



Editorial

Natural hydrocolloids in the food sector – Recent applications beyond conventional uses

Ahmet Yemenicioğlu,¹  Stefano Farris,² Meltem Turkyilmaz,³ & Sukru Gulec^{1,4} 

1 Department of Food Engineering, Izmir Institute of Technology, 35430 Urla, İzmir, Turkey

2 Packaging Division, DeFENS, Department of Food, Environmental and Nutritional Sciences, University of Milan, Via Celoria 2, 20133 Milan, Italy

3 Institute of Food Safety, Ankara University, 06110 Dışkapı, Ankara, Turkey

4 Molecular Nutrition and Human Physiology Laboratory, Izmir Institute of Technology, 35430 Urla, İzmir, Turkey

In food industry, natural hydrocolloids have been extensively used to increase the functionality of different food products such as beverages, bakery and confectionery, sauces and dressings, and meat and poultry. Conventional applications of hydrocolloids in the food industry are still based on their rheological and surface-active properties (Dickinson, 2018; Nishinari *et al.*, 2018; Yousefi & Jafari, 2019). However, recent developments in the hydrocolloids sector fuelled by sophisticated market demands and emerging new technologies expanded the applications of hydrocolloids beyond their conventional uses. For example, extensive studies conducted to improve stability and controlled release properties of bioactive agents, probiotics and nutrients using hydrocolloids as encapsulating systems, eased and encouraged the development of many novel functional food products. Hydrocolloids tailored/modified by different physical, chemical and biological methods or applied with novel strategies also start to play a central role in the development of more functional (or even multi-functional) food ingredients, better performing encapsulating devices and advanced coating and packaging materials (e.g. with superior barrier, mechanical, active, controlled release and visual properties). A number of new strategies and methods are available to scientists and workers using natural hydrocolloids for food applications. However, both current industrial trends and extensive literature survey suggest that next innovation will go along five main pathways: (i) screening of agro-industrial wastes to discover alternative hydrocolloids showing unique functional properties or free from chronic problems associated with some classical hydrocolloids (e.g. limited resources, health problems, religious concerns and rejection by vegans.); (ii) using hydrocolloids in nanotechnology to develop advanced coating, packaging and encapsulating materials (applications with nano-sized cellulose, chitin, starch, milk proteins, etc.); (iii) combining different hydrocolloids to boost their functionality; (iv) exploiting interactions of natural hydrocolloids with different food components (especially with

phenolic compounds); and (v) employing natural hydrocolloids as food ingredients to improve health benefits and nutritive value of food (use of pectin, inulin, β -glucan, resistant starch, milk and whey protein concentrates, etc.; Yemenicioğlu *et al.*, 2019).

The scope of this special issue is to present current and potential future applications of food hydrocolloids in the food sector through high-quality research articles in the field. In particular, current and future trends in selecting sources of extraction and technological applications of hydrocolloids as well as recent developments related to their health effects have been discussed in a detailed review paper authored by the guest editors (Yemenicioğlu *et al.*, 2019). Two articles related to emulsion-based films of pectin (Çavdaroglu *et al.*, 2019) and gelatin (Dammak & Sobral, 2019) with eugenol, and an article related to eugenol and linalool retention capacities of hydrogels from guar and xanthan gums (Kopjar *et al.*, 2019) clearly proved the significant research interest in functional and active (antimicrobial and antioxidant) hydrocolloid–volatile polyphenol mixtures. Additional articles of the special issue are related to hot-topic areas of hydrocolloids research such as discovery of novel functional properties (e.g. emulsification, gelation and rheological properties), possible dietary effects, nanotechnology applications, tailoring of functional properties via non-thermal methods, combinational applications, edible oleogels, probiotic edible films and interactions with food components. By providing the most up-to-date information on hydrocolloids at both basic to advanced levels, this special issue can be of great interest for researchers from academia and industry, as well as students, practitioners and experts that are (or will be) involved in the field of hydrocolloids research.

References

Çavdaroglu, E., Farris, S. & Yemenicioğlu, A. (2019). Development of pectin–eugenol emulsion coatings for inhibition of *Listeria* on webbed-rind melons: a comparative study with fig and citrus

- pectins. *International Journal of Food Science & Technology*, **55**, 1448–1457.
- Dammak, I. & Sobral, P.J.D.A. (2019). Active gelatin films incorporated with eugenol nanoemulsions: effect of emulsifier type on films properties. *International Journal of Food Science & Technology*, **54**, 2725–2735.
- Dickinson, E. (2018). Hydrocolloids acting as emulsifying agents—How do they do it? *Food Hydrocolloids*, **78**, 2–14.
- Kopjar, M., Ivić, I., Vukoja, J., Šimunović, J. & Pichler, A. (2019). Retention of linalool and eugenol in hydrogels. *International Journal of Food Science & Technology*, **55**, 1416–1425.
- Nishinari, K., Fang, Y., Yang, N. *et al.* (2018). Gels, emulsions and application of hydrocolloids at Phillips Hydrocolloids Research Centre. *Food Hydrocolloids*, **78**, 36–46.
- Yemenicioğlu, A., Farris, S., Turkyilmaz, M. & Gulec, S. (2019). A review of current and future food applications of natural hydrocolloids. *International Journal of Food Science & Technology*, **55**, 1389–1406.
- Yousefi, M. & Jafari, S.M. (2019). Recent advances in application of different hydrocolloids in dairy products to improve their techno-functional properties. *Trends in Food Science & Technology*, **88**, 468–483.