Physicochemical properties and antioxidant capacity of oak (Quercus resinosa) leaf infusions encapsulated by spray-drying

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abstract

The effect of two wall materials and two feed flow rates on the physical and antioxidant properties of Quercus resinosa leaf infusion microencapsulated by spray-drying is reported. Dispersions with lyophilized Q. resinosa infusion and wall material (k-carrageenan and maltodextrin [10 DE]) were prepared. Samples were fed at rate flows of 1.6 and 1.7 L/h. Encapsulation yield, total phenolic content, DPPH test, deoxy-D-ribose assay, rheological and SEM evaluations were made. The highest yield and DPPH scavenging activity were obtained at 100% maltodextrin and 1.7 L/h. Higher polyphenolic retention was observed in blends of carrageenan/maltodextrin (1.6 and 1.7 L/h) and maltodextrin (1.6 L/h). The highest inhibition of deoxy-D-ribose oxidation was found at blends of carrageenan/maltodextrin (1.7 L/h). Dispersions showed pseudoplastic behavior and properties as liquid-like materials. Microcapsules showed particle sizes between 5 and 35 μm. The best condition for encapsulation of Q. resinosa infusions was suggested as 100% maltodextrin at 1.7 L/h.

1. Introduction

Quercus resinosa is a deciduous tree belonging to the family Fagaceae and is found in the mixed pine-oak forests in Northern Mexico. The bark, leaf and galls have been studied by several researchers in function of their antioxidant capacity (Rivas-Arreola et al., 2011; Rocha-Guzman et al., 2009). Rocha-Guzman et al. (2012) identified several polyphenol compounds in Q. resinosa infusions by HPLC including gallic acid, syringic acid, epigallocatechin gallate. Based in the scientific evidence, it is clear that Q. resinosa infusions have antioxidant properties related with its phenolic content.

Unfortunately, phenolic compounds are influenced by several factors as oxygen, temperature and processing. Moreover, the antioxidant capacity could be affected with...