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The 4th International Conference on Food Digestion

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Introduction to the Special issue

Food Digestion is the process that lies between the food we consume and any health benefits that it may impart. In a world where food related disease is already a significant and increasing burden on health services, it is important to understand the link between food and health. This requires a range of approaches including the use of *in vitro* simulations of the digestive process. However, if experimental data is to be comparable and useful it needs to make use of harmonised and physiologically relevant methods. The Infogest static model (Minekus et al., 2014) offers such a method and has been cited in more than 100 times. The success of this article confirms the interest in understanding the links between food structure and health.

Digestion includes a number of steps and these have all seen an increase in popularity as areas of scientific exploration. Oral processing is an important first phase because it involves diminution of the food and the addition of amylase but mainly because it represents a major sensory interaction with the food (Chen, 2009). The second stage of digestion and one that has been quite central to developing an understanding of the connection between food structure and rates of nutrient release, is the gastric phase. Because of this central importance a number of articles in this special issue have focused on the behaviour of food in the gastric compartment. Indeed it has recently become the focus of a number of studies aimed at determining the factors that drive emptying rates (Camps, Mars, de Graaf, & Smeets, 2016)(Mackie, Rafiee, Malcolm, Salt, & van Aken, 2013). The final stage of digestion is the intestinal phase, which can be divided into the small intestine, where through the release of endogenous enzymes most of the digestion and absorption occurs and the large intestine where digestion continues through the fermentation of remaining food by gut microflora. Both Infogest and this special issue of Food Research International, focus primarily on the upper GI tract and so the complex interactions between food, especially dietary fibre, intestinal microbiota and the host not explored. However, the role of soluble dietary fibre in the upper GI tract is discussed in one of the articles and fibre such as cereal beta glucan is the subject of much current research (Fardet, 2010; Wood, 2007).

This special issue brings together articles presented at the 4th International Conference on Food Digestion that was held in Naples in March 2015. The meeting was the last one in the series to be run directly by the COST Action Infogest (Dupont et al., 2011). The congress built on the success of previous meetings in Cesena (2012), Madrid (2013) and Wageningen (2014). The meeting in Naples invited submissions on three topic areas based on the three workgroups of the Action.

- Characterization of raw materials and processed food matrices for optimized nutrient bioavailability: Identification of bioactive compounds - stability during processing - characterization of food structures.
- In vitro, in vivo and in silico models of mammalian gastrointestinal digestion: Application of digestion models to food - comparison *in vitro/in vivo* - identification of digestion products.
- Evaluation of the health effects: Immunomodulatory properties of food - regulation of appetite and satiety - effect of food on gut microbiota

Both the conference series and the COST Action Infogest have proved to be highly successful and the next conference in the series will be held in Rennes, France in 2017. As interest in research involving simulating digestion continues to grow, efforts are being made to validate the methods used against *in vivo* data (Bornhorst, Roman, Dreschler, & Singh, 2014). In addition, efforts are being made to extend the research to other more specific groups such as infants (de Oliveira et al., 2016) or the elderly (Levi & Lesmes, 2014). Given the amount of research that is going on around Europe, it is clear that in the near future there will be papers showing the extent to which *in vitro* methods such as the Infogest static model can be used to predict *in vivo* outcomes.

Finally, the guest editors would like to thank Elsevier staff for all the editorial help they provided and especially like to thank Prof. Anderson Sant'Ana, Editor-in-Chief for her help and encouragement. We are also grateful for the interest and participation of all authors who submitted their work to this special issue containing in total 20 original research articles and 1 review.

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