

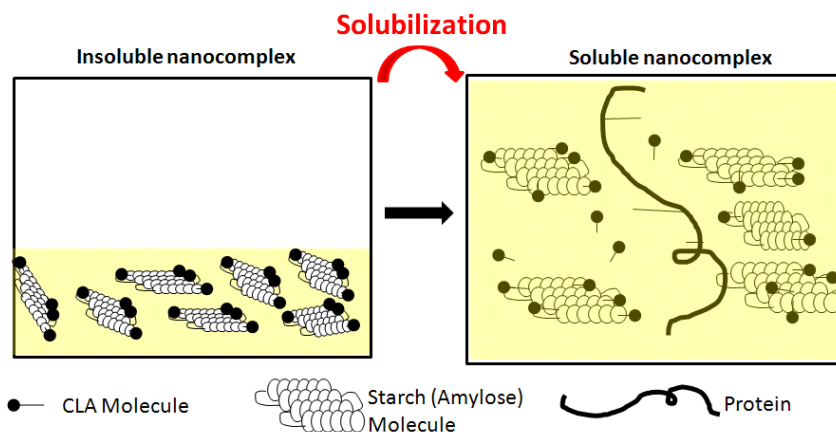
A soluble nanoscale self-assembling complex from starch, protein and lipid for healthy nutrient delivery

Functional foods are designed to provide vitamins, minerals and bioactive phytochemicals and macronutrients, among other compounds, in a form that efficiently and effectively delivers these important nutrients. Polysaccharide- (e.g., starch) and lipid-based **nanoparticles** have gained importance during the past decade due to their ability to act as versatile nutrient carriers.

Conjugated linoleic acid (CLA) is a bioactive compound that has been recognized by its antioxidant and anticancer properties. One of the problems with CLA is that it oxidizes rapidly losing these properties. Past studies have been conducted to protect CLA from oxidation by

incorporating it into **nanoparticles** that are formed by complexing CLA with starch (amylose). Although good advances have been achieved in regard to CLA stability, the **nanoparticles** are insoluble and cannot be used in beverages due to precipitation. Through studies on biopolymer interactions, we have been able to solubilize these nanoparticles through the use of whey proteins. The resulting CLA-carrying **nanocomplex** is stable in solution at least up to 2 months.

These soluble **nanocomplexes** have the potential to carry CLA, as well as some other charged bioactive compounds, in a soluble form that could be used in the production of nutritional and palatable beverages



- Zhang, G., Maladen, M.D., and Hamaker, B.R. 2003. Detection of a novel three component complex consisting of starch, protein, and free fatty acids. *Journal of Agricultural and Food Chemistry* 51:2801-2805.
- Liu, J., Fei, L., Maladen, M., Hamaker, B.R., and Zhang, G. 2009. Iodine binding property of a ternary complex consisting of starch, protein, and free fatty acids. *Carbohydrate Polymers* 75:351-355.

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