PRACTICE ABSTRACT nº 39

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Composite flour formulation using different vegetable flours

The formulation and sieving of vegetable flours play a crucial role in developing nutrient-rich food ingredients with improved functional properties. This study focuses on the preparation of composite vegetable flours from dried and milled vegetables, followed by sieving to achieve desirable particle size distribution. Seven vegetables (leaf: spinach, parsley and chard; bulb: carrot and potato and spice: onion and tomato) were selected from the Food Hub Enfidha/Chebika in Tunisia, dried using a convective dryer then sieved at two particle sizes ϕ<0.5 mm and ϕ >0.5 mm (fig. 1). The effects of sieving and flour formulation on nutritional and functional properties were tested.

Particle Size

Results indicate that finer sieving enhances antioxidant activity and the availability of phenolic compounds. In terms of colour properties, flours with smaller particle sizes appear more homogeneous. However, functional properties such as bulk and tapped densities vary depending on the vegetable type. Water absorption increases or remains stable as particle size increases, while oil absorption remains largely unaffected for most vegetables. Sensory evaluation reveals that different particle sizes receive comparable levels of appreciation.

Figure 1: particle size of composite flour φ<0.5mm (a) and φ >0.5 mm (b)

Flour formulation

The colour of the composite flour was significantly influenced by its formulation (fig. 2). Significant differences were observed in functional properties, including bulk density, tapped density, swelling capacity, and water absorption capacity. Additionally, the nutritional composition varied based on the flour formulation. The inclusion of leafy vegetables significantly enhanced the phenolic content and antioxidant activity of the composite flour.

Figure 2: different formulations based on the variation of leaf, bulb, and spice vegetables levels

Cooking procedure

For cooking, the recommended ratio of powder to water is 1:20 (m/v). The soup should be boiled until it thickens.

In conclusion, based in these findings, we can contribute to the development of high-quality vegetable flours for improved dietary diversity and food security, particularly in rural and vulnerable populations.

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