**Enhancing the aqueous extraction of sunflower seed proteins by addition of NaCl or ultrasound treatment**

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Valorizing food processing side streams (by-products of lower value) that still contain essential macro- and micronutrients is a promising way to enhance a sustainable food system. In particular, the demand for plant protein continues to grow, pushed by the need to contribute to a healthy environment. Oilseeds represent thereby a potential sustainable protein source.

This study evaluated a gentle fractionation of two press cakes obtained from cold pressing of either dehulled (protein-rich) or whole (fiber-rich) sunflower seeds to investigate the aqueous extraction of the proteins. It was proposed that the addition of NaCl or ultrasound treatments improve the extraction of proteins under native or alkaline conditions.

For the two matrices, aqueous dispersions with 5 g/L protein were prepared. The protein solubility was determined as a function of the pH (2-12) and after adding 1 M NaCl or the application of ultrasound. The soluble fractions were evaluated using SDS-PAGE.

By extraction in water, it was observed that proteins in both dehulled and whole press cakes exhibited relatively low solubility (13 and 22%, respectively) at their native pH (6.6 and 6.2 respectively), while at pH 11-12, they exhibited the maximum solubility (81 and 88%).

The addition of 1 M NaCl significantly increased the protein solubility at native pH to about 85% for both press cakes, while at pH 11, there was only a minor increase in solubility for dehulled press cake (92%) and no effect in the case of the whole cake. In contrast, ultrasound performed better at alkaline pH, resulting in protein solubility greater than 92%.

SDS-PAGE showed that sunflower albumins were soluble in acidic conditions, whereas helianthinin (family of globulins) were more soluble in neutral or alkaline media, which was similar for both tested press cakes.

This research provides fundamental knowledge about the behavior of soluble sunflower protein after different treatments, that is critical for developing innovative food ingredients. Future investigations will include enzymatic and mechanical treatments to improve protein extraction, besides their effects on protein quality and functionality.