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Influence of the sodium alginate's concentration on the quality parameters of nutmeg essential oil loaded microcapsules

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Background

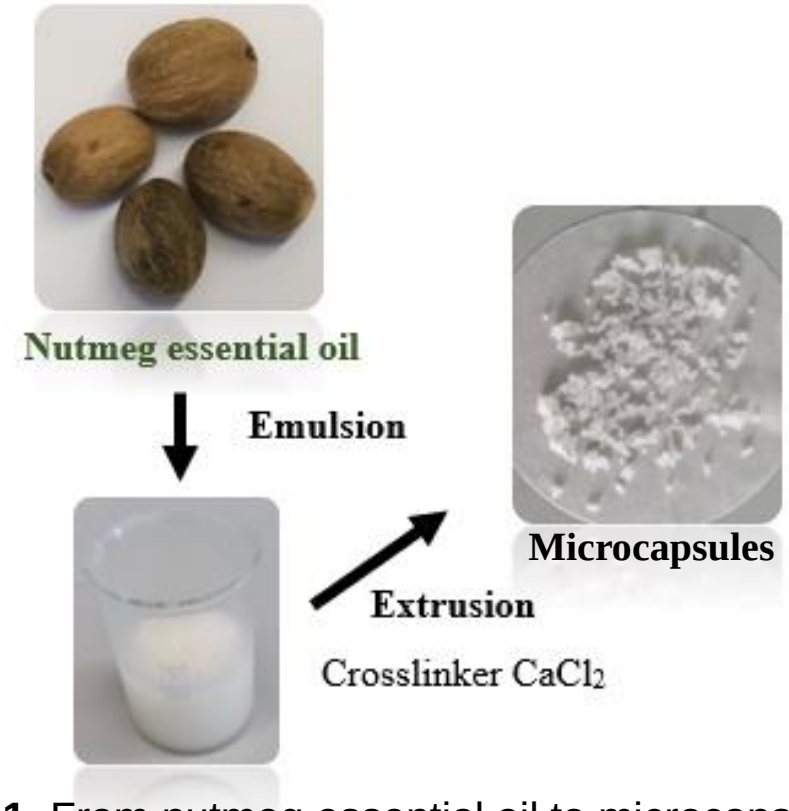

Figure 1. From nutmeg essential oil to microcapsules.

Methods

Nutmeg essential oil emulsion:

- 4% of sodium alginate aqueous solution;
- distilled water;
- emulsifier;
- nutmeg essential oil.

Microcapsules prepared by extrusion ($CaCl_2$ crosslinker).

Physical parameters:

- diameter of wet and dry microcapsules;
- force for crushing (the capsules firmness);
- encapsulation efficiency.

Aim: prepare nutmeg essential oil loaded microcapsules with sodium alginate as a shell material and evaluate its influence on physical properties of microcapsules.

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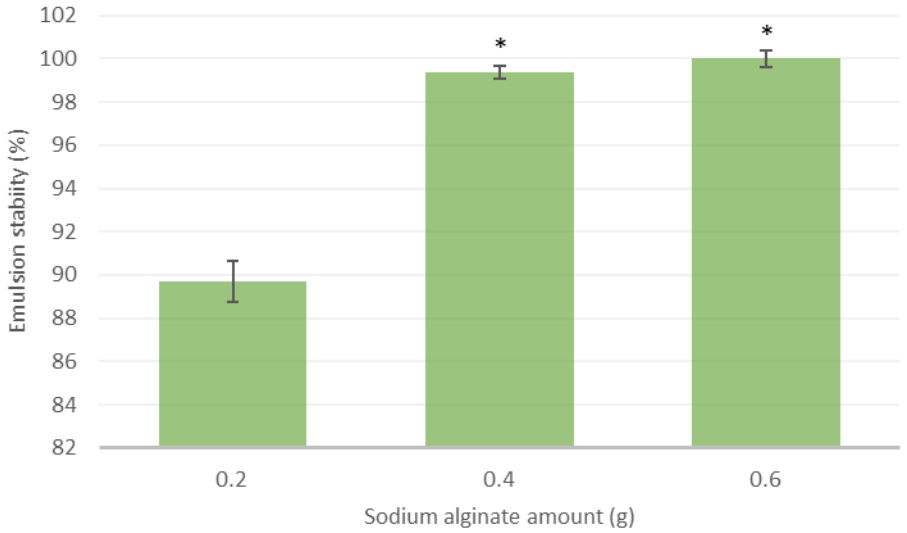
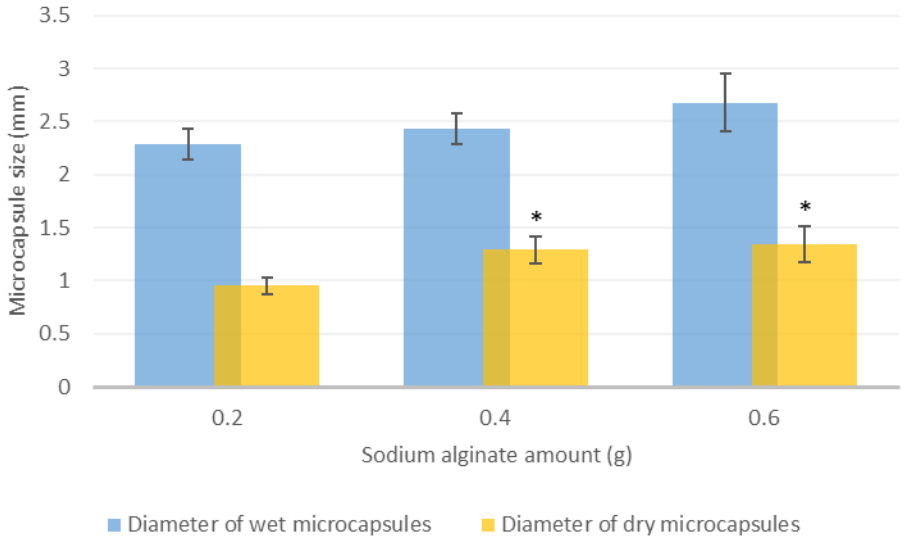
Results (1)



