

Influence of Methylcellulose on Bioaccessibility of β -Carotene Incorporated within Starch-based Filled Hydrogels

Saehun Mun

Center for Food and Bioconvergence, Seoul National University,
Seoul 08826, Republic of Korea
saehun@snu.ac.kr

Extended Abstract

There is considerable interest in controlling the gastrointestinal fate of nutraceuticals to improve their efficacy [1]. In this study, the influence of methylcellulose (an indigestible polysaccharide) on lipid digestion and β -carotene bioaccessibility was determined. The carotenoids were encapsulated within lipid nanodroplets that were then loaded into rice starch hydrogels containing different methylcellulose levels. Incorporation of 0 to 0.2% of methylcellulose had little impact on the dynamic shear rheology of the starch hydrogels, which may be important for formulating functional foods with desirable textural attributes. The microstructure, lipid digestion, and β -carotene bioaccessibility of the filled hydrogels were measured as the samples were passed through simulated oral, gastric, and small intestinal phases. The lipid digestion rate and carotenoid bioaccessibility decreased with increasing methylcellulose. This effect was attributed to the ability of the methylcellulose to inhibit molecular diffusion, promote droplet flocculation, or bind gastrointestinal components thereby inhibiting triacylglycerol hydrolysis at the lipid droplet surfaces. This information may be useful for rationally designing functional foods with improved nutritional benefits.

References

- [1] K. O. Aboalnaja, S. Yaghmoor, T. A. Kumosani, and D. J. McClements. "Utilization of nanoemulsions to enhance bioactivity of pharmaceuticals, supplements, and nutraceuticals," *Expert Opin Drug Deliv.* pp. 1-10, 2016.