



# Evaluation of the bacterial diversity and its evolution during storage of fresh beef from British and Belgian origins under different atmosphere and temperature conditions

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Avec le soutien de



Wallonie

*BAMST Symposium  
Kortrijk, December 10<sup>th</sup>, 2013*

# INTRODUCTION

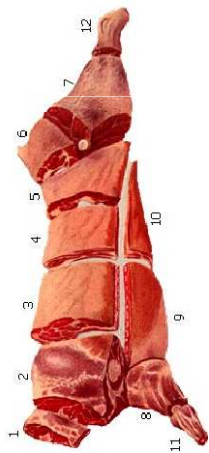


## Food contamination and food spoilage have always been a source of concern in food microbiology!

- Some lactic acid bacteria (LAB) are known for their bactericidal or bacteriostatic activity

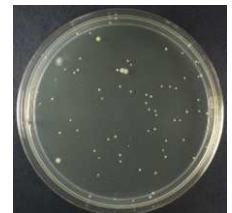


the presence of certain LAB could extend the shelf life and improve the microbial stability and safety of meat



Selection of specific flora in meat depending on atmosphere and temperature, for example

Some bacteria may be missed by cultivation-based methods

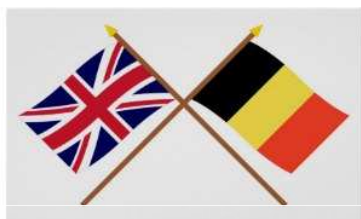


# OBJECTIVE

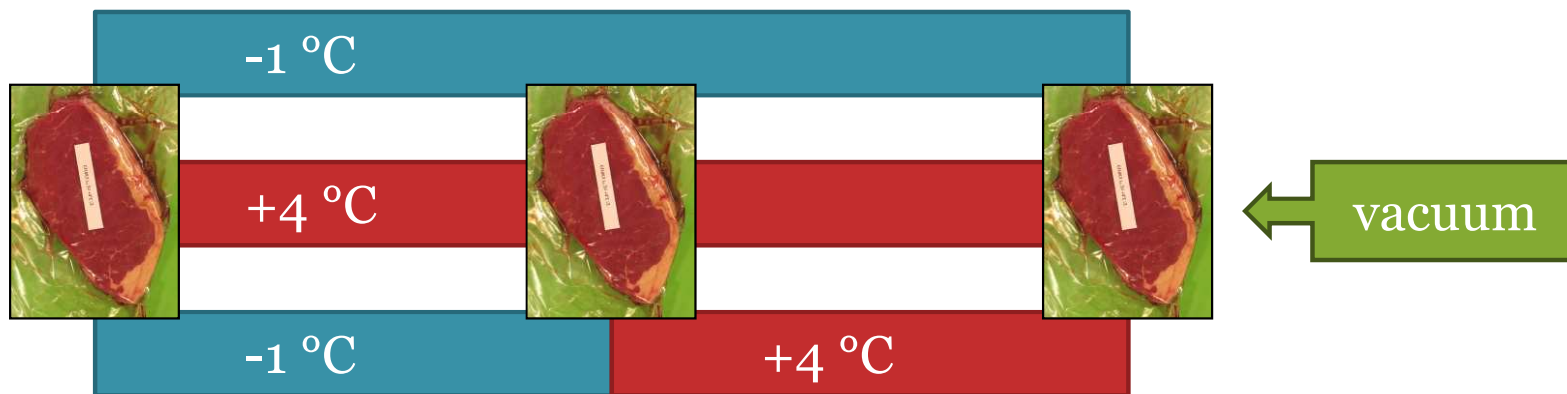
**To evaluate the bactericidal diversity and its evolution during storage of fresh beef, depending on its origin, atmosphere and storage temperature, by using a metagenomic approach.**

