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Controlled release of flavor oil nanoemulsions encapsulated in filled soluble hydrogels

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Abstract

The goal of this project was to create hydrogels, a type of soluble biopolymer delivery system to encapsulate flavored nanoemulsions that are released under artificial saliva conditions. Low methoxyl (LM) pectin and whey protein isolate (WPI) at pH 4.0 were used to form the hydrogels at a ratio of 4:1 (w/w), respectively. Orange oil, medium-chain triglyceride (MCT) oil, and WPI were used to make stable nanoemulsions loaded with flavor oil. The nanoemulsions were encapsulated into hydrogels with a mean diameter of 768 ± 36 nm. The ability of the hydrogels to encapsulate the orange oil and release the flavor in the presence of artificial saliva was determined using size distribution data, confocal microscopy, and the release of limonene as assessed by solid-phase microextraction using gas chromatography mass spectrometry. Results showed that the encapsulation of flavor nanoemulsions in filled hydrogels reduces the release of limonene.

Keywords: flavor nanoemulsions, encapsulation, filled hydrogels, soluble complexes, pH-dependent release.

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