Gum arabic/starch/maltodextrin/inulin as wall materials on the microencapsulation of rosemary essential oil

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Highlights

- Rosemary essential oil was encapsulated through spray drying process.
- The presence of inulin decreased the absorption of water under high water activity.
- The rosemary oil maintained all of its main constituents after the spray drying.
- Maltodextrin and modified starch (1:1) were suitable as wall materials.

Abstract

The effects of the partial or total replacement of gum arabic by modified starch, maltodextrin and inulin on the characteristics of rosemary essential oil microencapsulated by spray drying were evaluated in this study. The lowest level of water absorption under conditions of high relative humidity was observed in treatments containing inulin. The wettability property of the powders was improved by the addition of inulin. The total replacement of gum arabic by modified starch or a mixture of modified starch and maltodextrin (1:1, m/m) did not significantly affect the efficiency of encapsulation, although higher $T_g$ values were exhibited by microcapsules prepared using pure gum arabic or gum arabic and inulin. 1,8-cineol, camphor
and α-pinene were the main components identified by gas chromatography in the oils extracted from the microcapsules. The particles had smoother surfaces and more folds when gum arabic or inulin was present. Larger particles were observed in the powders prepared with pure gum arabic or modified starch.

Keywords
Spray drying; Flavour; Morphology; Isotherm; Glass transition