

INFLUENCE OF CHITOOLIGOSACCHARIDE DERIVATIVES OBTAINED BY MAILLARD REACTION ON THE GROWTH OF PROBIOTIC BACTERIA

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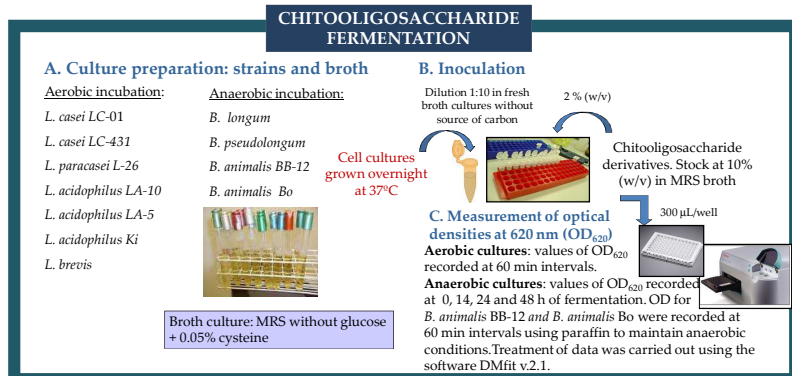
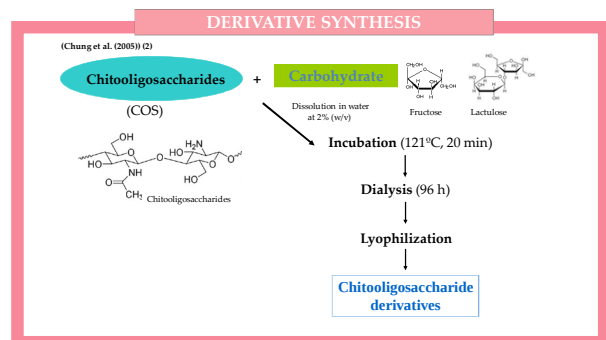
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Introduction

Recent advances in the study of prebiotics are addressed to the design of new oligosaccharides able to reach unaltered the colon distal regions and to promote the growth of specific probiotic bacteria. Chitooligosaccharides (COS) obtained from chitosan possess antimicrobial properties due to the presence of amino groups in its structure. Chemical modification of COS by substitution of their amino groups could eliminate this antimicrobial effect and convert chitosan in a new interesting prebiotic ingredient. Although these kind of modifications have already been carried out [1,2] the evaluation of these COS derivatives as potential prebiotic ingredients has not been yet investigated.

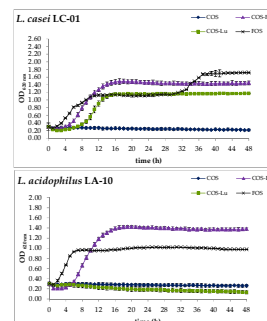
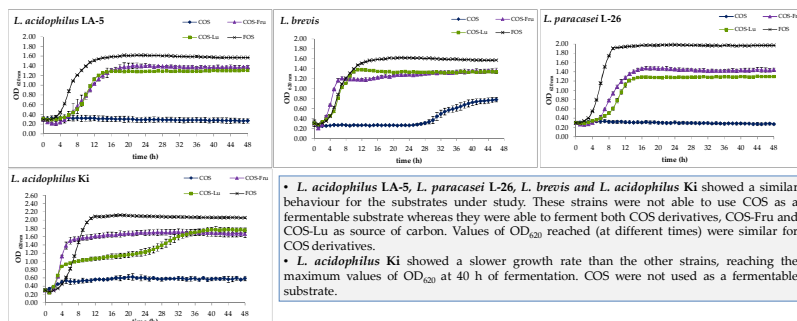
Material and Methods



Results

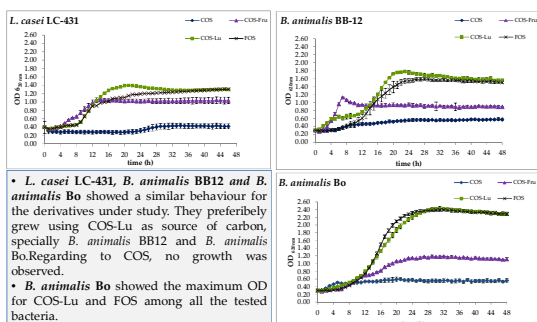
AEROBIC CULTURES: GROWTH RATES.

Figures show growth curves for all the aerobic strains tested with unmodified COS (—◆—) and COS derivatives, COS-Fru (—▲—) and COS-Lu (—■—). FOS (—×—) were used as controls.



• *L. casei* LC-01 showed higher growth values for the derivative COS-Fru.

• *L. acidophilus* LA-10 was, also, able to ferment the COS-Fru derivative, however, it did not use COS-Lu as a source of carbon. Values reached for OD using FOS as source of carbon were significantly lower than those reached using the COS-Fru derivative.



ANAEROBIC CULTURES: VALUES OF OD₆₂₀

Table 1.- OD₆₂₀ values after 14, 24 and 48 h of anaerobic growth with COS and COS derivatives

	<i>B. pseudolongum</i>				<i>B. longum</i>			
	0 h	14h	24h	48 h	0 h	14h	24h	48 h
COS	0.300	0.300	0.378	0.394	0.300	0.289	0.371	0.417
COS-Fru	0.300	0.374	0.343	0.320	0.300	0.387	0.354	0.364
COS-Lu	0.300	0.610	1.111	1.205	0.300	1.473	1.441	1.425

• *B. pseudolongum* reached maximum values of OD₆₂₀ after 48 h of fermentation when COS-Lu was used as source of carbon. This strain was not able to grow on COS-Fru and COS.
• *B. longum* reached maximum values of OD₆₂₀ after 14 h of fermentation. This strain, like *B. pseudolongum*, was not able to grow in COS-Fru and COS.

Conclusions

- ✓ This study about the fermentation of COS derivatives by Maillard reaction by selected strains of *Bifidobacterium* and *Lactobacillus* spp. has been carried out for the first time.
- ✓ All the probiotic strains tested in this study were not able to use COS as carbon source. COS derivatives, however, were used by most of the tested strains. Modification by Maillard reaction converts COS into fermentable substrates by *Bifidobacterium* and *Lactobacillus* strains.
- ✓ Although more studies are necessary to evaluate the possible prebiotic effect of COS derivatives obtained by Maillard reaction, these preliminary results indicate that they are fermented by probiotic bacteria and that they could be good candidates to be used as prebiotics.

References

- [1] Yang, T. C., Chou, C. C., & Li, C. F. (2002). *Food Research International*, 35, 707-713
- [2] Chung, Y.C., Wang, H.L., Chen, Y.M., Li, S.L., 2003. *Biorescience Technology*. 88 (3), 179-184.

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