

**Lactoferrin/ β -lactoglobulin heteroprotein system: Interactions,
coacervation and encapsulation potentiality**

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The mechanism of interaction of two oppositely charged macromolecules leading to a liquid-liquid phase separation is called complex coacervation. Examples of complex coacervation between oppositely charged polyelectrolytes are numerous but complex coacervation involving two oppositely charged proteins was only described recently and it results from precise balance of repulsive and attractive interactions between the two proteins¹. A better knowledge of the mechanisms of formation and stabilization of such system is essential to design biomaterial with optimized properties such as the encapsulation of bioactives.

Here, we investigated the potentiality of two whey proteins, Beta-lactoglobulin (BLG) and Lactoferrin (LF), known for their ability to form complex coacervation², to spontaneously co-assemble with vitamin B9. Under conditions of LF-BLG coacervation, in contrast to BLG, LF is able to interact with vitamin B9, forming specific nanoparticles³. The ability of such nanoparticles to form coacervates with BLG (B9-LF-BLG coacervates) was further investigated.

B9-LF-BLG coacervation was assessed across a range of B9:Proteins mixing ratios and pH conditions by turbidity and phase contrast microscopy. Kinetics of their formation were monitored by light scattering technics. B9 entrapment was evaluated. Storage and time stability of the coacervates were assessed at various temperatures.

B9-LF-BLG coacervates were formed in a narrow range of pH, protein concentration and stoichiometry. We evidenced that B9-LF-BLG coacervates exhibited an optimal entrapment of ≈ 10 mg B9/g of proteins. The B9-LF-BLG coacervates were stable over a two weeks storage time. The entrapment efficiency of B9 by the coacervates was found to be similar to that of other encapsulation techniques. Hence the B9-LF-BLG coacervates display useful potentialities as biocarriers for bioactives. They constitute new structured biomaterial based delivery systems with enhanced health benefit to formulate natural and functional ingredient.

References:

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