Use this page to provide an abstract (up to 350 words) outlining the research described in your poster. **This OUTLINE MUST BE APPROVED AND SIGNED BY THE DEPARTMENT HEAD OR MAJOR PROFESSOR.** (Note: *email notification by your advisor to Ms. Debbie Koch can be substituted for the signature)*

Developing organogel-based Pickering emulsions with improved freeze-thaw stability and hesperidin bioaccessibility

Organogel-based delivery systems, which may enhance product stability and improve the dispersibility of nutraceuticals encapsulated in organogels, are relatively novel in food science and technology. Organogel-based oil-in-water emulsions are a major class of organogel-based delivery systems. However, most of the previous researches about organogel-based emulsions are nanoemulsions stabilized by small-molecular weight surfactants. The surfactants applied may have detrimental effects on gut microbiota, which seriously limits application of organogel-based nanoemulsions stabilized by surfactants in food industry. To the best of our knowledge, no research related to organogel-based Pickering emulsions stabilized by particles has been reported. It is of great interest to understand the performance of organogel-based Pickering emulsions in tolerating environmental stresses during food storage and delivering nutraceuticals.

In the present study, soybean oil-based organogel was structured using monostearin, and the organogel had a gel-sol melting temperature of 44.0 °C. Loading amount of hesperidin in soybean oil-based organogels could be about twice as much as metastable solubility of hesperidin in soybean oil. Organogel-in-water Pickering emulsion was formed using the soybean oil-based organogel as the oil phase and ovotransferrin (OVT) fibrils as the emulsifier. Visual observation indicated that organogel-based Pickering emulsions stabilized by OVT fibrils (40 mg/mL) at oil fractions of 0.50–0.85 had excellent storage stability and could withstand three cycles of freeze-thaw treatments. Conventional oil-in-water Pickering emulsion was prepared as control to better understand impact of organogel incorporation on freeze-thaw stability, and conventional Pickering emulsion was formed using soybean oil as the oil phase and OVT fibrils as the emulsifier. Freeze-thaw stability of organogel-based Pickering emulsions was better than that of conventional Pickering emulsions (without organogel) stabilized by OVT fibrils. In vitro digestion study revealed that organogel-based Pickering emulsion could improve both the extent of lipolysis and hesperidin bioaccessibility when compared with organogel. This study demonstrates the feasibility of formulating novel food-grade organogel-based Pickering emulsions with high nutraceutical loading, excellent freeze-thaw stability and improved nutraceutical bioaccessibility.

The above, proposed plan of research is approved and accepted.

Karl Matthews

DATE SIGNATURE OF DEPARTMENT HEAD OR MAJOR PROFESSOR - PRINT NAME