# MATERIALS AND METHODS

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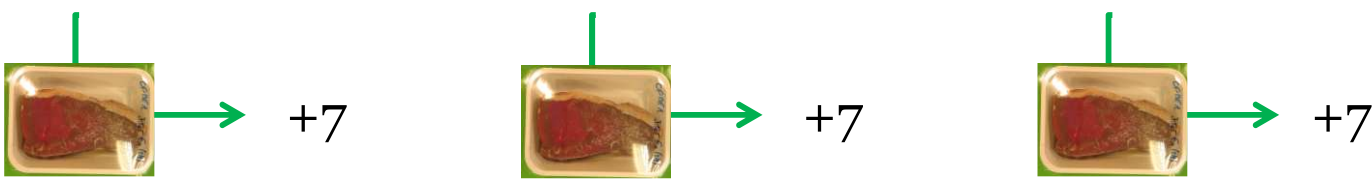


**Slaughter**



0 15 30 45

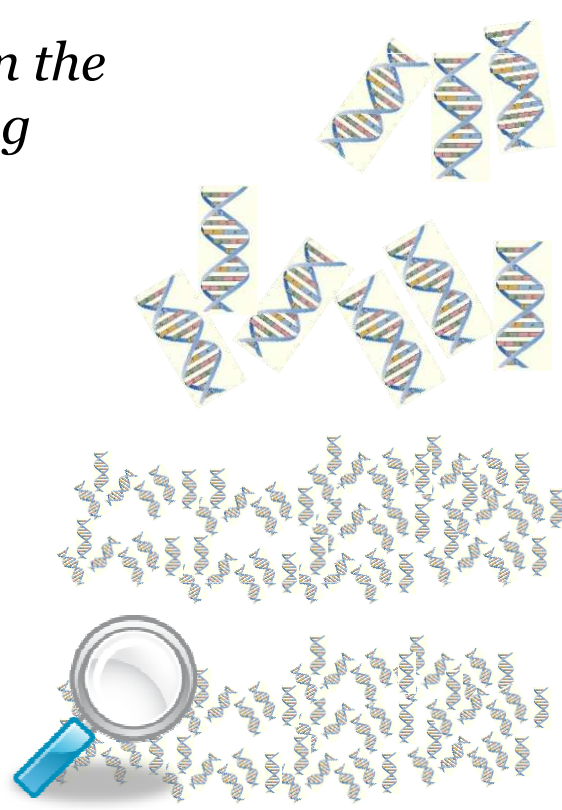
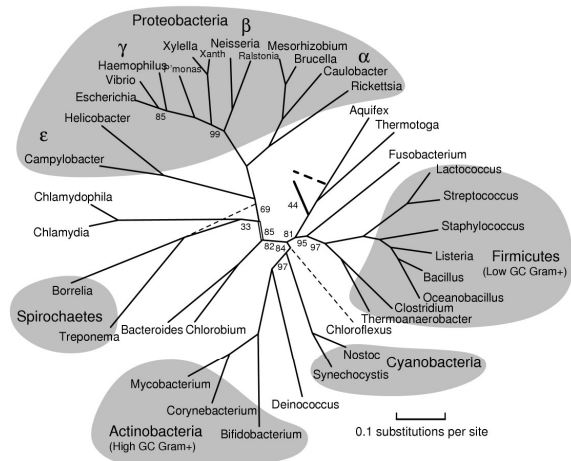
70 % O<sub>2</sub>  
30 % CO<sub>2</sub>



