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### **INFLUENCE OF POLYGLYCEROL ESTERS OF FATTY ACID ON IN VITRO DIGESTIBILITY OF SOYBEAN OIL-IN-WATER BY PANCREATIC LIPASE**

LIJUN YIN<sup>1</sup>

<sup>1</sup>College of Food Science & Nutritional Engineering, China Agricultural University, China, ljyin@cau.edu.cn

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**ABSTRACT** In humans, fat digestion in small intestine is mainly due to the hydrolysis of lipids by pancreatic lipase. The physicochemical properties of the interfacial layer surrounding fat droplets could play an important role in determining the extent of enzyme binding to the emulsion surface and therefore the extent of lipolysis. Our previous study confirmed that various polyglycerol esters of fatty acid (PGEs) surrounding emulsified lipids affected the stability of emulsions and the encapsulated lipophilic compounds during gastric digestion. The objective of this work was to investigate the influence of PGEs on in vitro digestion of emulsified oil by pancreatic lipase. Three polyglycerol esters of monooleate were used to prepare oil-in-water emulsions. Pancreatic lipase (1.6 mg/ml) and/or bile extract (5.0 mg/ml) were added to emulsion and particle charge, droplet aggregation, microstructure and free fatty acids released were measured. In the presence of bile extract, there were appreciable increases in amount of free fatty acids released (>19.8%) and negative charge in emulsions compared with the absence of bile extract. The stability of emulsions to droplet flocculation and coalescence during hydrolysis was strongly dependent on emulsifier type. Emulsion stabilized by decaglycerol monooleate was the most stable with a slight increase of particle size from 0.73 $\mu$ m to 0.97 $\mu$ m and a 69.6 $\mu$ mol/ml free fatty acid released. Our results suggest that emulsifiers could influence the susceptibility to lipid digestion of emulsions by pancreatic lipase and the susceptibility to droplet coalescence, which may have potential application for the design of foods to control the bioavailability of lipids. Acknowledgement: This work was also supported by a fund from National Natural Science Foundation of China (No. 20976187).

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