UNIVERSITY OF AGRICULTURAL SCIENCE AND VETERINARY MEDICINE CLUJ-NAPOCA

FREE AND ENCAPSULATED PROBIOTIC CELLS VIABILITY AND THEIR EFFECT ON THE SENSORY PROPERTIES OF YOGHURT DURING STORAGE

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CASEE
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CONTENT

- Objectives
- Materials and methods
  - Encapsulation
  - Viability of probiotics
- Results and discussions
- Conclusions

LACTOBACILLUS CASEI STABILYTY IN FREE AND ENCAPUSLATED FORM IN YOGHURT

OBIECTIVES

- Encapsulation of *L. casei* in alginate and alginate/pectin and incorporation of lyophilized microspheres in yoghurt
- Determination of the pH dimanics in the yoghurt containing encapsulated (in alginate and alginate/pectin) and free *L. casei*
- Testing the viability of encapsulated probiotic cells over 35 days of storage at 4 °C

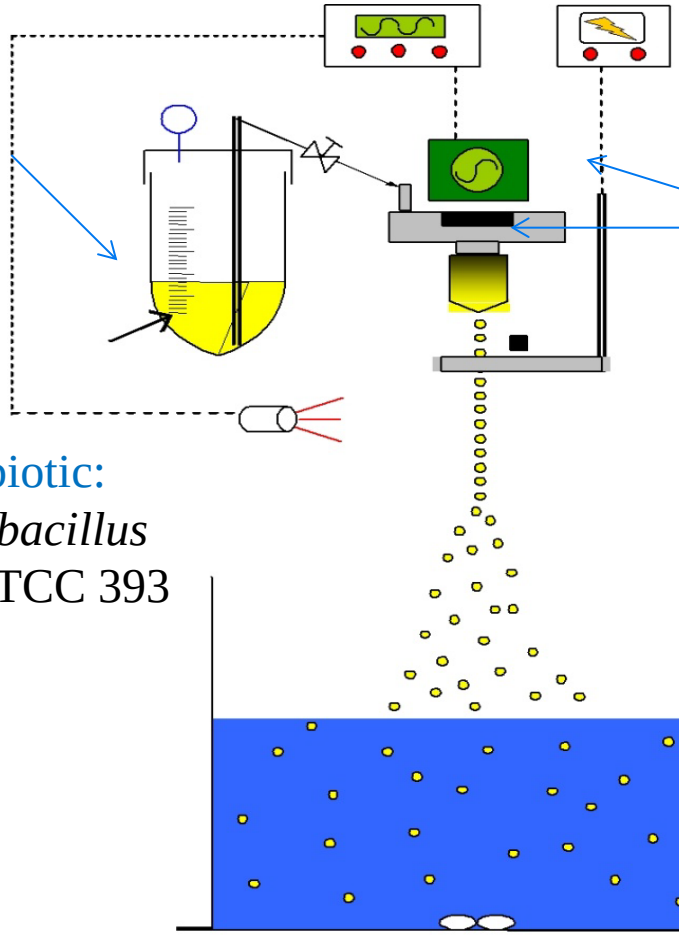
LACTOBACILLUS CASEI STABILYTY IN FREE AND ENCAPUSLATED FORM IN YOGHURT

MATERIALS and METHODS

- Probiotic strain: *Lactobacillus casei* ATCC 393
- Encapsulation using cross linking gelation: alginate with or without pectin
- Incorporation of the lyophilized microcapsules containing the probiotic in yoghurt
- The monitoring of physico-chemical properties of yogurt containing probiotic cells in free and encapsulated form with and without pectin
- Encapsulated probiotic survival test before and after storage at 4 °C over 35 days of storage

PROBIOTIC ENCAPSULATION PROCEDURE

Mix polimer / probiotic



Vibrational system encapsulation using cross linking

Polymers:
Alginate and alginate/pectin.

