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Towards development of plant-based alternatives for animal products

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The use of plant proteins instead of proteins from animal origin is a promising route to make food production more sustainable. Replacement of animal protein by plant proteins is not trivial because animal-based products like meat and cheese are highly appreciated by consumers due to their unique sensory properties. From consumer research, it became clear that consumers appreciate alternative products most, when those resemble the original products as much as possible. We therefore investigate how to make fibrous products using plant materials as an alternative for meat. The concept of shear-induced structuring turned out to be a new route to make highly fibrous materials. The exact properties of the materials are determined by a combination of process conditions (temperature, time and deformation rate) and the functional properties of the raw materials. To obtain suitable raw materials, plant materials have to be refined due to their high carbohydrate content. The way how those are removed determine the functional properties and their structuring potential greatly. We therefore also investigate how functional protein-rich materials can be obtained from legumes/plants in a sustainable manner. Nowadays, fractionation of plant proteins is usually done with wet fractionation processes in which proteins and carbohydrates are separated based on solubility characteristics. Traditionally, refining plant proteins focuses on high protein yields and high protein purity. But, functionality may be negatively influenced by the focus on protein yield and purity. Besides, the purity of each fraction will be higher at the expense of yield, leading to less efficient use of raw material. A less intensive separation will preserve the natural structure of the plant leading to enhanced properties. In addition, a reduction in the use of chemicals, water and energy for refining is expected which contributes to a more sustainable fractionation process. In case of soy, we demonstrate a certain amount of carbohydrate have a positive effect on the final structure of the material obtained. Here, complete purification of soy protein is not the best route towards the production of high quality meat alternatives. Both from sustainability and well as final product quality, the focus in fractionation of plant materials should therefore be on functionality rather than purity.

Biography

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