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Study of the conditions of encapsulation of piperine in microwave-assisted nanosponges

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Nanosponges (NS) is a class of colloidal structures based on hyper-crosslinked polymers that are made up of microscopic particles with nanometric cavities in which a large variety of substances can be encapsulated. These cavities can incorporate lipophilic and hydrophilic compounds. The objective of this work was to evaluate the effect of NS with different degree of crosslinking, the type of solvent (SOLV) used in the loading process and the load ratio PIP-NS (w/w) on the encapsulation efficiency of piperine (PIP) in the microwave-assisted cyclodextrin-based nanosponges. The NS was formed with β -cyclodextrin (β -CD) and diphenyl carbonate (DPC) through the microwave-assisted method. NS of molar ratios 1:2, 1:6 and 1:10 (β -CD-DPC) were used to perform loads of PIP-NS (2:1, 1:1 and 1:2) (w/w). The solvents used in the fillers were dichloromethane, acetone and ethanol. Characteristic peaks were identified for PIP and displacement of peaks attributable to inclusion as methylenedioxy phenyl at 928 cm^{-1} . ANOVA was performed to determine if there were statistically significant differences for each of the variables on the encapsulation efficiency response. NS and PIP-NS are significant ($p \leq 0.05$), on the other hand, SOLV was not significant ($p \geq 0.05$) on the response. For the NS variable, the molar ratio that presented the best responses were 1:6=77.12a and 1:10=78.74a followed by 1:2=71.55b. For the PIP-NS variable, the load ratio that presented the best response was 1:2=84.08a, followed by 2:1=77.28b and finally 1:1=66.05c.

Biography

Jeyson Alan Hermosilla Gajardo is a biotechnologist from the University of La Frontera, Temuco, Chile. He has worked on several projects at the University in the micro and nanoencapsulation area, currently working on the Fondecyt project N°1160558 "Nanoencapsulation of polyunsaturated fatty acids and pungency alkaloids using nanosponges as carrier model to deliver lipophilic compounds of high biological value".

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