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Presentations

P24. Role of polysaccharides in ice cream texture and aroma release

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Ice cream's physical and sensory properties depend on its microstructure, which consists of the ice, air and fat phases. Understanding the interactions among these phases is essential for controlling the texture and flavour profile of ice cream. To enhance these attributes and maintain stability through shelf life, which may involve temperature fluctuations, stabilizers such as polysaccharides are used¹. This study is based on a pilot-scale system with a fixed 100% overrun and aims to examine how combinations of polysaccharides affect premix viscosity, and ice cream hardness, texture, melting behavior over a 12-month shelf life at various storage temperatures. The release of volatile organic compounds is also investigated.

Preliminary observations suggest that after seven days more viscous mixes produce softer ice cream, contrary to the usual assumption that higher viscosity leads to denser textures². For instance, samples with a high viscosity of 825 mPa·s prepared with alginate had a mean hardness of 334 ± 65g, while samples with the lowest viscosity of 218 mPa·s prepared with cassia-guar-carrageenan kappa had a hardness of 394 ± 120g. Rather than a simple "more viscous = firmer" relationship, these results point to how different polysaccharides, each with distinct molecular weights and hydration behaviors, can influence water immobilization and ice crystal formation in ways that do not solely depend on overall viscosity³. In addition, producing a softer, more deformable matrix could enhance volatile compound release and initial aroma intensity⁴. Planned PTR-MS and GC-MS analyses will clarify how formulation adjustments influence both immediate flavor release and long-term aroma stability.

References:

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