

# Study of the bacterial flora and the growth of *Listeria monocytogenes* in raw milk butter

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# Raw milk butter, a RTE product

- Butter consumption : 2.15 kg per person (CBL, 2020)
- pH from 4.25 to 6.50 (El-Hajjaji et al., 2019)

Food category	Micro-organisms	Limits	Stage where the criterion applies
RTE foods able to support the growth of L. monocytogenes	Listeria monocytogenes	Not detected in 25g	Food business operator
		100 cfu/g	Shelf-life
RTE foods unable to support the growth of L. monocytogenes & foods with pH ≤ 4.4 or a <sub>w</sub> ≤ 0.92 or pH ≤ 5.0 and a <sub>w</sub> ≤ 0.94	Listeria monocytogenes	100 cfu/g	Shelf-life

# Objective

Assessment of growth of *Listeria monocytogenes* in raw milk butter

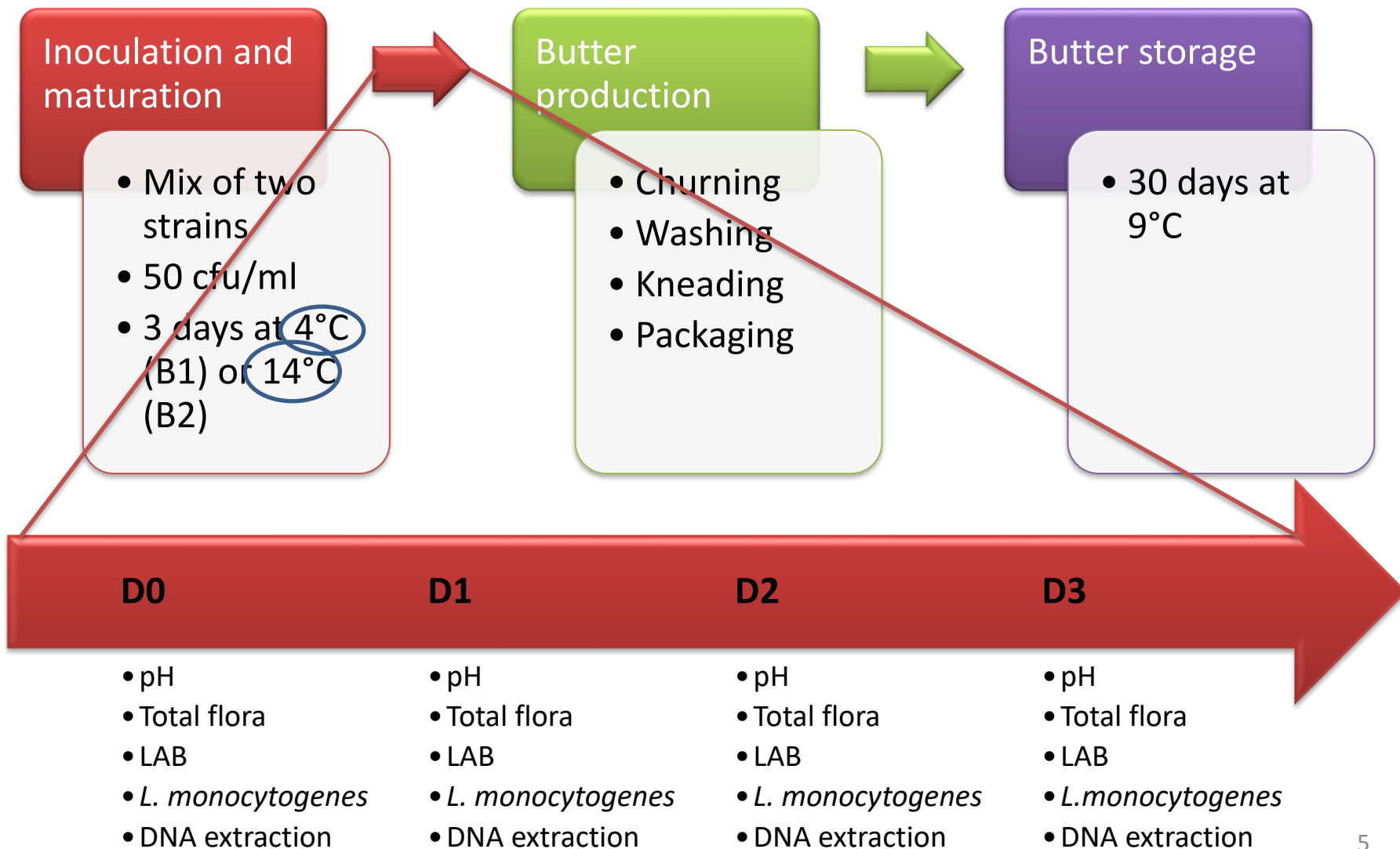


Challenge test



Metagenetics





## Butter storage

- 30 days at 9°C



**D0**

pH  
a<sub>w</sub>  
Total flora  
LAB  
*L. monocytogenes*  
DNA extraction



**D7**

pH  
Total flora  
LAB  
*L. monocytogenes*  
DNA extraction



**D14**

pH  
Total flora  
LAB  
*L. monocytogenes*  
DNA extraction



**D30**

pH  
a<sub>w</sub>  
Total flora  
LAB  
*L. monocytogenes*  
DNA extraction

 Sequencing of V1-V3 region of the 16S rDNA genes

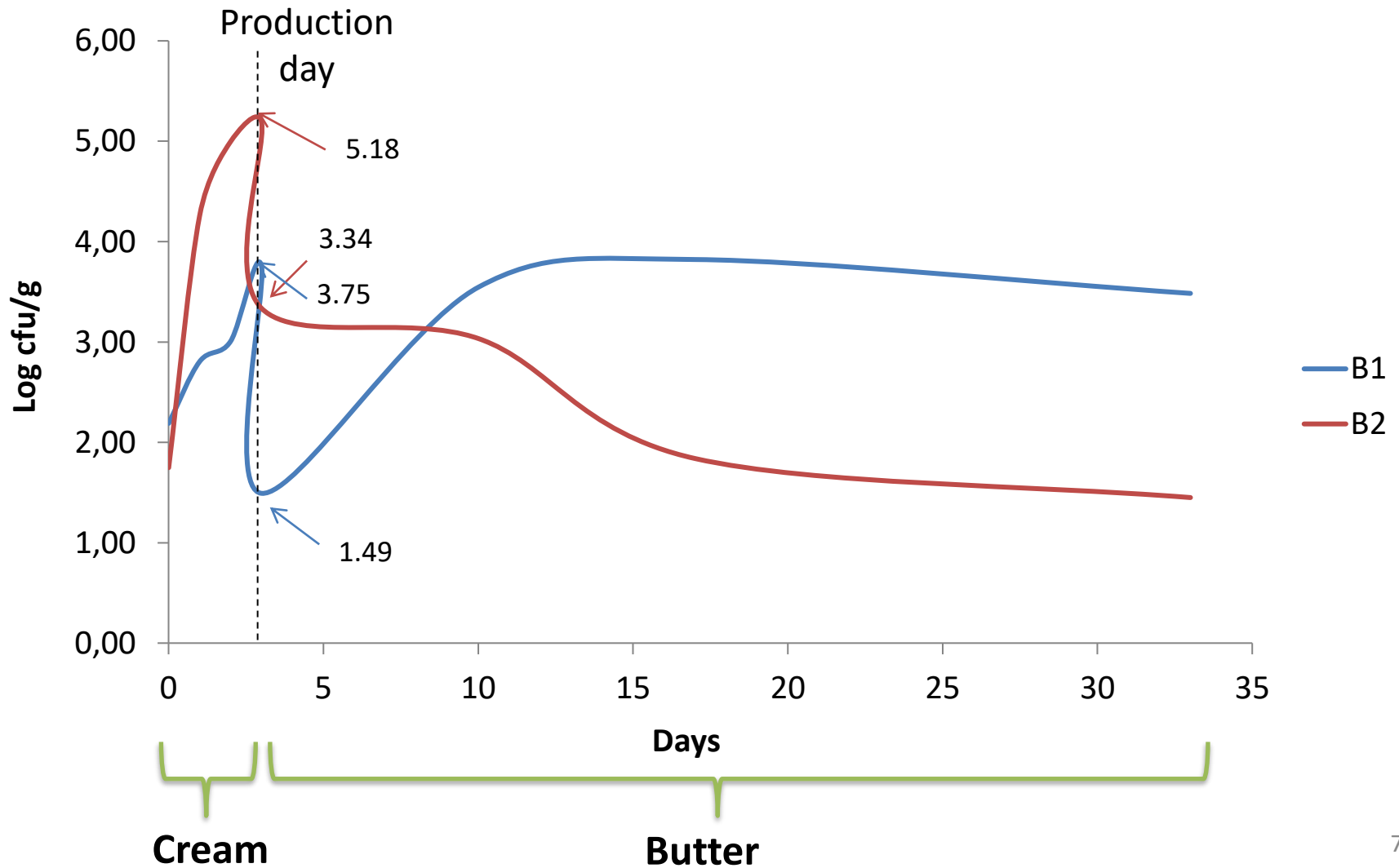
 Bioinformatics using Mothur software:

