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GREEN LEAF BIOMASS AS AN ALTERNATIVE PROTEIN SOURCE

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Ensuring enough protein for growing world population while respecting sustainability goals puts alternative proteins in the spotlight of food science research. Green leaf biomass represents prospective plant-based alternative source of proteins. The use of leafy biomass as protein source has long research history, but recent increase in protein demand highlighted its potential for food applications. This is mostly because of the enzyme ribulose-1,5-bisphosphate carboxylase/oxygenase (RuBisCO), major fraction of leaf water-soluble (white) proteins. RuBisCO is ideal for human consumption due to its low allergenicity, high digestibility and excellent amino acid composition. In addition to the acknowledged nutritionally valuable RuBisCo protein, other leaf proteins, namely membrane (green) leaf proteins, could be used more in human nutrition.

However, leafy biomass remains underutilized due to the complexity of protein extraction and purification. Insufficiently purified proteins compromise their functionality and applicability in food formulations. Therefore, the development of scalable processes remains an imperative for the cost-efficient and sustainable production of leaf-based proteins. One of the key features for the efficient process is the right choice of the starting material. The starting material should be rich in protein, available in excessive amount, and preferably without other applications.

Pumpkin leaves represent an appropriate choice for production of leaf-based proteins. These leaves are rich in proteins and they are obtained as waste (or by-product) during pumpkin production, hence their usage is in accordance with the trend of making agroindustry more sustainable. Our results showed that the highest yield of pumpkin leaf proteins is obtained when twin-screw press was used for tissue disruption with subsequent repressing. Usage of alternative extraction (ultrasound-assisted) and purification (membrane separation) methods positively affected protein functionality.

Keywords: alternative protein, leaf protein, RuBisCO, agro-waste valorization.

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