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Preparation of alginate-poly (vinyl alcohol) nanocapsules containing curcumin oil as the core

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The "Nanocapsules" are called to those structures which have been formed from an external thin layer and an internal great space. This is known as core/shell structure. In present experimental test, the O/W nanoemulsion/solvent evaporation method has been used for production of nanomedicine containing the turmeric oil. The main purpose of this research is to apply polymer alloy of alginat/poly (vinyl alcohol) as wall material in capsulation process of natural plant essential. In first step, blend of polymers were used in wall and it was formed by dissolving a certain amount of polymer of alginate and poly (vinyl alcohol) within water (concentration of 0:1, 0.25:0.75, 0.5:0.5, 0.75:0.25, 1:0 w/v). Later on, a certain amount of turmeric oil (concentration of 0.75%, 05%, 0.25% w/v) was dissolved within ethanol and then was added to the primary solution drop by drop. After that, a certain amount of Tween 80 as surfactant and also calcium chloride as crosslinking agent were added to final solvent. In next step, obtained solvent was subjected to sonication and after that it was evaporated by vacuum device. In this research, we investigated effect of various factors such as layer of polymer concentration changes, variant concentration of turmeric oil and variant time of sonication on the size of nanocapsules. Scanning electron microscope (SEM), Zetasizer device with dynamic light scattering (DLS) technique were used to investigate of morphology and size of nanocapsules. The results of (DLS) analyses have proven that the best combination percentage for structure of the polymer layer is alginate with concentration of 0.25% and Poly (vinyl alcohol) with concentration of 0.75%. Therefore, the optimum amount of used polymer in the wall and different concentration of turmeric oil as the core have been investigated. The results of DLS test have demonstrated that the optimum concentration of turmeric oil is 0.25% (w/v) within ethanol. Furthermore, the optimum duration of sonication just took around 45 minutes. As results, the size of nanocapsules has been obtained up to 50 nm, with the optimum amount of used polymer in the wall. Also, the size of produced nanocapsule has been obtained up to 91 nm in the optimum concentration of turmeric oil. Finally, 45 minutes sonication leads to production of 50 nm nanocapsules.

Biography

Shima Vaezi has fulfilled his/her Bachelor's degree in Chemical Engineering from Azad University, Tehran in 2013. After that, he/she studied Master of Chemical Textile Engineering at Azad University, Tehran. She/He is researching on nanocapsules for drug delivery.

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