2 d at +4 °C and 5 d at +8 °C

# Metagenomics

*Taxonomic analysis based on the 16S rRNA gene sequencing*



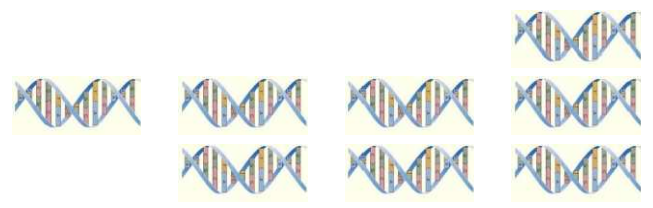
Total DNA extraction

DNA pooling

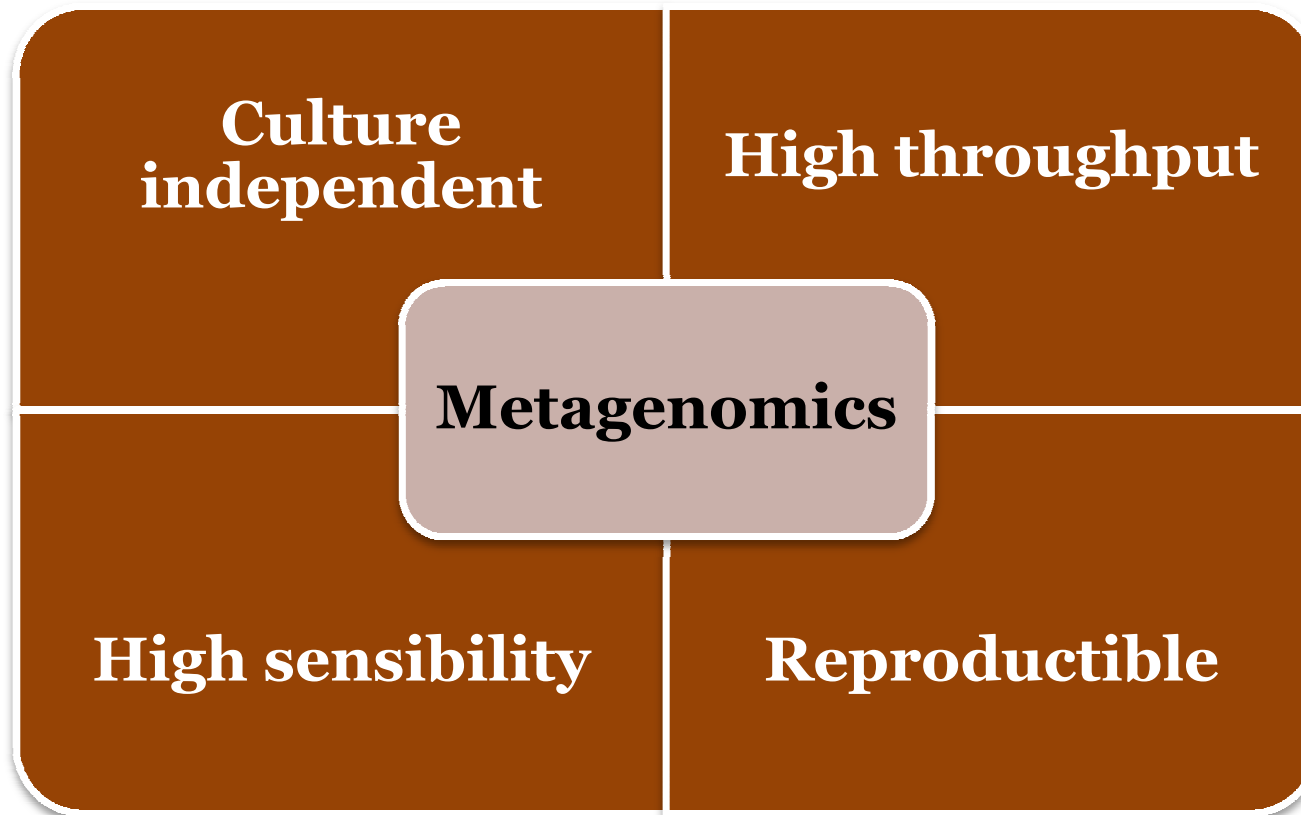
16S rRNA gene amplification

Pyrosequencing

Bioinformatics (data processing)



## Advantages





# RESULTS AND DISCUSSION

The slide features a dark brown header with the title 'RESULTS AND DISCUSSION' in white. Below the header, there is a decorative graphic consisting of a thick yellow bar, a thin orange bar, and several thin white lines, all of which are offset to the right.

