Fabrication, characterization, and potential applications of texturization of biopolymers to produce nutritious and high-quality food products

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Texturization of proteins and other food molecules has become a useful processing tool for creating foods with improved textures and nutritional qualities. There is an increasing interest in using plant proteins to produce meat analogs which are promoted by environmental, health, and sustainability concerns. However, the amino acid composition of plant proteins and their reduced functionality may limit their applications in the manufacture of quality foods. It is being considered that the structuring of vegetable proteins and other food components will favor various food applications. Therefore, a systematic and in-depth understanding of the texturizing mechanisms and how the physicochemical properties of raw materials affect the final quality of the product is necessary.
Key parameters that are associated with the texturization of proteins and other food components, which are closely related to changes in the protein structure and interactions with other components will be discussed. Different types of manufacturing processes, their process conditions, the type of raw materials and their physicochemical characteristics, and their effects on the product quality will be described.
Extrusion is one of the technologies used for protein texturing. Distinctive features of extrusion technologies currently used and under development and their different capabilities will be discussed and linked to the development of innovative food products. The role of formulations in product rheology and their effects on product quality shall be described.
The presentation will focus on the fabrication of structures from plant and animal proteins and other materials via self-assembly, electrospinning, solution blow spinning, 3D printing, wet spinning, and high-temperature shear for several applications where such food materials assemble in quality foods.