* $p < 0.05$ versus sample with 0.2 g of sodium alginate

Figure 2. Emulsion stability.



* $p < 0.05$ versus sample with 0.2 g of sodium alginate

Figure 3. Diameter of wet and dry nutmeg essential oil loaded microcapsules.

Results (2)

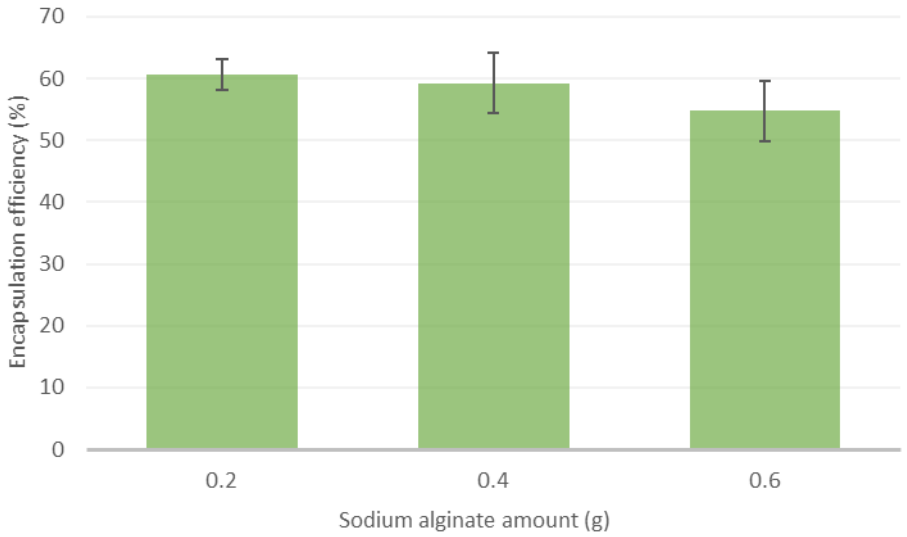
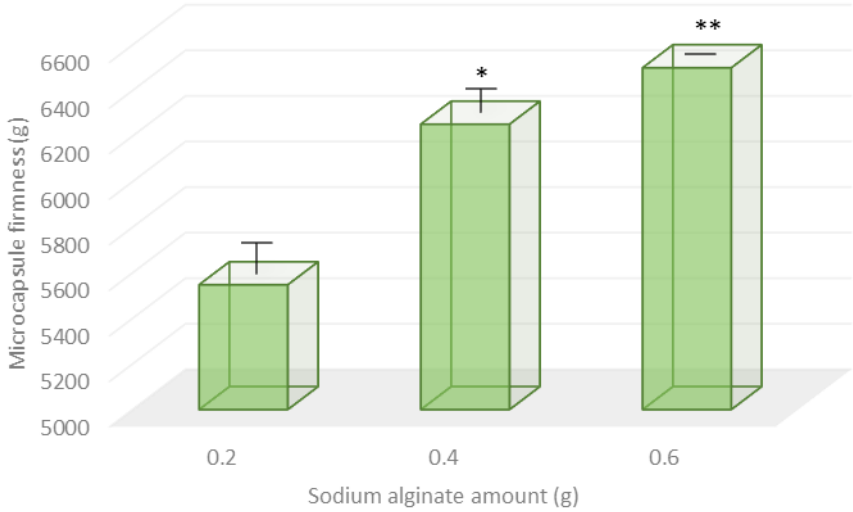


Figure 4. Encapsulation efficiency.



* $p < 0.05$ versus sample with 0.2 g of sodium alginate
** $p < 0.05$ versus sample with 0.4 g of sodium alginate
Firmness of sample with 0.6 g of sodium alginate was higher than 6500 g and was not measured.

Figure 5. Nutmeg essential oil loaded microcapsules firmness.

Conclusions

- A direct correlation was found between sodium alginate content and microcapsule size and firmness; alginate increases these parameters.
- Higher amounts of sodium alginate decrease the release of essential oil from nutmeg essential oil loaded microcapsules.

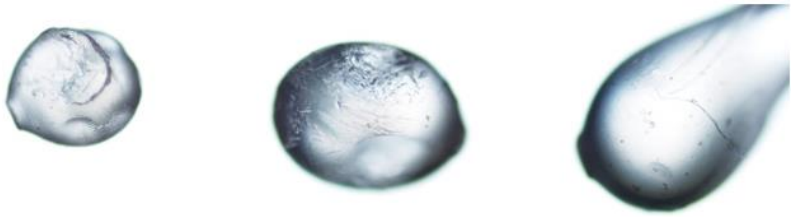


Figure 6. Structure of microcapsule.

Figure 7. Wet and dry microcapsules.