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Utilização de proteínas do leite como nanocarreadores de compostos funcionais em alimentos: importância do estudo das interações intermoleculares.

Use of milk proteins as nanocarriers for functional compounds in foods: importance of the study about intermolecular interactions.

Milk proteins (caseins and whey proteins) are natural and multifunctional biopolymers widely used to deliver molecules with sensory and bioactive properties in food, protecting them against oxidation and degradation. In order to ensure the functional properties of bioactive compounds in foods, these molecules should withstand conditions of food processing and storage, as well as the digestive tract environment. Moreover, a large number of functional compounds have low water solubility, small bioavailability and sensitivity to heat, oxygen, light and pH. Thus, the properties of milk proteins at various environmental conditions (temperature, pH and ionic force) can be successfully adapted for transporting functional ingredients, in micro and nanocapsules. For this purpose, the study at the molecular level of interactions between bioactives and milk proteins, at different thermodynamic conditions, is fundamental. Isothermal titration nanocalorimetry, differential scanning nanocalorimetry, UV-vis and fluorescence spectroscopy, surface plasmon resonance and electrokinetic measurement have been often used to determine thermodynamic parameters of interaction between protein-ligand complexes. The binding constant (K_b), complex stoichiometry (n), standard Gibbs free energy change (ΔG°), standard enthalpy change (ΔH°), standard entropy change (ΔS°) of complex formation, zeta potential (ζ) of the complex, among others can provide fundamental information about the stability of the protein-ligand complex at different conditions of temperature, pH and ionic force. These scientific data are fundamental for developing products with better sensory, nutritional and nutraceutical properties, especially those rich in milk proteins.

References

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