A strategy to implement the circular economy paradigm using okara extracts fractions and biochemical approach in agri-tech innovation

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The significant environmental and economic impacts of waste and byproducts from food chains are well-documented. However, these byproducts still contain numerous valuable molecules with potential applications and bioactivities in various fields. Moreover, the environmental impact and economic aspects related to the usage of agri-food by-products and food waste represent a cornerstone in advancing the circular economy [1]. Okara, a byproduct from soy, *Glycine max*, generated from soymilk production, is gaining attention due to its abundance and the numerous possible applications in the agri-food sector. This work focused on the fractionation of okara proteins through green, sustainable, water-based extraction processes [2] and the enzymatic production of peptides. We tested different peptide fractions for their potential inhibitory capacity against pathogenic fungi (i.e. *Fusarium graminearum*) and bio-stimulatory activities tested on plant systems. Fractionating waste is crucial for a comprehensive analysis and a deep understanding of the activities of the single peptide obtained through enzymatic digestion. This approach facilitates comprehensive investigations into residual proteins' molecular and biochemical properties and valuable compounds, which can be studied using both *in vitro* and *in vivo* methodologies.

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