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# FUNCTIONAL AND PHYSICOCHEMICAL CHARACTERIZATION OF EMERGING PLANT-BASED PROTEINS

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In the last years, the consumption of vegetable proteins as a viable alternative to traditional meat and dairy-based products has been significantly increasing. This is in part due to the rising demand from consumers for more ethical, environmentally sustainable, and healthier food products coupled with the ongoing rise in public knowledge of the socio-economic, animal welfare, religious or social benefits associated with veganism [1,2.]

Conventional proteins (i.e., egg and milk) dominate the food sector, in particular the pastry industry, however, in recent times, emerging sources (i.e., soy, pea, faba and chickpea) are gaining traction. There are several benefits associated with vegetable proteins such as their low allergenicity, easy accessibility, nutritional advantages and no legal restrictions [3]. In particular, such plant-based proteins play a significant role in food formulations, functioning as gelling, thickening, and foaming agents as well as emulsion stabilizers and fat binders. These properties are quite interesting as they might enable to replace the traditional animal proteins used in baking. Even though significant progress has been made in understanding the physicochemical and functional characteristics of plant proteins, more studies are required to fully characterize and modulate their functionality to enable their use in a wider range of dietary applications [4]. Hence, the aim of this study was to characterize the functional and physicochemical properties of different emerging alternative protein sources (pea, faba, soy and chick pea) in terms of solubility, foaming capacity (FC), emulsifying capacity (EC) and gelling properties. The results showed increased protein solubility at alkaline pH values, with soy protein exhibiting the greatest solubility profile and chickpea protein the lowest. In terms of FC, most of the proteins performed very well and at pH 3 presented greater FC than at pH 7. Soy protein showed the highest FC at pH 3, with a value over 200%, followed by pea (158% at pH 3) and faba bean protein (153% at pH 3), while chickpea protein displayed a value

of 19% at pH 3 and no FC at pH 7. A similar effect was found for the EC where values between 73-86 % were obtained. Finally, protein concentrations ranging from 5 to 15% (w/v) were used to assess the thermal gelling properties at pH 3 and 7. Under these conditions only soy protein (15% w/v) at pH 3 and 7, and fava bean protein (15 %w/v) at pH 7, formed self-sustainable gels. Generally, the alternative proteins tested displayed interesting functional properties with soy standing as the protein with most potential, followed by pea and faba, while chick peak displayed poor overall performance.

**Keywords:** Plant proteins, emerging proteins, Functionality.

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