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## Study of nanosponge based on cyclodextrin and carbonate as a nanoencapsulation system of lipophilic compound

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Nanosponges (NSs) are able to capture, transport and selectively release a huge variety of substances, they can be used to mask the unpleasant flavor. The objective of this work was to evaluate nanosponges based on cyclodextrin and carbonate as piperine (PIP) nanoencapsulation system. The NS was formed with a molar ratio of polymer (β-cyclodextrin) and crosslinker (diphenyl carbonate) of 1:2, 1:6 and 1:10 by the solvent method, but only molar ratios 1:6 and 1:10. The NS 1:6 and 1:10 were loaded with piperine in different encapsulation media (ethanol and acetone) and determine its loading efficiency. Both for the NSs and the inclusion complex (PIP:NS) were characterized with FTIR, hyperspectral FTIR images and Degree of Substitution. The appearance of characteristic peaks of ß-CD at 1155cm$^{-1}$ belonging to the glycosidic bonds was observed. In addition, a peak was identified at 1750cm$^{-1}$ which is an indicator of the carbonyl group (C=O), which also demonstrate the esterification between DPC and the hydroxyl groups of the ß-CD. The results showed NS 1:6 DS=2.613 and NS 1:10 DS=3.429. Both NSs 1:6 and 1:10 obtained a high load capacity with the different means of encapsulation. Therefore the formation of cyclodextrin-based NSs by solvent method was demonstrated. Moreover, the capacity of cyclodextrin-based NSs to encapsulate PIP was confirmed. The NSs are an effective encapsulation system of PIP and they protect the bioactive properties of the PIP. Therefore the formation of cyclodextrin-based NSs by solvent method was demonstrated. Moreover, the capacity of cyclodextrin-based NSs to encapsulate PIP was confirmed showing that PIP is distributed in a dispersed way, not forming large clusters or concentrating in a single zone. The NSs are an effective encapsulation system of PIP and they protect the bioactive properties of the PIP. Supported by funding from Conicyt through Fondecyt project 1090516.

### Biography

Sofía Belen Gonzalez Lezana is a Food Engineer from the Universidad of La Frontera, Temuco, Chile. Currently, she is a working in 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". This research was supported by funding from Conicyt through Fondecyt project.

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