Probiotic:
Lactobacillus casei ATCC 393

Hardening bath
$CaCl_2$

Beads containing probiotic cells

TESTING VIABILITY AND SURVIVAL OF PROBIOTICS

Cell viability of probiotic - colony forming units (CFU) after encapsulation, coating, freeze-drying

Survival of probiotic cells - number of viable cells after certain treatments - simulated gastrointestinal environment, storage under specific conditions.

RESULTS and DISCUSSION

Lapte cu 3,5% grăsime
+
Culturi starter iaurt

↓

Omogenizare 3 minute

↓

Incubare la 37°C, 6 h

↓

Încorporarea microsferelor
11,11%

↓

Omogenizare

↓

Incubare la 37°C, 18 h

↓

Depozitare la 4°C pentru teste ulterioare

Soluție alginat 1,5%

Soluție alginat 1,5% +
1,5 % pectină

↓

Adaos celule probiotice *L. casei*
10^{10} UFC/ml

↓

30 minutes în $CaCl_2$

↓

Limpezire cu soluție sterilă NaCl
(8.5 g/L)

↓

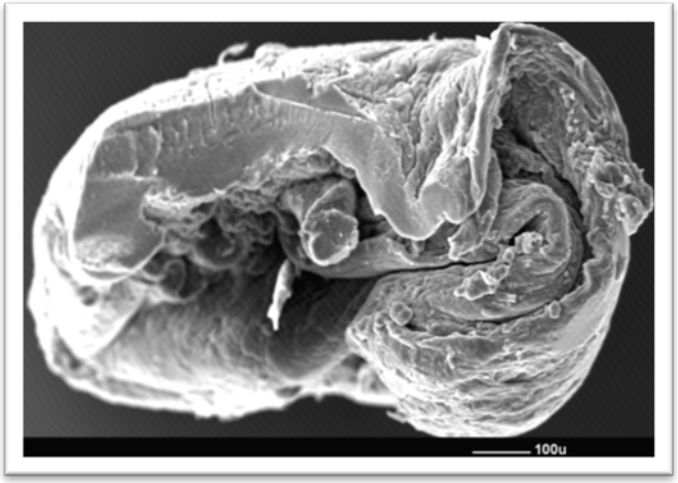
Liofilizare la -50°C, 0.05 mbar, 24h

Obtaining yogurt with alginate or alginate/pectin microspheres containing *L. casei*

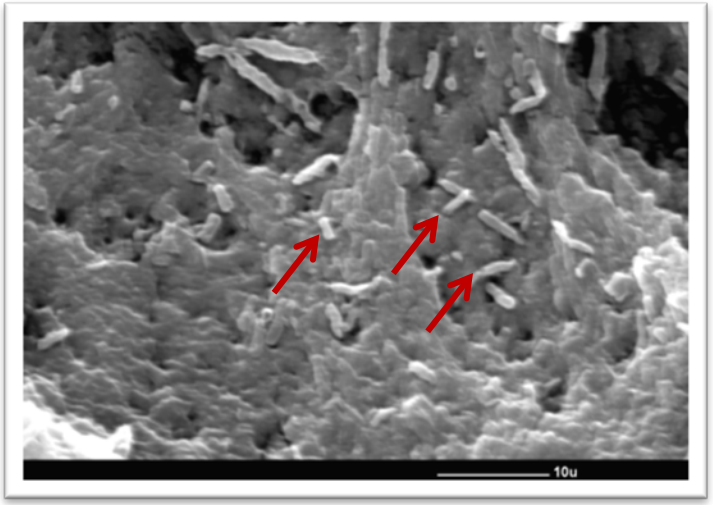
RESULTS and DISCUSSION

CARACTERISATION OF THE ALGINATE BEADS

- Alginate beads 1110.5 ± 12.7 µm
- Alginate / pectin beads 1201 ± 4.3 µm
- Alginate beads microscopy - SEM



