

Effect of high hydrostatic pressure-assisted extraction on the techno-functional properties of lupin (*Lupinus luteus*) protein isolates

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INTRODUCTION

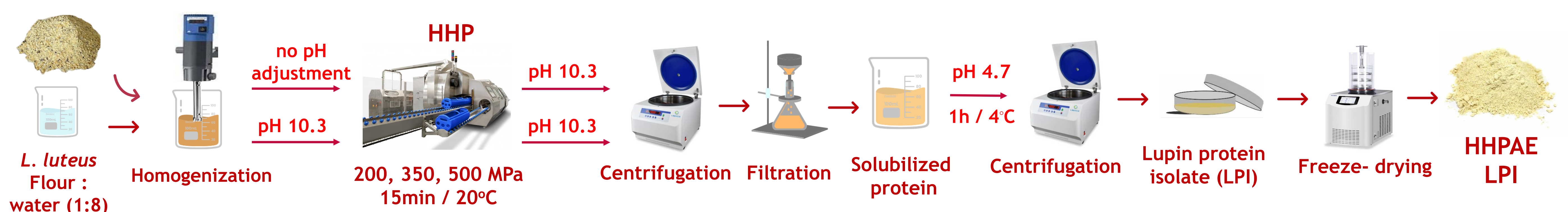


Lupin (*Lupinus luteus*) has a high protein content, and despite its nutritional value is underutilized as a human food ingredient. Obtainment of lupin protein isolates (LPI) with desired techno-functional properties would boost the use of lupin as an alternative source of protein. However, protein extraction by conventional methods has presented several limitations such as low recovery yield and limited techno-functional properties.

OBJECTIVE

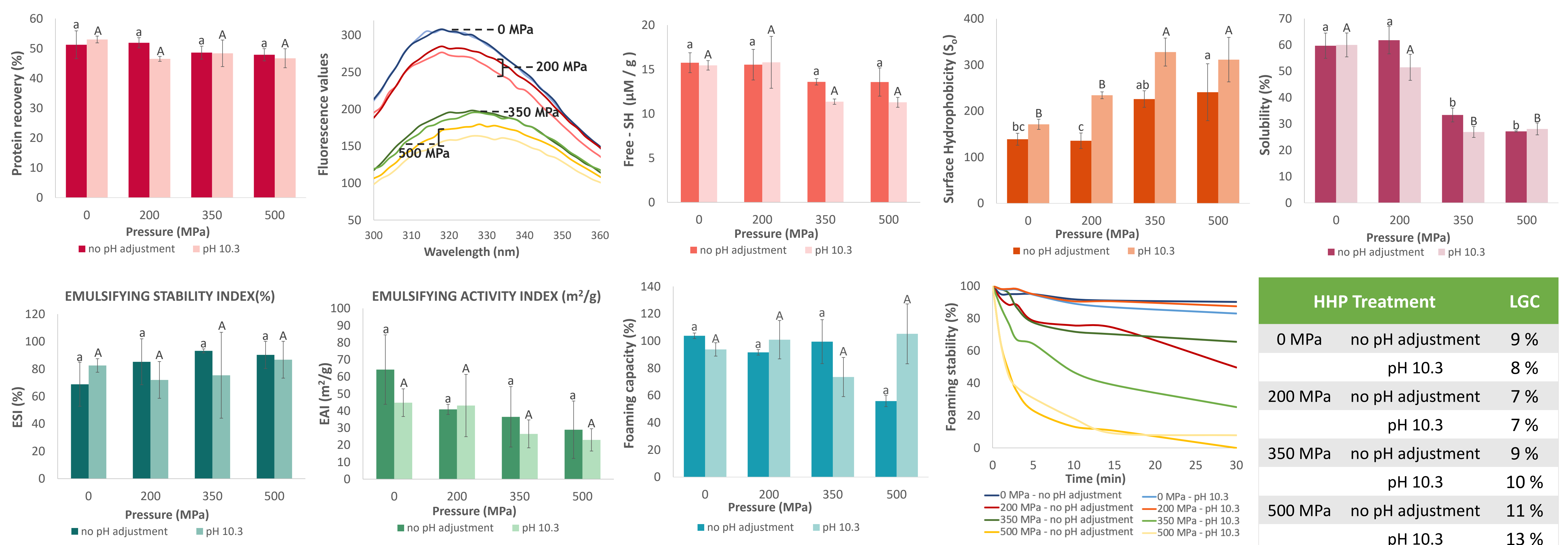
The evaluation of the effect of high hydrostatic pressure-assisted extraction (HHPAE) on the protein recovery and techno-functional properties of LPI for a potential application in the development of plant-based meat analogues.

MATERIALS AND METHODS



Techno-functional properties: Protein solubility, Emulsifying capacity, Foaming capacity and Gelling capacity

RESULTS AND DISCUSSION



- Increased levels of pressure induced a decrease in the fluorescence intensity and a red shift, mainly at 350 and 500 MPa.
- After treatments, S_0 increased at 500 MPa, whereas the free SH content decreased at 500 MPa, regardless of the pH adjustment.
- Solubility decreased with pH adjustment and HPPAE above 350 MPa.
- HHPAE at 200 MPa improved the least gelation concentration which decreased from 9% to 7% without pH adjustment and from 8% to 7% with pH adjustment.

CONCLUSIONS

HHPAE is an eco-innovative method that could be applied to modify the protein structure and tailor the properties of LPI, facilitating its use as a gelling agent in food matrices without need of prior pH adjustment of the lupin flour.

Tipología de comunicación
(sombrea la opción preferente)

- Comunicación oral
 Póster

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Contexto: The global growing demand of consumers for sustainable alternatives to animal protein sources has drawn the food industry's attention to high-quality and functional plant proteins. Lupin (*Lupinus luteus*) has a high protein content, and despite its nutritional value is underutilized as a human food ingredient. Obtainment of lupin protein isolates (LPI) with desired techno-functional properties would boost the use of lupin as an alternative source of protein. However, protein extraction by conventional methods has presented several limitations such as low recovery yield and limited techno-functional properties.

Objetivos: The present study aimed to evaluate the effect of high hydrostatic pressure-assisted extraction (HHPAE) on the protein recovery and techno-functional properties of LPI for a potential application in the development of plant-based meat analogues.

Métodos y resultados: Lupin flour, with or without pH adjustment at 10.3, was treated at 0, 200, 350, and 500 MPa for 15min at 20°C. Results showed that with the pH adjustment, HHPAE did not improve or decrease the protein content (85%) and recovery (48%). Without pH adjustment, HHPAE did not affect either the protein content (87%) or recovery (51%). The increased levels of pressure induced a decrease in the fluorescence intensity and a red shift, mainly at 350 and 500 MPa, indicating the gradual protein unfolding with the exposure of hydrophobic groups to hydrophilic environment. After treatments, surface hydrophobicity was increased at 500 MPa, indicating partial denaturation of the proteins, whereas the free sulfhydryl content decreased at 500 MPa regardless of pH adjustment. Moreover, solubility decreased with pH adjustment and HHPAE above 350 MPa. Despite that, in comparison to the control, HHPAE at 200 MPa improved the least gelation concentration which decreased from 9% to 7% without pH adjustment and from 8% to 7% with pH adjustment.

Conclusiones: HHPAE is an eco-innovative method that could be applied to modify the protein structure and tailor the properties of LPI, facilitating its use as a gelling agent in food matrices without need of prior pH adjustment of the lupin flour.

Agradecimientos:

PID2020-114422RR-C51 financiado por MCIN/ AEI /10.13039/501100011033.