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Xiang Li

Abbott Nutrition Research and Development, Singapore

The role of milk protein and vegetable protein in nutritional supplement powders during microencapsulation processing

Nutrition supplement powder as one of the key sub-categories in functional foods has seen rapid growth in the past 20 years. Many powder formulations use a substantial amount of milk protein, both as a protein source and as a wall material for encapsulating sensitive nutrients, most commonly by spray-drying. There has been a recent trend of partially replacing milk proteins with vegetable proteins, because vegetable proteins are more sustainable and cost-effective. Among vegetable proteins, soy protein has been extensively studied and showed excellent functionality, while pea protein is also gaining increasing interest in sports nutrition due to its nutrition values, allergy free, emulsifying and anti-oxidative properties. The first part of this research aims to review the current trends of mixed protein system in nutritional supplement powder formulation, the comparison of different protein combinations as wall materials in microencapsulation processing and discussion of their strengths and limitations, and then discussions of various strategies to improve encapsulation efficiency in nutritional powder. The latter part is to investigate six different proteins combination (Sodium caseinate and Milk protein concentrate as Casein proteins, paired with globular proteins Soy protein, Pea protein and Whey protein) as emulsifiers and wall materials. Multiple trials were conducted, and the potential correlations among formulations, liquid emulsion properties and powder microencapsulation stability were studied using coefficient correlation analysis. The research findings (powder physical attributes, nutrient retention, microencapsulation efficiency, and oxidative stability) showed great potential of mixed protein system application as wall materials in the future nutritional powder development work.

Biography

Xiang Li has more than 20-years experiences in new product development, research and innovation. Currently, he is the Director of Product Development and Research in Abbott Nutrition R&D Pacific-Asia Centre. He is leading the analytical research, product development, and rapid prototype innovation teams. His research portfolio includes nutritional product innovation, dairy processing, ingredient chemistry, consumer insight, and user experience. He is the Pioneer of Abbott Nutrition R&D in Asia and recorded many first, including led two new Green-field nutritional plant start-ups in Singapore and China. His previous efforts resulted in the commercial launches of more than 250 Pediatric and Adult nutritional products globally. Recently, he has accepted an invitation to be a Technical Advisor to the Singapore National Research Foundation (NRF), accountable to the Prime Minister Office of Singapore. He is a Senior Associate Research Fellow in Abbott Volwiler Society. He has received his EMBA degree from NUS and UCLA in 2012.

Xiang.li@abbott.com

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