

Effects of Centrifugation, Encapsulation Method and Different Coating Materials on the Total Antioxidant Activity of the Microcapsules of Powdered Cherry Laurels

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Abstract : Encapsulation protects sensitive food ingredients against heat, oxygen, moisture and pH until they are released to the system. It can mask the unwanted taste of nutrients that are added to the foods for fortification purposes. Cherry laurels (*Prunus laurocerasus*) contain phenolic compounds which decrease the proneness to several chronic diseases such as types of cancer and cardiovascular diseases. The objective of this research was to study the effects of centrifugation, different coating materials and homogenization methods on microencapsulation of powders obtained from cherry laurels. In this study, maltodextrin and mixture of maltodextrin:whey protein with a ratio of 1:3 (w/w) were chosen as coating materials. Total solid content of coating materials was kept constant as 10% (w/w). Capsules were obtained from powders of freeze-dried cherry laurels through encapsulation process by silent crusher homogenizer or microfluidization. Freeze-dried cherry laurels were core materials and core to coating ratio was chosen as 1:10 by weight. To homogenize the mixture, high speed homogenizer was used at 4000 rpm for 5 min. Then, silent crusher or microfluidizer was used to complete encapsulation process. The mixtures were treated either by silent crusher for 1 min at 75000 rpm or microfluidizer at 50 MPa for 3 passes. Freeze drying for 48 hours was applied to emulsions to obtain capsules in powder form. After these steps, dry capsules were grounded manually into a fine powder. The microcapsules were analyzed for total antioxidant activity with DPPH (1,1-diphenyl-2-picrylhydrazyl) radical scavenging method. Prior to high speed homogenization, the samples were centrifuged (4000 rpm, 1 min). Centrifugation was found to have positive effect on total antioxidant activity of capsules. Microcapsules treated by microfluidizer were found to have higher total antioxidant activities than those treated by silent crusher. It was found that increasing whey protein concentration in coating material (using maltodextrin:whey protein 1:3 mixture) had positive effect on total antioxidant activity for both silent crusher and microfluidization methods. Therefore, capsules prepared by microfluidization of centrifuged mixtures can be selected as the best conditions for encapsulation of cherry laurel powder by considering their total antioxidant activity. In this study, it was shown that capsules prepared by these methods can be recommended to be incorporated into foods in order to enhance their functionality by increasing antioxidant activity.

Keywords : antioxidant activity, cherry laurel, microencapsulation, microfluidization

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020