

Exploring the Nutritional and Functional Attributes of Milk Protein Hydrolysate: A Comprehensive Review

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Abstract

Milk protein hydrolysate has garnered significant attention in the food industry due to its nutritional and functional properties. This comprehensive review delves into the various aspects of MPH, including its production methods, nutritional composition, bioavailability, and functional applications. MPH offers numerous health benefits, such as improved digestibility, enhanced protein absorption, and bioactive peptide functionality. Furthermore, its diverse functional properties make it a versatile ingredient in food formulations. This review aims to provide a thorough understanding of MPH and its potential applications in the food industry.

Keywords: Food industry • Bioavailability • Nutritional

Introduction

Milk protein hydrolysate is derived from the enzymatic hydrolysis of milk proteins, resulting in smaller peptides and amino acids. This process enhances the digestibility and bioavailability of proteins, making MPH an attractive ingredient in various food products. MPH contains bioactive peptides with potential health benefits, including antioxidant, antihypertensive, and antimicrobial properties. Moreover, MPH exhibits functional properties such as emulsification, foaming, and gelation, contributing to its versatility in food applications. This review comprehensively explores the nutritional and functional attributes of MPH, shedding light on its potential as a valuable ingredient in the food industry. MPH can be produced through enzymatic hydrolysis, using proteolytic enzymes such as protease, pepsin, or trypsin. This process breaks down the larger protein molecules into smaller peptides and amino acids, increasing the solubility and digestibility of the protein. The degree of hydrolysis affects the molecular weight distribution of peptides in MPH, influencing its nutritional and functional properties. Additionally, factors such as enzyme type, substrate concentration, temperature, and pH play crucial roles in the hydrolysis process, influencing the quality of MPH [1-3].

Literature Review

MPH is rich in essential amino acids, which are readily absorbed and utilized by the body for various physiological functions. The hydrolysis process increases the bioavailability of amino acids, facilitating faster absorption and utilization. Furthermore, MPH contains bioactive peptides with diverse health-promoting properties, including antihypertensive, antioxidant, and immunomodulatory effects. These bioactive peptides exert their beneficial effects by interacting with specific receptors or enzymes in the body, regulating various physiological processes.

The enzymatic hydrolysis of milk proteins enhances their digestibility

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Received: 27 January, 2024, Manuscript No. JCTT-24-133838; **Editor assigned:** 30 January, 2024, PreQC No. P-133838; **Reviewed:** 14 February, 2024, QC No. Q-133838; **Revised:** 19 February, 2024, Manuscript No. R-133838; **Published:** 29 February, 2024, DOI: 10.37421/2471-9323.2024.10.242

and bioavailability compared to intact proteins. The smaller peptide size in MPH facilitates faster digestion and absorption in the gastrointestinal tract, leading to improved protein utilization. Moreover, bioactive peptides present in MPH may exert physiological effects beyond basic nutrition, contributing to overall health and well-being. Studies have shown that MPH supplementation may enhance muscle protein synthesis, improve exercise performance, and promote recovery after physical activity. In addition to its nutritional benefits, MPH exhibits various functional properties that contribute to its utility in food applications. These include emulsification, foaming, gelation, and water-holding capacity. MPH can stabilize emulsions and enhance the texture, mouthfeel, and shelf-life of food products. Furthermore, its ability to form gels and foams makes it suitable for use in a wide range of food formulations, including dairy products, beverages, bakery items, and sports nutrition products.

Discussion

MPH finds applications in a diverse range of food products, including infant formulas, sports nutrition supplements, protein bars, beverages, and functional foods. Its neutral taste and odor make it suitable for incorporation into various formulations without affecting the sensory attributes of the final product. Moreover, the health-promoting properties of bioactive peptides present in MPH enhance the nutritional value of food products, catering to the growing demand for functional foods and beverages [4-6].

Conclusion

Milk protein hydrolysate offers a range of nutritional and functional benefits, making it a valuable ingredient in the food industry. Its enhanced digestibility, bioavailability, and bioactive peptide content contribute to its potential health-promoting effects. Furthermore, MPH exhibits diverse functional properties that enhance the texture, stability, and sensory attributes of food products. As consumer demand for nutritious and functional foods continues to rise, MPH is poised to play a significant role in meeting these needs. Further research and development in the field of MPH production and applications are warranted to unlock its full potential in the food industry.

Acknowledgement

None.

Conflict of Interest

No conflict of interest.

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How to cite this article: Charles, Cameron. "Exploring the Nutritional and Functional Attributes of Milk Protein Hydrolysate: A Comprehensive Review." *J Cosmo Tricho* 10 (2024): 242.