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 derivates have many health-promoting properties such as antioxidant, antiinflammatory 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 forumulation of beads had the best retention ability of this polyphenol.



METHODS

1.

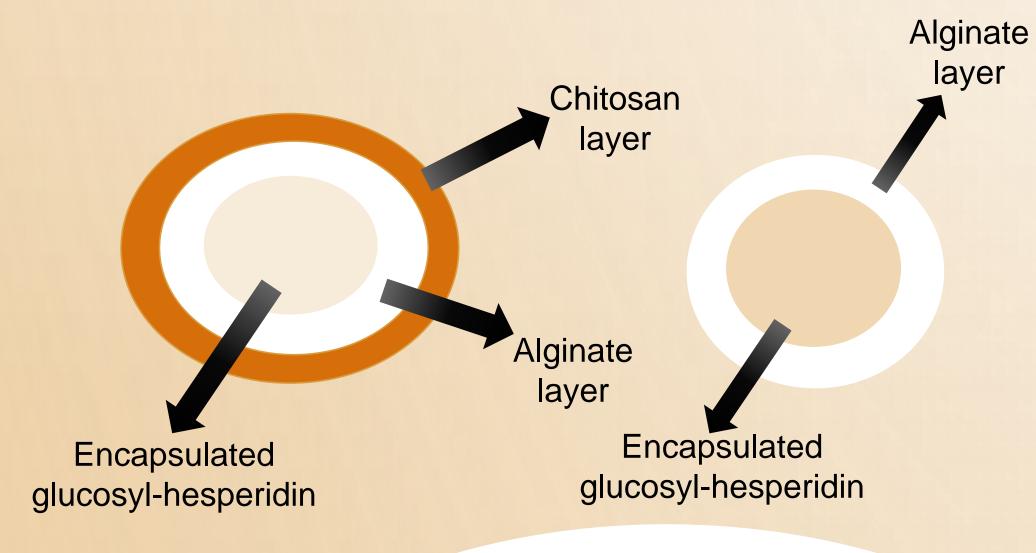
System for beads production: Encapsulator B-390, (BÜCHI Labortechnik AG, Flawil, Switzerland) **Operating conditions:** 1000 µm nozzle, 500 mbar, 200 Hz, 1000 V **Encapsulation mixture:** Glucosyl-hesperidin solution (1500 mg/L) with 3.75% very low viscosity alginate **Cross-linking solutions**: a) 10% $CaCl_2$ b) 10% $CaCl_2$, 1.25% chitosan, 2.5% ascorbic acid **Time of complexation:** 1) 30 min 2) 90 min **Storage conditions:** 7 days at room temperature

2.

<u>Determination of glucosyl-hesperidin</u>: <u>hesperidin</u>: 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



CONCLUSION

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

A – alginate; C – chitosan; 30 – 30 minutes of complxation; 90 – 90 minutes of complxation 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 ≤ 0.05 (ANOVA, Fisher's LD).

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

ACKNOWLEDGMENTS

This work was supported by the Croatian Science Foundation under project (IP-2019-04-5749) "Design, fabrication and testing of biopolymer gels as delivery systems for bioactive and volatile compounds in innovative functional foods (bioACTIVEgels)", Young Researchers's Career Development Project – Training of New Doctoral Students (DOK-2020-01-4205).

