Mouthfeel challenges of plant proteins: Towards colloidal solutions informing future sustainable food development

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To ensure a continued supply of safe, pleasurable and healthy food to feed the growing population within the planet’s environmental constraints, the transition from animal to plant-based foods is imperative. However, the major obstacle to consumer acceptance of plant proteins is their unpleasant mouthfeel, particularly with respect to textural perception *i.e.* astringency1, often linked to high oral friction. We have recently demonstrated that plant proteins offer different tribological properties2,3 dependent upon how they adsorb to oral-mimicking surfaces. This talk will cover our mechanistic understanding of astringency in plant proteins. We coupled well-established Rate All That Apply (RATA) sensory trial (n=100) with brain imaging using functional near infrared spectroscopy (fNIRS) and cellular response of plant proteins using mucin-producing cell lines. Results indicate that astringency mechanism of plant proteins resembles that found in polyphenols resulting from binding to salivary mucins. In addition, the jamming of tribological contact due to aggregation of plant proteins owing to surface hydrophobicity cannot be ignored. Finally, the talk will cover innovative colloidal strategies such as microgelation4,5 that may mitigate such astringency issues, informing the design of the next generation of pleasurable plant-based foods.

**References**

1. Sarkar A. (**2024**). *Annual Review of Food Science and Technology*. **15 (1).**
2. Lesme H, Kew B, Bonnet L, Sarkar A, Stellacii F. (**2024**). *Food Hydrocolloids*, 149, Art. No. 109489.
3. Kew B, Holmes M, Stieger M, Sarkar A. (**2021**). *Food Hydrocolloids,****116****, Art. No. 106636.*
4. Kew B, Holmes, M, Liamas E, Ettelaie R, Connell S, Dini D, Sarkar A. (**2023**). *Nature Communications*, ***15,***Art No. 4743.
5. Pabois O, Dong Y, Kampf N, Lorenz C D, Doutch J, Avila-Sierra A, Ramaioli M, Mu M, Message Y, Liamas E., Tyler A I I, Klein J, Sarkar A. (**2024**). *Communication Materials*. **5,**Art No. 158.

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