

# MICROENCAPSULATION OF GLUCOSYL-HESPERIDIN IN ALGINATE/CHITOSAN HYDROGEL BEADS

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## INTRODUCTION

Glucosyl-hesperidin is a water-soluble derivate of hesperidin. Both these derivatives have many health-promoting properties such as antioxidant, anti-inflammatory and antimicrobial activities. However, the low water solubility of hesperidin disables its wide utilization in the food and pharmaceutical industry so glucosyl-hesperidin has an advantage concerning new product development. Aim of this study was to produce hydrogel beads filled with glucosyl-hesperidin and store them for 7 days to examine which formulation of beads had the best retention ability of this polyphenol.

## METHODS

1.

### System for beads production:

Encapsulator B-390, (BÜCHI Labortechnik AG, Flawil, Switzerland)

### Operating conditions:

1000 µm nozzle, 500 mbar, 200 Hz, 1000 V

### Encapsulation mixture:

Glucosyl-hesperidin solution (1500 mg/L) with 3.75% very low viscosity alginate

### Cross-linking solutions:

- a) 10% CaCl<sub>2</sub>
- b) 10% CaCl<sub>2</sub>, 1.25% chitosan, 2.5% ascorbic acid

### Time of complexation:

- 1) 30 min
- 2) 90 min

### Storage conditions:

7 days at room temperature

2.

### Determination of glucosyl-hesperidin:

- 1. Extraction of beads with acidified methanol
- 2. Determination of glucosyl-hesperidin concentration in extracts using HPLC method



## RESULTS

Table 1 Concentration of glucosyl-hesperidin in produced hydrogel beads determined using HPLC method

Sample	Concentration after preparation (mg/kg)	Concentration after 7-day storage (mg/kg)
A - 30	409.94 ± 2.37 <sup>a</sup>	318.59 ± 6.32 <sup>a</sup>
A - 90	512.20 ± 5.03 <sup>c</sup>	376.10 ± 0.73 <sup>c</sup>
AC - 30	590.93 ± 2.86 <sup>d</sup>	456.23 ± 0.47 <sup>d</sup>
AC - 90	425.61 ± 2.73 <sup>b</sup>	357.45 ± 0.13 <sup>b</sup>

A – alginate; C – chitosan; 30 – 30 minutes of complexation; 90 – 90 minutes of complexation  
The samples are marked so that the numbers represent time of complexation and the letters represent used cross-linking solution. Within the column, means followed by superscript different letters are significantly different at  $p \leq 0.05$  (ANOVA, Fisher's LD).

## CONCLUSION

The best retention ability of glucosyl-hesperidin had chitosan-alginate beads which were complexed for 30 min (590.93 mg/kg), while the lowest retention ability was observed for alginate beads with a complexation time of 30 min (409.94 mg/kg). Beads were stored for 7 days and the highest amount of glucosyl-hesperidin was detected in chitosan-alginate beads as after preparation. Formulated beads can be used for controlled release of glucosyl-hesperidin, but also for enhancement of antioxidant potential of food and pharmaceutical products.

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