in 3D printing and extrusion cooking.

The activities of this doctoral thesis project can be divided according to the Gantt diagram given in table 1.

A0). Bibliographic research

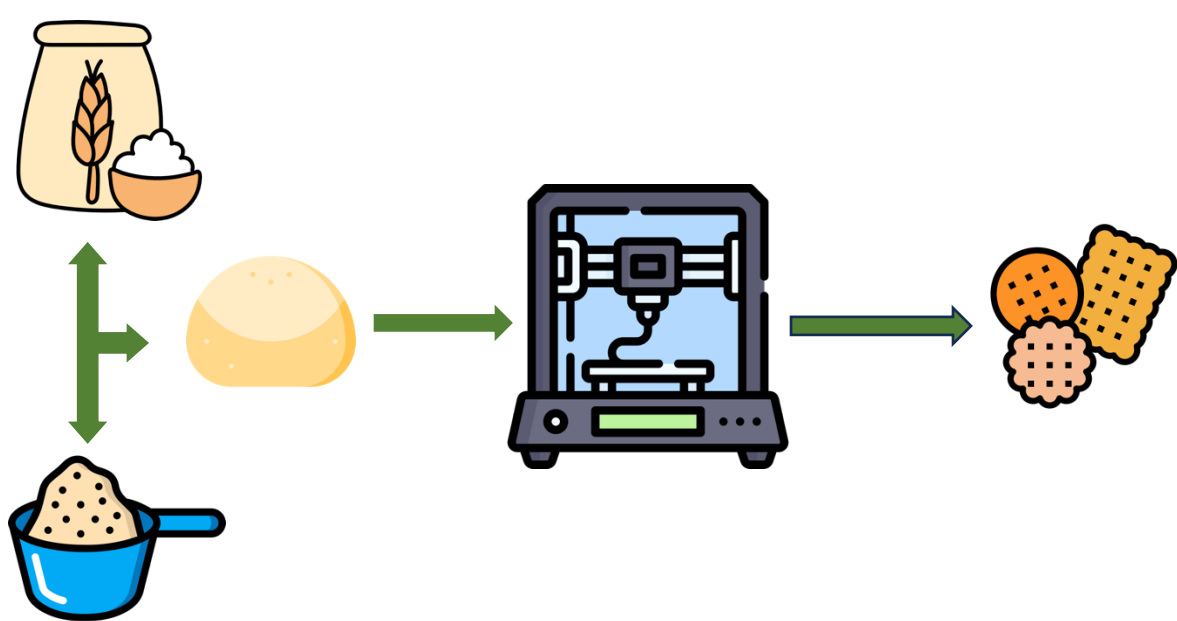
A1). Study of the protein technological, functional and nutritional properties



Extraction of the protein fraction from different sources (e.g. wheat germ, microalgae, malting and brewing by-products) and study of the techno-functional (solubility, water-oil absorption capacity, emulsifying, foaming) and nutritional properties (amino acid profile, protein digestibility)

A2) Optimization of the triboelectrostatic parameters for the concentration of protein from different sources

A3) Development of protein-rich cereal based food products



Study of rheological parameters of dough. Optimization of process parameters in 3D printing and extrusion cooking for the development of different types of products (pasta, snacks, breakfast cereal). Analysis of the protein quality (amino-acid profile, protein digestibility) of final products. Sensorial analysis of final products through consumer tests and panel tests.

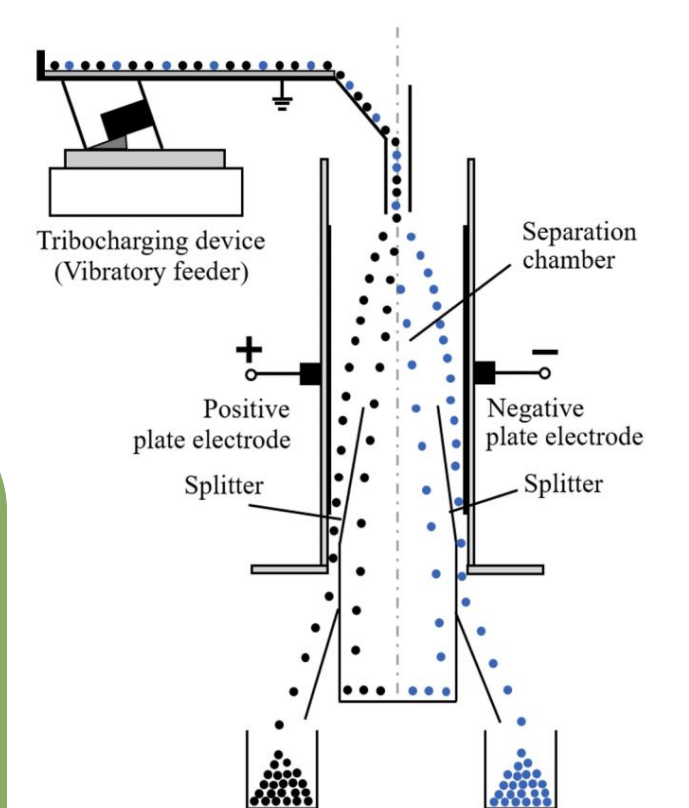


Illustration of free-fall type triboelectric separator (Huang et al., 2023).

A4) Data processing, writing and editing of scientific papers and PhD thesis

Table 1. Gantt diagram for this PhD thesis project

Activity\ Month		3	6	9	12	15	18	21	24	27	30	33	36
A0	Bibliographic research	[Shaded]											
A1	Study of technological, functional and nutritional properties of protein		[Shaded]										
	1.1) Protein extraction		[Shaded]										
	1.2) Study of techno-functional and nutritional properties			[Shaded]									
A2	Optimization of triboelectrostatic parameters				[Shaded]								
A3	Development of protein-rich cereal-based food products					[Shaded]							
	3.1) Study of rheological parameters of dough					[Shaded]							
	3.2) Optimization of extrusion parameters in 3D printing/extrusion cooking for the development of different types of products					[Shaded]							
	3.3) Analysis of the protein quality						[Shaded]						
	3.4) Sensorial analysis							[Shaded]					
A4	Thesis and paper preparation				[Shaded]								