Casein micelles as encapsulating material and delivery system for jaboticaba extract

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Publication date: 2019

Document Version
Publisher's PDF, also known as Version of record

Link back to DTU Orbit

Citation (APA):
**INTRODUCTION**

The jabuticaba is a dark berry rich in vitamin C, minerals and phytochemicals (phenols and anthocyanins). These last ones have biological properties including strong antioxidant and anti-inflammatory, anti-atherosclerotic, and anti-oxidative properties. The polyphenols are found only in the fruit peel (~50% of fruit), which is not directly edible. Thus, the extraction of anthocyanins and other bioactive compounds from jabuticaba peels is of industrial interest. However, polyphenols originating from jabuticaba are unstable under environmental conditions and their encapsulation is necessary for industrial applications.

The jabuticaba is a natural nano-transporter with hydrophilic and hydrophobic binding sites, which make favorable the encapsulation of lipophilic and water-soluble compounds. The casein micelles are a renewable resource obtained by industrial techniques of Shirataki and drying of soybean milk.

Studies have reported that some anthocyanins are able to link to the casein monomers, which makes the micelles a potential encapsulation agent of polyphenols from jabuticaba fruit. Nonetheless, the caseins are unstable in pH 4.6 and a burst release of polyphenols in the stomach would be expected. Thus, the crosslinking of casein micelles with transeptaginase makes them more resistant to acid and, in turn, improving the release of the active at different pH conditions.

**METHODS**

**RESULTS**

The microencapsulation of jaboticaba extract in casein micelles has been allowing the prolonged release of the active. The crosslinking has been increasing the release time.

**CONCLUSION**

This work showed that crosslinked casein hydrogel can be a good candidate to encapsulate Jabuticaba extract. The polyphenols interact spontaneously with caseins and it is entrapped into micelles. The internal encapsulation of extract did not change the properties of caseins in suspension. However, the extract caused modifications in the protein matrix, which can be attested by rheological measurements and pour size evaluation. Crosslinked casein micelle hydrogel can encapsulate polyphenols without large changes in hydrogel properties. For this reason, this hydrogel can be applied to carry and deliver such compounds. After spray drying, the crosslinked micelles presented higher protection of polyphenols against stress agents such as aging and heat treatment, being a good alternative to encapsulation. This brings about the potential use of this encapsulation agent as functional ingredient for foods or drugs.