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Casein micelles as encapsulating material and delivery system for JABUTICABA EXTRACT

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INTRODUCTION

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-thrombotic, and anti-obesity 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 peel is of industrial interest. However, polyphenols originating from jabuticaba are unstable under environmental conditions and their encapsulation is necessary for industrial applications.

METHODS

The jabuticaba peel was placed in an extraction solution made of 70% (v/v) acetic acidified ethanol (pH 2.0). The mixture was put under ultrasound treatment for 50 min. The suspension was concentrated until 30% of the initial volume. A total polyphenol content of 11.64 g L⁻¹ and monomeric anthocyanin content of 8.39 g L⁻¹ were found.

RESULTS

The micellar casein suspension, treated or not with transtulaminase, was added of jabuticaba extract and evaluated by hydrodynamic-diameter (D), Zeta potential (ξ) and SEC-MALLS electrophoreses. Micellar casein suspensions added of jabuticaba extract were put in contact with glucose-0-lactate to elution of proteins at pH 4.5. The gels were evaluated by Dynamic rheological measurements, water holding capacity and Critical scanning laser microscopy.

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 entraped 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 pore 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 delivery 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.