 Trimming, length and quality filtering, and removing of chimeras

 Alignment with SILVA database

 Clustering into operational taxonomic units (cutoff of 0.03)

# No growth of *L. monocytogenes* in B2 samples compared to B1 during storage



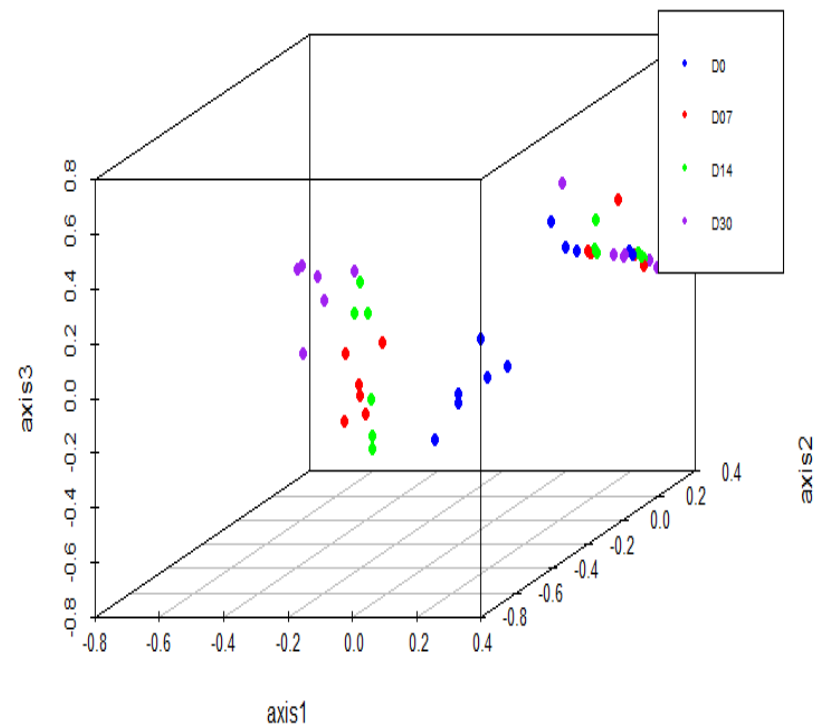
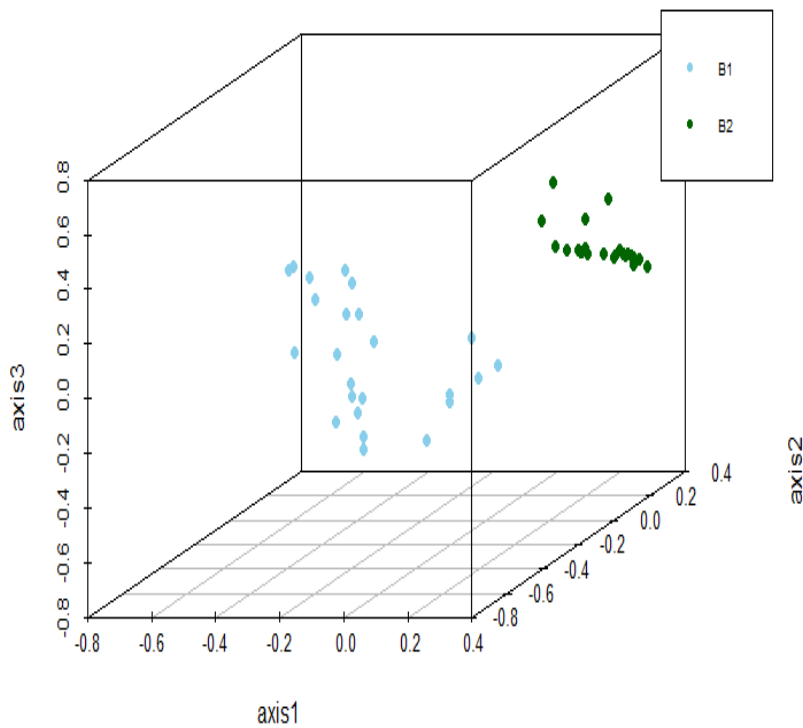
# No growth of *L. monocytogenes* in B2 samples compared to B1 during storage

	pH	a <sub>w</sub>	D0	D7	D14	D30	δ (med D30 – med D0)
B1	6.81 ± 0.01	0.98 ± 0.01	1.00 1.78 <b>1.70</b>	3.62 3.51 3.51	3.81 3.89 3.76	3.34 3.60 <b>3.51</b>	<b>1.81</b>
B2	4.75 ± 0.04	0.98 ± 0.01	2.95 4.08 <b>2.98</b>	2.85 3.15 3.11	2.18 1.30 2.05	<b>1.26</b> 1.48 0.95	<b>-1.72</b>

