**Enhancing Technological and Nutritional Value of Pea Protein Concentrate through Subcritical Water Hydrolysis**

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The global demand for protein is projected to steadily increase in the coming years, driven by the growing world population and the shifts in food production and consumer diets. To address the current animal protein overconsumption and meet the sustainability demand, it is paramount to boost the production of high-quality, functional, and sustainable plant protein ingredients. Pea, *Pisum sativum*, is one of the main legume crops utilized to provide protein-rich ingredients in the plant-based food market. Pea protein concentrates are usually obtained through dry fractionation procedures, which involves preservation of the native protein structure at relatively high purity (~50% protein). However, dry fractionation also preserves high amount of non-protein components and antinutritional factors, which can impair protein functionality and nutritional value. In this work, pea protein concentrate (PPC) was hydrothermally treated by subcritical water to obtain enriched pea protein fractions with improved technological and nutritional characteristics. To achieve this, PPC was solubilized at 10% (w/w) water with and without 0.4 M NaCl addition prior subcritical treatment. Then, subcritical hydrolysis was conducted at 170 bar for 4 s at two different water temperatures, 200 ºC (T1) and 340 ºC (T2). After the treatment, the treated PPCs was also fractionated to evaluate the ratio and composition of soluble and insoluble fractions and the whole, soluble and insoluble fractions were further dried for analyses. In the protein concentrates, protein composition, structure and functionality were evaluated in terms of globulin/albumin composition (SDS-PAGE), molecular weight and aggregation (HPLC-MALS), degree of denaturation and stability (DSC, TGA), solubility and charge (Z-potential), foaming and gelation ability. Furthermore, the presence of phytic acid, antinutritional factor with high thermal resistance, and the release of free amino acids were analyzed to assess the effects of hydrolysis. Results indicated that protein denaturation occurred in all treatments, albeit the short exposure time. Meanwhile, water binding capacity and gelation of the ingredients were generally improved, especially in the insoluble fraction at low-temperature conditions (T1>T2) and salt-free treatments. Conversely, protein solubility improved under high-temperature conditions (T2>T1), with the greatest improvement observed in the presence of salt, although the increase was also observed without salt addition. This suggests that the partial hydrolysis of the fibre fraction also promoted the solubility of the protein within the matrix. Interestingly, subcritical water also increased the foaming ability of the treated PPC, although the long-term stability of the foams was reduced. Regarding phytic acid, it was primarily found in the soluble fraction, and its levels decreased during high-T2 treatments, indicating phytic acid (inositol hexaphosphate) was hydrolyzed under the most severe subcritical water treatments. As for free amino acids, the presence of salt at T1 promoted the release of amino acids, suggesting partial protein hydrolysis. At T2, free amino acid decreased in salt-free and salt containing conditions, likely due to thermal degradation and secondary reactions with other matrix components (i.e., Maillard). Therefore, results suggest that treating PPC with subcritical water influenced its technological and nutritional value based on treatment temperature and salt addition, increasing the offer of available plant-protein ingredients in the market for targeted food applications and functionalities.