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The 6th International Conference on Food Digestion

Editorial by Alan Mackie, Pasquale Ferranti, Didier Dupont

The 6th International Conference on Food Digestion was held on the 2-4 April 2019 in Granada

Introduction to the special issue The need to feed the world against a background of climate change, increasing pollution and increasing malnutrition has placed food research at the centre of many global challenges. We need to feed the global population in a more sustainable and healthier way while at the same time, cost effectively offering the same pleasurable and sensations. Food digestion sits at the boundary between the food we eat and the health effects that it generates. Thus, it is vital to understand this process if we are to overcome the challenges currently faced by the food industry. Infogest was setup as a COST Action in 2011 to improve the health properties of food by sharing our knowledge on the digestive process and this is still the primary objective of the Infogest network (<https://www.cost-infogest.eu/ABOUT-Infogest>) ten year later. The specific objectives of the network are to:

- Compare the existing digestion models, harmonize the methodologies, validate them towards in vivo data and propose guidelines for performing new experiments.
- Identify the bioactive components that are released in the gut during food digestion.
- Demonstrate the effect of these compounds on human health.
- Determine the effect of the matrix structure on the bioavailability of food nutrients and bioactive molecules.

The success of the network can be measured in many ways but the first specific objective of standardising approaches based on physiologically relevant methodology has certainly been achieved with the static digestion protocol (Brodkorb et al., 2019; Minekus et al., 2014), the earlier article having now been cited more than 2000 times. The network is continuously working on further standardising protocols and validating them against human and animal studies (Miralles et al., 2021). For example, there is now a protocol for a semi-dynamic simulation of digestion (Mulet-Cabero et al., 2020) and a review assessing the ability of dynamic simulations of digestion to mimic physiology (Dupont et al., 2019). There continues to be global interest in designing more relevant and sophisticated laboratory models to simulate human digestion. As a result, there is little doubt of the need for the Infogest network to reach out to collaborators across the globe to ensure a common understanding of digestion physiology and its importance in the development of future foods.

The move to more plant-based diets continues to drive the need for research into the functionality of plant-based ingredients and this includes not just nutritional functionality but also the increasing spread of technological functionality required by the food industry. If the food industry is to provide more sustainable and healthier foods, they need to have the support of scientists to do so (Garcia-Garcia, Azanedo, & Rahimifard, 2021). The research needed includes an understanding of how plant-based alternatives to existing animal-based products will behave both technologically and nutritionally. In the future these ideas will be combined to provide a nutritional footprint that may be based on combination of environmental indicators (material footprint, carbon footprint, water footprint, land use) and health indicators (energy intake, sodium intake, content of dietary fibre and saturated fat), that in combination give a nutritional footprint. These requirements are likely to mean a continued need for research into the digestive behaviour food for many years to come.

The development of more targeted models of digestion continues. In particular with the development of simulations of digestion in specific demographic groups such as infants (Menard et al., 2014) and the elderly (Shani-Levi et al., 2017). Both of these have been the subject of significant research for the development of foods such as infant formula and softer textured foods respectively. Specific regions of the GI tract have also come under increasing scrutiny. The commercial importance of organoleptic properties has continued to drive research into oral processing (Sarkar & Mackie, 2020) and with increasing recognition of the importance of gut microbiota (Macfarlane & Macfarlane, 2012), colonic fermentation models have also proliferated. In addition, there is an increasing interest in providing mathematical models to provide more predictive capabilities and these too are increasing in sophistication (Le Feunteun, Mackie, & Dupont, 2020). Although this area of research is challenging and needs the collaboration of theoretical and experimental scientists, it is a highly active area. Indeed, all the pieces seem now available to start building *in silico* models that could predict the main metabolic responses to liquid foods and meals, although more work remains to be done for the case of solid foods.

In conclusion, research in the field of food digestion and health continues to grow in strength and the Infogest network has become the centre of a global effort to deliver more sustainable healthier food to a growing population. This bodes well for the future and we should all be looking forward with interest to the 7th International conference on food digestion in Cork, Ireland in 2022.

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