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Formulating orange oil-in-water beverage emulsions for effective delivery of bioactives: Influence of carrier oil type on chemical stability, antioxidant activity and *in vitro* bioaccessibility of lycopene

Erika Meroni¹ and Vassilios Raikos²¹University of Milan, Italy²University of Aberdeen, UK

The carotenoids inclusion in diet is considered to contribute to human health, as their antioxidant properties are associated with a reduced risk for the development of chronic diseases. Thus, the consumption of lycopene, which is the most predominant carotenoid in human plasma, is important for various biological functions. The addition of lycopene in food formulations is problematic because of its lipophilic nature and high susceptibility to oxidation. However, its bioavailability can increase when co-ingested with other lipids. A popular method for increasing carotenoid bioavailability is emulsification. The purpose of the present work was to develop an edible orange oil-in-water beverage emulsion containing lycopene as a bioactive ingredient. Particularly, the influence of carrier oil type on the chemical stability, antioxidant properties and bioaccessibility of lycopene in orange oil-in-water beverage emulsions was investigated. The emulsions were formulated with orange oil (A), which was partially (50%) replaced with tributyrin (B) or corn oil (C). The addition of corn oil enhanced the physical stability of the beverage during chilled storage by inhibiting Ostwald ripening. The formation of oxidation products was insignificant during storage for 28 days at 4°C, regardless the type of added oil. Lycopene was more susceptible to chemical degradation in the presence of unsaturated, long chain triglycerides and the retention followed the order: A (87.94%), B (64.41%) and C (57.39%). Interestingly, bioaccessibility of lycopene was significantly lower for emulsions formulated with 50% corn oil as opposed to 100% orange oil as indicated by the simulated *in vitro* gastric digestion model.

Biography

Erika Meroni is a third year PhD student in Food Systems at the Department of Food, Environmental and Nutritional Sciences (DeFENS), Italy. The general topic of her research is about bioavailability, biological activity, mechanisms of action and role on health of bioactive components (endogenous, from food or from food industry by-products) through cell culture models and *in vivo* studies. Currently, her PhD project is focused on a particular dietary approach, which is the "ketogenic diet". The aim of her study is to investigate the metabolic effects of ketone bodies, by *in vitro* and *in vivo* studies.

erika.meroni@unimi.it

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