REIMAGINING WASTE: Exploring the Nutritional and Biological Power of a Freeze-Dried Snack based on Broccoli Stalk Powder

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Food Development & Production

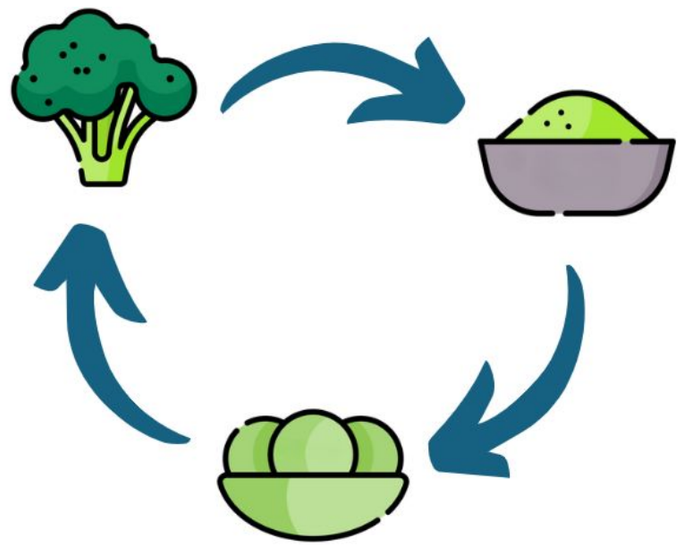
1. Introduction

The global food industry is progressively adopting closed-loop systems to promote sustainability and resource efficiency [1]. Upcycling of food by-products has emerged as a critical strategy within this paradigm, with the aim of minimising waste while maximising the use of nutrient-rich residues [2]. **Broccoli stalks, which are often discarded during processing, are rich in dietary fibre and bioactive compounds, making them an ideal candidate for upcycling** [3]**.**

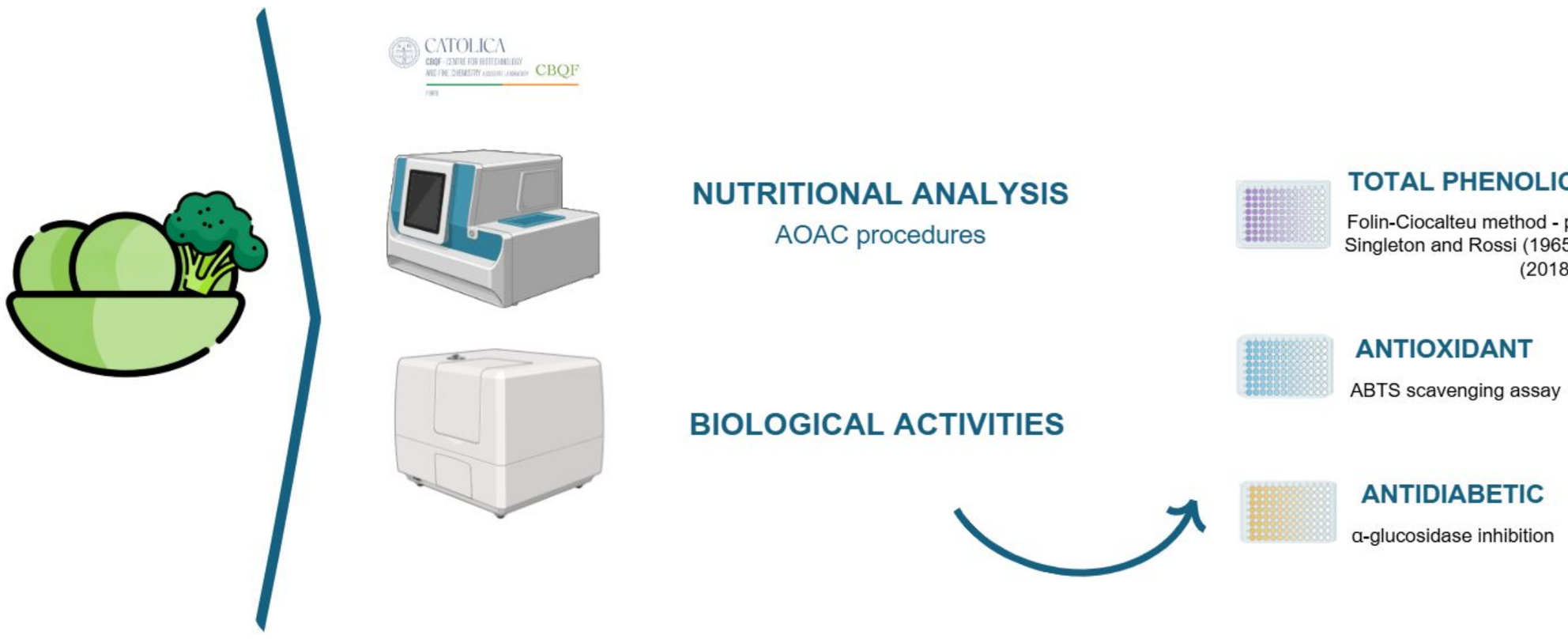
2. Objectives

- Investigate the **nutritional composition of a freeze-dried snack based on broccoli stalk powder**, determining its suitability for upcycling.

- Evaluate the **bioactive properties of this novel food, focusing on the total phenolic content, antioxidant and antidiabetic activities.**



3. Methods



4. Results

Table 1. Nutritional composition of the freeze-dried snack based on broccoli stalk powder.

NUTRIENTS	BROCCOLI STALK SNACK (100 g)
PROTEIN	23 g
FAT	7 g
TOTAL CARBOHYDRATE	51 g
SUGARS	9 g
FIBRE	34 g

RICH IN FIBRE

LOW FAT CONTENT

RICH IN PROTEIN

Table 2. Total phenolic content, antioxidant and antidiabetic properties of the freeze-dried snack based on broccoli stalk powder.

Total Phenolic Content	**2** mg gallic acid equivalents/g of freeze-dried snack
Antioxidant Activity	**6** µmol Trolox equivalents/g of freeze-dried snack
Antidiabetic Activity	**74 %** of α-glucosidase inhibition

NOTEWORTHY TOTAL PHENOLIC CONTENT

VALUABLE ANTIOXIDANT AND ANTIDIABETIC ACTIVITIES

5. Conclusion

The freeze-dried snack based on broccoli stalk powder demonstrated multifunctional potential supported by an i**nteresting nutritional profile, noteworthy phenolic content and valuable antioxidant and antidiabetic properties**. Incorporating broccoli stalk powder into food formulations not only supports sustainability goals by reducing food waste, but also meets growing consumer demand for nutrient-enriched, health-oriented products. **This approach exemplifies the dual role of up-cycled ingredients in driving nutritional innovation and environmental sustainability in the food industry.**

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