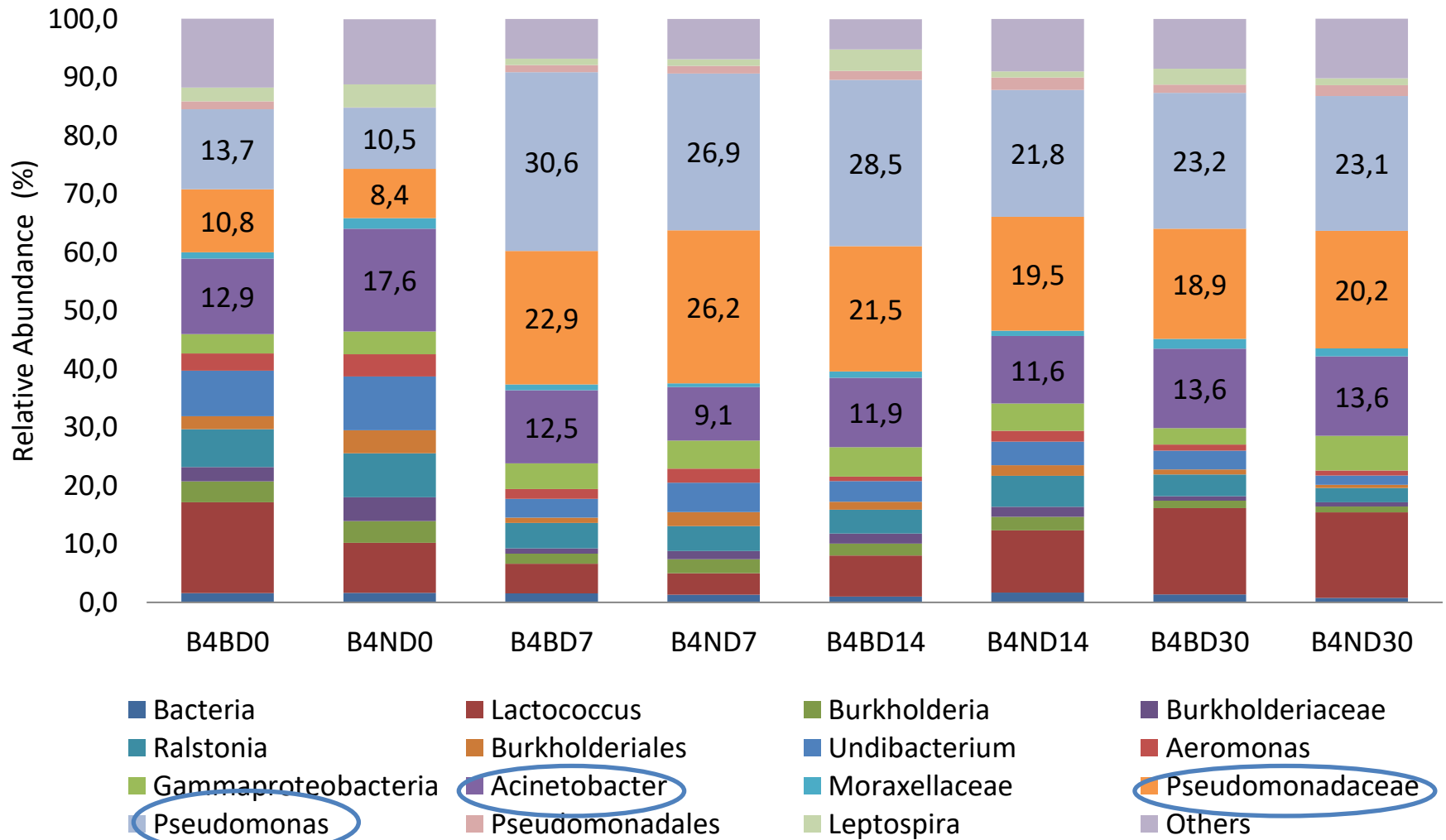
- **δ > 0.5** → the food is able to support the growth of *L. monocytogenes*
- **δ ≤ 0.5** → the food is not able to support the growth of *L. monocytogenes*



