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Ice structuring proteins from plants: Mechanism of action and food application

Majid Hassas-Roudsari
University of Guelph, Canada

Application of ice structuring proteins (ISPs, also known as anti freeze proteins) as a food preservative has shown potential to enhance the quality of frozen food and desserts during freezing storage, transport, and thawing. One of the main advantages of ISPs for the food industry is that they are fairly active in very low amounts, which could make these new food ingredients very cost-effective. Therefore, ISPs have gained much attention in food science and their use has become more and more feasible. ISPs have been discovered in many cold tolerating biological systems such as fish, insects and plants, which all exhibit ice recrystallization inhibition, and also in some cases, thermal hysteresis and ice nucleating activities. This presentation discusses application of ISPs in different food products, cold stress and cold tolerance in plants, different mechanisms of actions of ISPs and homologies to other structurally identified proteins, which lead to the dual role of ISPs in plants as ice recrystallization inhibitors and pathogenesis-related proteins or enzymes. Ice crystallization and recrystallization (growth of larger ice crystals at the cost of "restructuring" of other ones), interaction of ice crystal and ISPs, ice recrystallization inhibition and thermal hysteresis assays are also discussed. To-date there is no data available to report toxicity or to challenge the safety of these "novel" food ingredients.

Biography

Majid Hassas-Roudsari received his Bachelor of Science in Food Sciences and Industries from University of Shahid Beheshti, Iran. He finished his Master of Science in Food and Bioproducts Sciences at the University of Saskatchewan and earned HIS Ph.D. in Food Science at the University of Guelph. Dr. Hassas has a number of publications and presentations on innovative extraction, assessment and preparation techniques of novel food ingredients. He is specialized in Separation Technology, Protein Chemistry and Biochemistry, Thermal and Cryotechnologies, and Bioactive Compounds. He is currently working as a faculty research lead and industrial liaison at Niagara Research/ Food & Beverage Research and Innovations.