19e Journées 3R Rencontres Recherches Ruminants  
Paris, 5 et 6 décembre 2012



# La diversité bactérienne et son évolution pendant la conservation de viandes bovines fraîches de différentes origines conditionnées sous vide

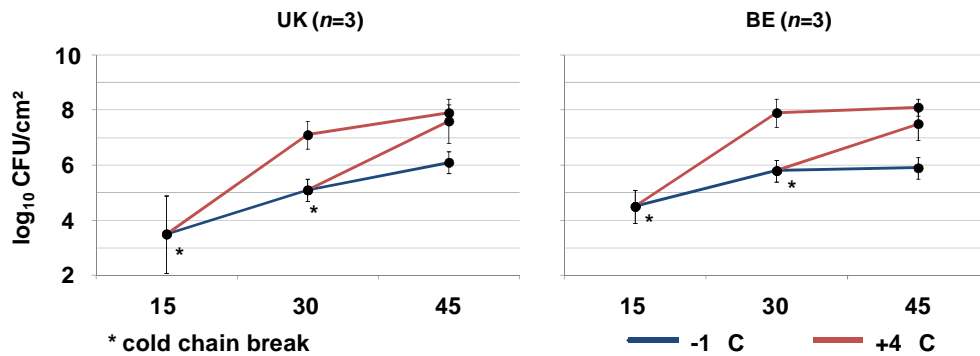


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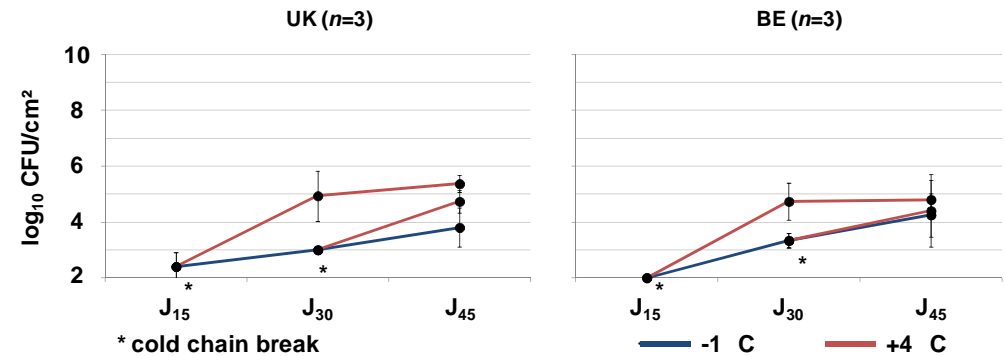
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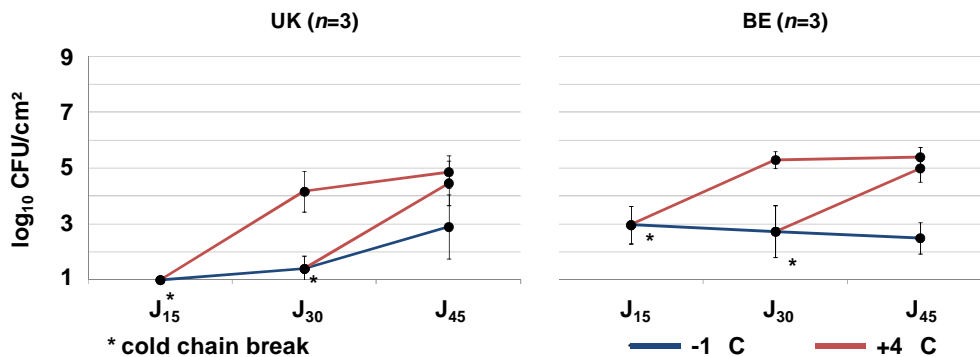
## Total viable count