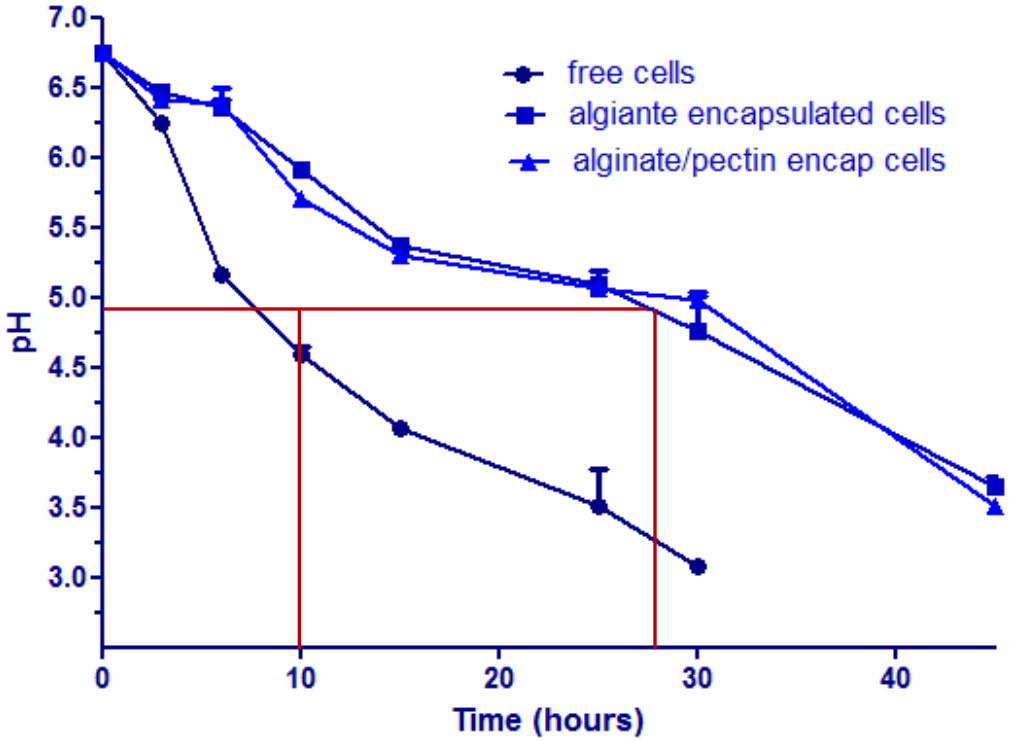
a)

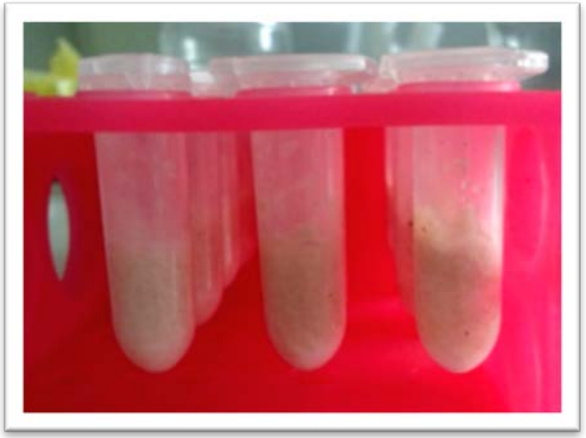


b)

Alginate beads containing *L. casei*
amplification a) low (x100); b) high (x2000)