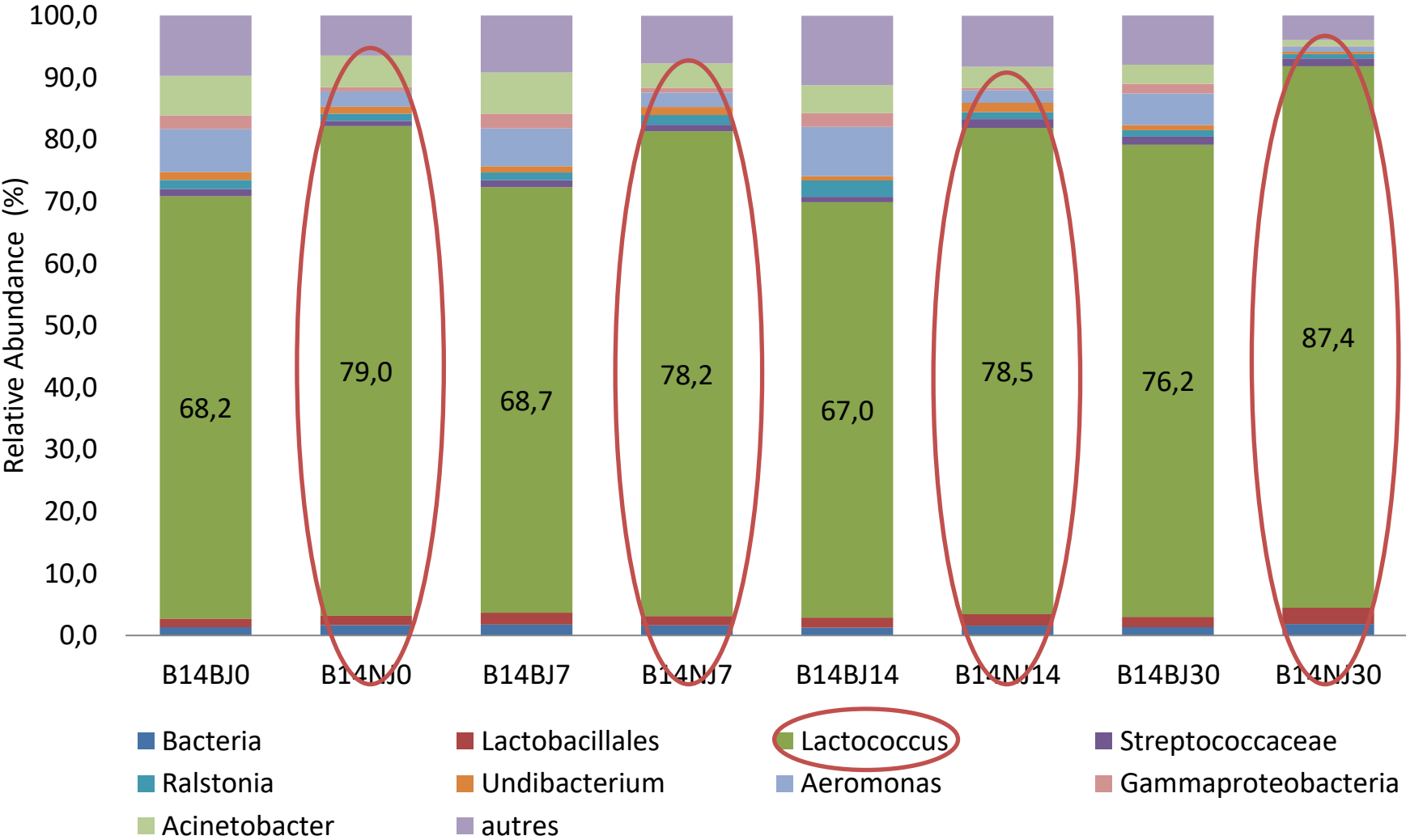
# Significant dissimilarity between samples depending on the maturation temperature



# Abundance of psychrotrophic bacteria in B1 butter samples



# Dominance of *Lactococcus* in B2 butter samples



# Conclusions

- No growth of *L. monocytogenes* in butter made of cream matured at 14°C
- Different bacterial profile depending on the maturation temperature
- High abundance of *Lactococcus* in inoculated samples

# Acknowledgments



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