

## ABSTRACT

Shah, Azalenah. M.S.E, Purdue University, August 2009. A soluble nanoscale self-assembling complex from starch, protein and lipid for healthy nutrient delivery. Major Professors: Osvaldo H. Campanella and Bruce R. Hamaker

Studies in our laboratory have shown that an interaction among amylose, protein and FFA resulted in the formation of a soluble high molecular weight nano-complex (radius of gyration, 20-70 nm). The important characteristics of this nano-complex is its solubility, its ability to carry valuable lipid-based compounds (e.g., CLA, DHA, EPA) and its slow starch digestion property. The main difference between the well studied amylose-lipid complex and this 3-component nanocomplex is its solubility and stability under appropriate conditions. Thus, we view this complex as a way of solubilizing the amylose-lipid complex, an attribute that will provide an important advantage for use in the production of beverage type foods. The unavailability of functional drinks containing bioactive PUFA's such as CLA makes this research potentially significant to the food industry. The goal of this research is to elucidate further the chemical interactions necessary to assemble and stabilize the complex by using physicochemical and rheological methods. Rheological characterizations of dispersions of the complex as well as its formation at various temperatures and shear rates were performed. It was found that concentration and type of main ingredients (i.e., native or defatted starch), temperature, interaction time and shear rates have a significant effect on the formation of the complex and its rheological properties.