



## Topical Research Meeting on Physics in Food Manufacturing

### **(Invited) A possible role in nutrition for amyloid fibrils from food proteins**

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Protein fibrils are protein aggregates, which can be generated from food-grade proteins by unfolding and hydrolysis. The resulting protein fibrils can be used in a broad context of applications. At length scales above the well-established atomistic fingerprint of amyloid fibrils, these colloidal aggregates exhibit mesoscopic properties comparable to those of natural polyelectrolytes, yet with persistence lengths several orders of magnitude beyond the Debye length. This intrinsic rigidity, together with their chiral, polar and charged nature, provides these systems with some unique physical behavior. In this talk I will discuss our current understanding on the mesoscopic properties of amyloid fibrils at the single molecule level, the implication of their semiflexible nature on their liquid crystalline properties, and I will illustrate how this information prove useful in understanding their collective behavior in bulk and when adsorbed at liquid interfaces. By the careful exploitation of the physical properties of amyloid fibrils, the design of advanced materials with unprecedented physical properties become possible, and I will give a few examples on how these systems can ideally suit the design not only of complex food systems, but also of biosensors and biomaterials, catalytic and water purification membranes. In the end of the talk it will be discussed how these intriguing colloidal systems can even serve food science and nutrition, by giving a perspective view on our recent results.