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Title:

Valorisation of Legume Protein Side-Streams: Composition, Functionality, and Nutrient Bioaccessibility in Tortilla Applications

Authors & affiliations:

<i>Name and surname</i>	<i>Institution/ Department, University, Country</i>
<i>Ruoxin Liu¹, Bernadine M. Flanagan¹, Vishal Ratanpaul², Michael J. Gidley¹</i>	
<i>¹Centre for Nutrition and Food Sciences, Queensland Alliance for Agriculture and Food Innovation, The University of Queensland, St Lucia, QLD, 4072, Australia</i>	
<i>²CSIRO, Agriculture and Food, 39 Kessels Road, Coopers Plains, Qld, 4108 Australia</i>	

Abstract: (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text into it.)

Preparation of Your Abstract

1. The title should be as brief as possible but long enough to indicate clearly the nature of the study. Capitalise the first letter of the first word **ONLY** (place names excluded). No full stop at the end.
2. Abstracts should state briefly and clearly the purpose, methods, results and conclusions of the work.

Introduction: Clearly state the purpose of the abstract

Methods: Describe your selection of observations or experimental subjects clearly

Results: Present your results in a logical sequence

Discussion: Emphasize new and important aspects of the study and conclusions that are drawn from them

Legumes and their protein fractions are increasingly utilised as sustainable, nutritious ingredients across various food applications, including bakery, extruded products, and plant-based alternatives. Industrial protein extraction through dry (air classification) or wet fractionation (alkaline extraction and isoelectric point precipitation) generates large amounts of side-stream co-products which are typically undervalued as waste or animal feed.

This study explores the valorisation of co-products derived from dry and wet fractionation of four dehulled legume flours (Desi chickpea, Kabuli chickpea, mung bean and lupin). Wet fractionation yielded high-purity fibre-rich and starch-rich fractions with excellent water and oil holding capacities (fibre-rich) and swelling power (starch-rich). In contrast, dry fractionation produced starch-rich coarse fractions with comparable properties to native flour.

To explore the application potential of some of these co-products, tortillas were developed based on the similar properties of coarse fractions and flour. Different levels of flour and dry-fractionated coarse fractions were added into wheat tortillas and simulated *in-vitro* digestion was conducted to assess nutrient bioaccessibility. This research highlights opportunities for adding value to the legume protein fractionation process promoting economic and environmental sustainability from a whole value chain perspective.