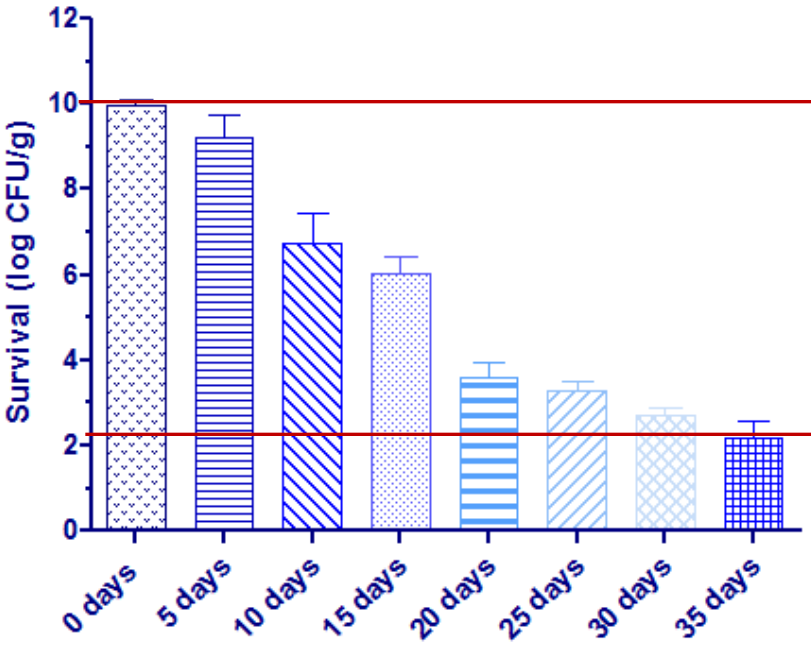
RESULTS and DISCUSSION



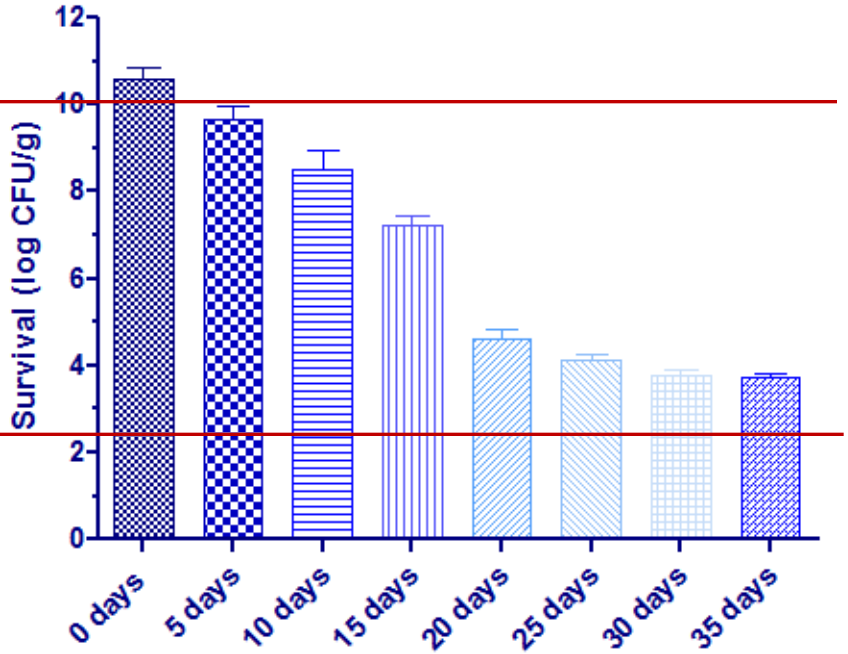


The pH kinetics of the yogurt containing *L. casei* free probiotic cells, respectively encapsulated in alginate matrix and alginate matrix / pectin

RESULTS and DISCUSSION



The survival of the probiotic *L. casei* encapsulated in **alginate matrix** in yogurt over a period of 35 days



The survival of the probiotic L. casei encapsulated in **alginate/pectin matrix** in yogurt over a period of 35 days

CONCLUSION

- Yogurt with free and encapsulated (1.3 – 1.7 mm) *L. casei* in alginate and alginate/pectin was obtained;
- Dynamic acidification of yoghurt (48h) - for freeL. casei, pH 5, 9H; encapsulated L. casei pH 5 after 25h;
- The decrease in viability was more pronounced after 15 days of storage, and after 35 days viable cell density has been doubled in *L. casei* encapsulated in alginate matrix / pectin compared to the encapsulated within the alginate matrix.

THANK YOU FOR YOUR ATTENTION!