

## PRO1525: Value-Added Applications of Pulse Proteins for Human Foods

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As a food ingredient pulse protein differs in quality and performance amongst suppliers, manufacturers tend to focus on the manufacturing process and protein yield without adequate attention to the specific food quality preferences. This gap exists because the protein functional properties are dictated to a large extent by a protein's structure as influenced by the varieties of raw grains, protein extraction, and processing treatment (e.g. heat, pressure, pH). The end result is that a vast array of products is produced exhibiting substantially different properties. More fundamental research is critical to address this knowledge gap in order to consistently produce quality protein products from legumes. Also, testing of pulse crops of different varieties is necessary to allow the industry to work with pulses of known varieties with predictable and consistent quality.

This research has systematically investigated how pulse type, variety, and processing techniques affect protein functional properties. The results have allowed us to identify unique properties of different pulse crops thus better predict their high value applications in food area. Variety, growth location, and harvest year profoundly impact pulse protein extraction and their functionalities, but protein extraction method and processing more significantly impact pulse protein structure and functional properties. In addition, high pressure homogenization treatment may provide a new strategy to improve pulse protein functional properties, as this technique disrupted the large protein aggregates to form supramolecular aggregates, thus increased protein solubility and foaming capacity. Finally, eight food prototypes qualifying for high protein claims were developed based on the unique functional properties of lentil, pea, and faba bean protein to target gluten-free, or vegan market.

The outcomes generated from this research has provided some specific variety recommendation to pulse producers and allow pulse protein processing industry to identify and control the critical processing stages to better preserve and control protein functionality for food applications. Moreover, it has provided the opportunity to develop new processing (e.g. high pressure homogenization) to improve protein functional properties. The finished food product manufacturers will also greatly benefit from new plant protein ingredients with superior quality. In such a way, both pulse processors and food manufacturers can better expand their market reach and strengthen their competitive capabilities and leadership in the global markets.