
Passion fruit ice cream enriched with nanoencapsulated lutein: antioxidant activity and bioaccessibility of the carotenoid

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Lutein is an important bioactive due to its potent antioxidant activity, as well as to the possibility of its used as a natural dye. However, this xanthophyll is sensitive, susceptible to oxidation by external factors such as heat, low pH and exposure to light. Microencapsulation is an alternative to reduce and prevent such degradation processes, and among the most used methods for the protection of hydrophobic bioactives such as lutein is the emulsification. The objective of this work was to evaluate the antioxidant activity of passion fruit flavor ice creams incorporated with nanoencapsulated lutein, as well as the bioaccessibility of carotenoid. Nanoemulsion was produced by high pressure homogenization, using medium chain triglycerides as the oil phase and phospholipids as surfactants, containing 1 g of lutein/100 g emulsion. Three ice cream formulations were produced (one control with a commercial mixture of passion fruit flavor and color, and two with 0.2% lutein nanoemulsion and 50% sugar reduction, one with 0.5% citric acid). The antioxidant capacity of ice cream was evaluated during 180 days of storage by FRAP methods, capture of ABTS radical and amount of total phenolics. In vitro digestion was performed according to the INFOGEST 2.0 method, modified with parameters for senior (>65 yo) adults. The results for FRAP and ABTS differed from the control for ice cream incorporating lutein, which presented higher antioxidant activities, and for phenolics also showed higher values than the control. Also, ice creams containing lutein-loaded nanoemulsion showed lower degradation of phenolic compounds after 180 days of storage. In vitro digestion data for ice creams enriched with lutein indicated that a significant amount of xanthophyll was still present - approximately 65% lutein at the end of the gastric phase, and 33% at the end of the intestinal phase. Compared to the initial amount of lutein in ice cream, 1/3 of the initial lutein was bioaccessible after the intestinal phase. Therefore, in addition to the possibility of producing an ice cream with natural coloring and antioxidant activity, there was a significant amount of lutein in the bioaccessible form after digestion.