**Innovative Processing Techniques Unveil the Potential of Chickpea Aquafaba**

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ABSTRACT

Chickpea aquafaba, the residual liquid from cooked chickpeas, stands out as a noteworthy player in the dynamic landscape of plant-based ingredients, captivating the food science community with its distinct attributes. This study delves deeply into the physicochemical properties of chickpea aquafaba and its powder counterpart, highlighting the protein-rich profile. Chickpea aquafaba inherits these nutritional components, boasting 1-1.5% protein and 3.5% carbohydrates by weight, and distinguishing itself with exceptional foaming ability derived from a unique composition rich in soluble proteins, oligosaccharides, saponins, and starches [1,2]. Aquafaba's foaming ability distinguishes it as a sought-after ingredient for vegan and egg-free recipes, excelling in achieving desirable textures[3,4].. The investigation extends into cutting-edge technologies, with a focus on the transformative impact of microwave vacuum technology and custom-designed microwave equipment on aquafaba. These methods not only fine-tune critical parameters for optimized protein content and foaming ability, but they also improve protein extraction precision. The study delves deeper into spray-dried chickpea aquafaba, presenting a concentrated and shelf-stable powder that expands the benefits of this plant-based elixir. Chickpeas, aquafaba, advanced processing technologies, and custom-designed equipment have all come together to usher in a new era of plant-based innovation. The study emphasizes microwave vacuum technology which is a method that combines the advantages of microwave and vacuum drying [5] and its superior performance, consistently yielding higher protein content and desirable properties in both liquid and powder forms of aquafaba. In the ever-changing landscape of food science, this comprehensive examination of composition, foaming ability, and advanced processing illuminates the path toward realizing the full potential of chickpea aquafaba.

*Keywords: Chickpea, Aquafaba, Microwave-Vacuum, Spray Drying, Powder*

**REFERENCES**

[1] Damian, J.J. et al. (2018). Phytochemical content and emulsifying ability of pulses cooking water. *European Food Research and Technology*. DOI: 10.1007/s00217-018-3077-5.

[2] Mustafa, R. and Reaney, M.J.T. (2020). Aquafaba, from Food Waste to a Value-Added Product, in *Food wastes and by-products* (eds.Campos-Vega, R. et al.), John Wiley & Sons Ltd., pp. 93–126.

[3] Shim, Y.Y. et al. (2018). Composition and properties of aquafaba: Water recovered from commercially canned chickpeas. *Journal of Visualized Experiments*. DOI: 10.3791/56305.

[4] Mustafa, R. et al. (2018). Aquafaba , wastewater from chickpea canning , functions as an egg replacer in sponge cake. *International Journal of Food Science and Technology*. DOI: 10.1111/ijfs.13813.

[5] Sun, T. et al. (2023). Heat and mass transfer law during microwave vacuum drying of rice. *Quality Assurance and Safety of Crops and Foods*. DOI: 10.15586/qas.v15i1.1153.