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37. ANALYSIS OF TECHNOLOGICAL PROSPECTS FOR CREATING MEAT AND SEAFOOD ANALOGUES

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One of the main problems associated with the production of meat and seafood analogs is the creation of a meat-like texture, which should be fibrous. There is a wide range of processing methods developed for plant-based meat analogs.

Processing methods can be classified as bottom-up and top-down structuring methods. According to the bottom-up approach, individual fibers are assembled to form the final product, while the top-down approach assumes that fibrous structures are developed by forming a mixture of biopolymers using an external force. The top-down strategy involves the use of extrusion, shear cells, 3D printing, freeze-fracture, and hydrocolloid blending. The bottom-up strategy uses wet spinning and electro-spinning. Different processing conditions can result in a variety of structures, such as fibrous, layered, or homogeneous. Due to their robustness and large-scale production capabilities, the two most common texturization methods are extrusion and shear cell methodology. Providing the right texture and structure to plant-based meat and fish analogues is crucial when defining the composition of new products. Texture imitation is crucial for the overall quality and consumer acceptance of seafood substitutes. The texture of fish is characterized by elasticity and a crumbly feel when chewed. The structure of proteins depends on their type. Proteins exhibit important structure-function relationships in terms of emulsifying and foaming properties, flavor binding, viscosity, gelation, and texturization. The main method for obtaining the appropriate structure of meat and fish analogues is the use of textured vegetable proteins.

Another alternative method for mimicking texture is to bind vegetable proteins with polysaccharides, such as alginates, which can form strong polysaccharide gels that entrap the protein. The additional use of microbial transglutaminase results in cross-linking of the proteins, creating solid gel networks.

The composition of the matrix, the variety of ingredients, and the water content have a great influence on the final product, and the types of ingredients can enhance or limit the desired texture of the food. The formulation of meat and fish analogues includes water, proteins, flavors, fat, binders, colors, vitamins, minerals, and antioxidants. Water usually constitutes more than 50–80% of the total ingredients, acts as a plasticizer during the processing of meat analogues and provides the desired juiciness.

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