Pea Seeds with Reduced Antinutritional Proteins: A Techno-functional and Nutritional Study

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Sustainable and nutritious protein sources are becoming increasingly essential due to a growing global population and the rising popularity of plant-based diets. Legumes, such as pea (*Pisum sativum* L.) emerge as promising alternatives due to their nutritional richness and environmental sustainability. Nonetheless, their full utilization is hindered by suboptimal techno-functional performance and the presence of antinutrients. This research aimed to evaluate the techno-functional properties of proteins isolated from two distinct pea lines: a wild-type control pea and a mutant line carrying null mutations for three proteins with poor nutritional characteristics.

The seeds of the wild-type and mutant pea lines were milled, and protein was isolated in an alkaline buffer. Next, the protein isolates were used to create emulsions and foams. The emulsions were characterized based on their particle size, zeta potential, microstructure, and stability over time, whereas foams were evaluated based on their foamability and stability. The pendant drop method was used to measure their surface tension and interfacial properties.

Both wild-type and mutant pea proteins showed effective emulsion stabilization over a 24-hour period, although the low zetapotential values indicated potential instability over time. The mutant pea line exhibited higher foamability, suggesting improved foaming properties compared to the wild-type. However, the mutant line had a higher surface tension as compared to the wild-type indicating that the foams could be prone to instability over time. Future work will assess the impact of the null mutations on the bioaccessibility of starch and proteins, in addition to the reduced allergenic potential of pea.