PROTEIN AGGREGATION FOR FOOD FORMULATIONS: INFLUENCE OF ELECTRIC FIELDS AND THE FORMATION OF PROTEIN-BASED NANOHYDROGELS

Protein aggregation for food formulations: influence of electric fields and the formation of protein-based nanohydrogels

António A. Vicente

CEB - Centre of Biological Engineering, University of Minho, 4710-057 Braga, Portugal.

Proteins are, *per se*, very strong candidates to become part of food formulations due to their inherent functional and nutritional properties. This includes their role as structural elements of food-grade delivery matrices due to the current GRAS ("generally recognized as safe") status of many of them.

Protein properties can be conveniently altered by subjecting them to various treatments (e.g. heat, pH changes). This lecture will present alternative technologies addressing the possibility of tailoring protein properties in order to ensure that they meet the adequate requirements for their use in various applications, e.g. nano-sized matrices for delivery of bioactives.

The delivery of functional ingredients in the human body has been a growing research trend. The fact that it can be made making use of foods as vehicles of delivery makes it simultaneously more attractive and more difficult to deal with, because it implies using food-grade ingredients to build the delivery matrices. Food proteins can fulfill this requirement. If such matrices are to be nano-sized structures, aiming at further enhancing their delivery potential, an extra layer of care must be considered, namely the evaluation of their toxicity once dispersed in the gastro-intestinal tract (GIT).

In this context, the influence of electric fields in food proteins has been evaluated by our group, aiming at their use as (nano)encapsulation systems for model bioactive compounds. The behavior of these nanostructures inside the GIT has been assessed in an *in vitro* model system.

Future work aims at establishing the limits of their use in foods, considering the actual regulations regarding novel foods and the related safety issues.