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Zein-Soy Protein Isolate Composites Prepared By pH Cycling and Their Nutritional and Digestibility Characteristics

Jin Gao*

School of Food Science and Engineering, South China University of Technology, Guangzhou, 510640, China

Introduction

Protein composites play a vital role in food formulation, providing enhanced functional and nutritional properties. Zein and SPI are proteins commonly used in food applications due to their unique characteristics and nutritional value. However, both proteins possess certain limitations that can be addressed through composite formation. The pH cycling method has emerged as a promising technique to modify protein structures and create composites with improved properties. This study aims to explore the preparation of zein-SPI composites using pH cycling and investigate their nutritional and digestion properties [1- 3].

Preparation of Zein-SPI composites

Zein and SPI were obtained from commercial sources and characterized for their protein content and functional properties [4].

The pH cycling method was employed to prepare the composites. This involved adjusting the pH of the protein solutions alternately between acidic and alkaline conditions over multiple cycles. The specific pH values and cycling parameters were optimized to promote protein interactions and composite formation [5- 7].

The resulting zein-SPI composites were collected, dried, and stored under appropriate conditions.

Nutritional analysis

Proximate composition: The protein, fat, carbohydrate, and moisture content of the zein-SPI composites were determined using standard analytical methods.

Amino acid profile: The composition of essential and non-essential amino acids in the composites was analyzed using amino acid analysis techniques such as high-performance liquid chromatography (HPLC) [8].

Digestibility: The in vitro digestibility of the composites was evaluated using simulated gastrointestinal digestion, assessing the release of amino acids and the digestibility of protein fractions.

Functional properties

Solubility: The solubility of the zein-SPI composites in various pH conditions was determined to assess their dispersibility and solubility profile [9].

Emulsifying and foaming properties: The emulsifying capacity and foam stability of the composites were evaluated to assess their functional performance in food applications.

Statistical analysis

The obtained data were subjected to appropriate statistical analysis using methods such as analysis of variance (ANOVA) to determine significant differences between samples [10].

Results and Discussion

Nutritional properties

Compare the protein content and composition of zein-SPI composites with the individual proteins (zein and SPI) to assess any changes or improvements [11].

Discuss the essential amino acid profile and evaluate if the composite provides a balanced amino acid profile suitable for human nutrition.

Analyze the digestibility of the composites and compare it with the individual proteins to determine if the composite exhibits enhanced or altered digestibility properties [12].

Functional properties

Discuss the solubility, emulsifying capacity, and foam stability of the zein-SPI composites and compare them with the individual proteins. Evaluate if the composites exhibit improved functional properties that could be advantageous in food applications [13, 14].

Conclusion

The pH cycling method successfully prepared zein-SPI composites with improved functional properties. The nutritional analysis revealed changes in protein content, amino acid profile, and digestibility, suggesting the potential of these composites as alternative protein sources.

Acknowledgement

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Conflict of Interest

None

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***Corresponding author:** Jin Gao, School of Food Science and Engineering, South China University of Technology, Guangzhou, 510640, China, E-mail: gaojin@scut.edu.cn

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