Kasetsart J. (Nat. Sci.) 48 : 893 - 907 (2014)

Microencapsulation of *Litsea cubeba* Essential Oil in *β*-Cyclodextrin Using Paste and Co-Precipitation Methods

Pooyan Shakouri Elizei and Wunwisa Krasaaekoopt*

ABSTRACT

Microencapsulation of *Litsea cubeba* essential oil (LCEO) with *β*-cyclodextrin (BCD) was carried out using the paste and co-precipitation methods at various oil concentrations and ratios of LCEO to BCD adapted from a central composite design to determine the effect of these factors on the microencapsulation efficiency, microencapsulation yield, surface oil and recovery of the finished product. In addition, the effect of different levels of water activity and temperature on the oxidative stability of the powder was investigated. Treatment 4 using the paste method with 90% LCEO and a ratio of LCEO to BCD of 15:85 was found to be more efficient compared to samples produced by the co-precipitation method. This condition provided an oil loading of 102 $mg.g^{-1}$ of powder, 74.7% microencapsulation yield, 71.9% microencapsulation efficiency, 94.8% recovery of LCEO powder and surface oil with 4.08 $mg.g^{-1}$ of powder. Statistical analysis indicated that the temperature and water activity had significant effects on the peroxide value. Moreover, there was an interaction between these two factors. The LCEO powder had higher oxidative stability with the lowest peroxide value of 4.9 $meq.kg^{-1}$ when it was stored at 10 °C and a water activity of 0.53 whilst the accelerated conditions of 50 °C and a water activity of 0.64 resulted in the highest peroxide value (13.6 $meq.kg^{-1}$) and lower oxidative stability. It was notable that except for the samples stored at a water activity of 0.64 and temperatures of 30 and 50 °C, the other samples did not exceed the limit for the peroxide value of 10 $meq.kg^{-1}$ which is the acceptable limit for edible vegetable oils.

Keywords: microencapsulation, *Litsea cubeba*, *β*-cyclodextrin, oxidative stability, peroxide value

INTRODUCTION

Litsea cubeba (Lour.) is an evergreen tree or shrub in the Lauraceae family and produces *Litsea cubeba* essential oil (LCEO) which is thin in consistency and greenish-yellowish in color and is extracted from the flower, leaf and fruit of the plant having a fresh, sharp, lemon-like scent and is in some ways similar to citronella (Anonymous, 2014). The amounts of *Litsea cubeba* oil extracted by hydrodistillation from fruits and leaves are in the range of 13.9 and 4.0%, respectively, with a total of 53 compounds being reported in the leaf oil, of which the main component is 1, 8-cineol (57.6%) whereas the main compound of the extract from fruit is citral (68.9%), which in turn consists of neral (31.3%) and geranial (37.6%) (Ho *et al,*. 2010). *Litsea cubeba* (LC) is a plant widely distributed in Southeast Asia, Japan, Taiwan and Southern China and has been used as a flavor enhancer in foods and the beverages industry, cosmetics and cigarettes (Luo *et al*., 2005). Since

Faculty of Biotechnology, Assumption University, Hua Mak Campus, Hua Mak, Bangkok 10240, Thailand.
* Corresponding author, e-mail: wunwisaKrs@au.edu

Received date : 24/03/14 Accepted date : 19/08/14