**Developing Strategies for the Production of Potato Protein Aerogels**

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The demand for sustainable plant-based food materials has driven research into innovative protein-based aerogels. These materials present high porosity, large surface area and lightweight structure, showing promise in personalized supplementation and as food-grade delivery systems (Abdullah et al., 2022). Although many studies focus on aerogels derived from animal proteins, the use of plant proteins is still relatively unexplored. Potato protein is a promising and sustainable alternative, aligning the increasing emphasis on reducing environmental and health impacts with the accommodation of diverse dietary preferences. Aerogels' structural stability is crucial for food applications, enabling controlled moisture absorption and bioactive compound release. The aim of this study was to develop various strategies for potato protein aerogel production. Three distinct gelation methods were explored: thermal gelation (at 90 °C for 15 minutes), enzymatic crosslinking (1 % (w/v) transglutaminase), and chemical crosslinking (0.4 % (w/v) genipin). Additionally, to further improve the stability and integrity of the aerogels, a water-resistant ethylcellulose coating was tested. A comprehensive characterization of the produced aerogels was conducted, encompassing the analysis of properties such as porosity, water and oil absorption capacity, mechanical strength, microstructure and thermal properties. This allowed to compare the effectiveness of different production techniques and to determine which strategy offers the best technological properties. These findings pave the way for future sustainable, functional and innovative applications in the field of food-grade aerogels.

References:

Abdullah, Zou, Y., Farooq, S., Walayat, N., Zhang, H., Faieta, M., Pittia, P., & Qingrong, H. (2022). Bio-aerogels : Fabrication , properties and food applications. *Critical Reviews in Food Science and Nutrition*, *0*(0), 1–23. https://doi.org/10.1080/10408398.2022.2037504