

## Encapsulation and Protection of Bioactive Nutrients Based on Ligand-Binding Property of Milk Proteins

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**Abstract :** Functional foods containing bioactive nutrients offer benefits beyond basic nutrition and hence the possibility of delaying and preventing chronic diseases. However, many bioactive nutrients degrade rapidly under food processing and storage conditions. Encapsulation can be used to overcome these limitations. Food proteins have been widely used as carrier materials for the preparation of nano/micro-particles because of their ability to form gels and emulsions and to interact with polysaccharides. The mechanisms of interaction between bioactive nutrients and proteins must be understood in order to develop protein-based lipid-free delivery systems. Beta-lactoglobulin, a small globular protein in milk whey, exhibits an affinity to a wide range of compounds. Alfa-tocopherol, resveratrol and folic acid were respectively bound to the central cavity, the outer surface near Trp19-Arg124 and the hydrophobic pocket in the groove between the alfa-helix and the beta-barrel of the protein. Beta-lactoglobulin could thus bind the three bioactive nutrients simultaneously to form protein-multi-ligand complexes. Beta-casein, an intrinsically unstructured but major milk protein, could also interact with resveratrol and folic acid to form complexes. These results suggest the potential to develop milk-protein-based complex carrier systems for encapsulation of multiple bioactive nutrients for functional food application and also pharmaceutical and medical uses.

**Keywords :** milk protein, bioactive nutrient, interaction, protection

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