## Lactic acid bacteria



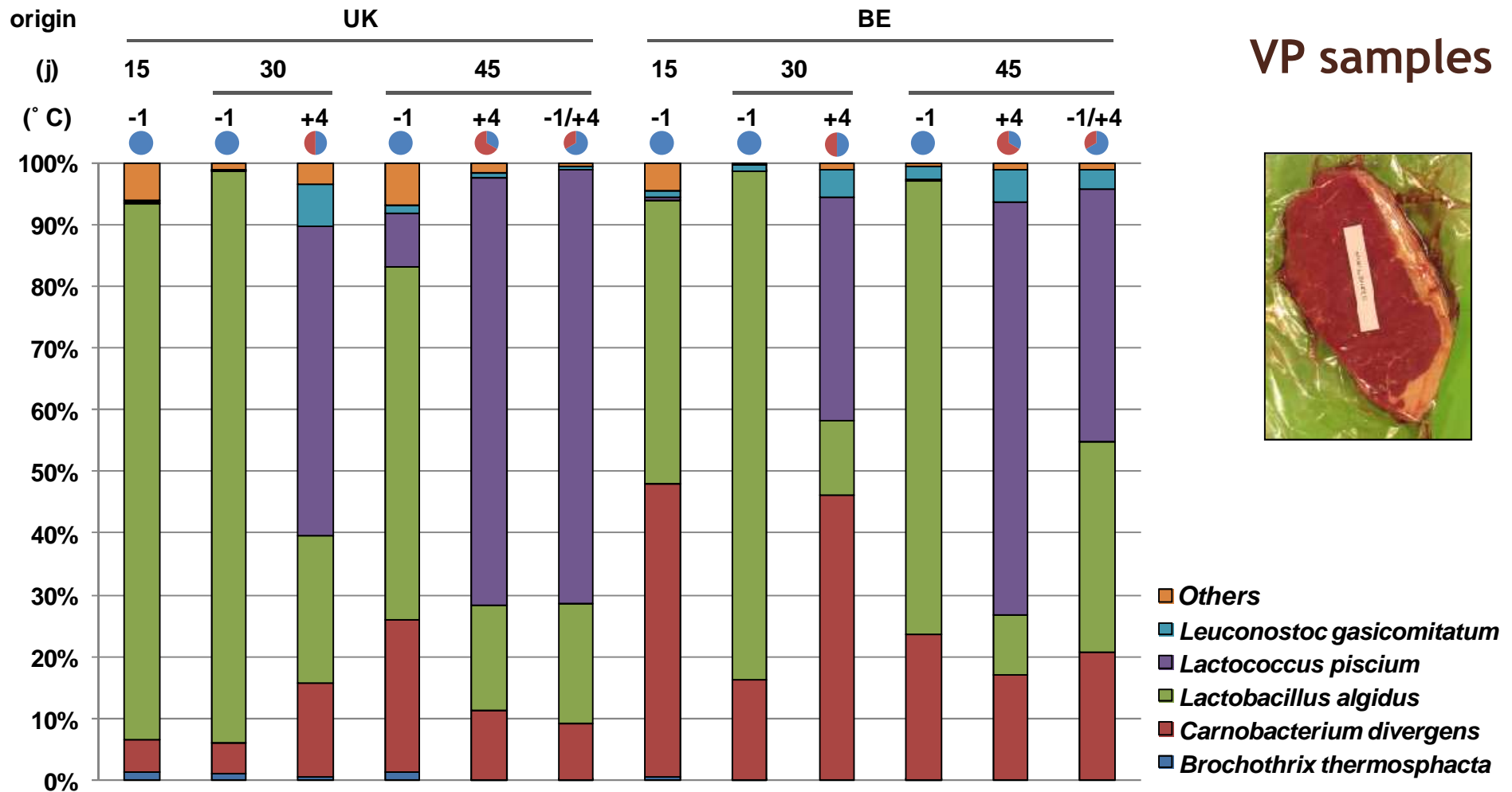
## Enterobacteriaceae



Different evolution of the microbial ecosystem

WHO IS THERE ?





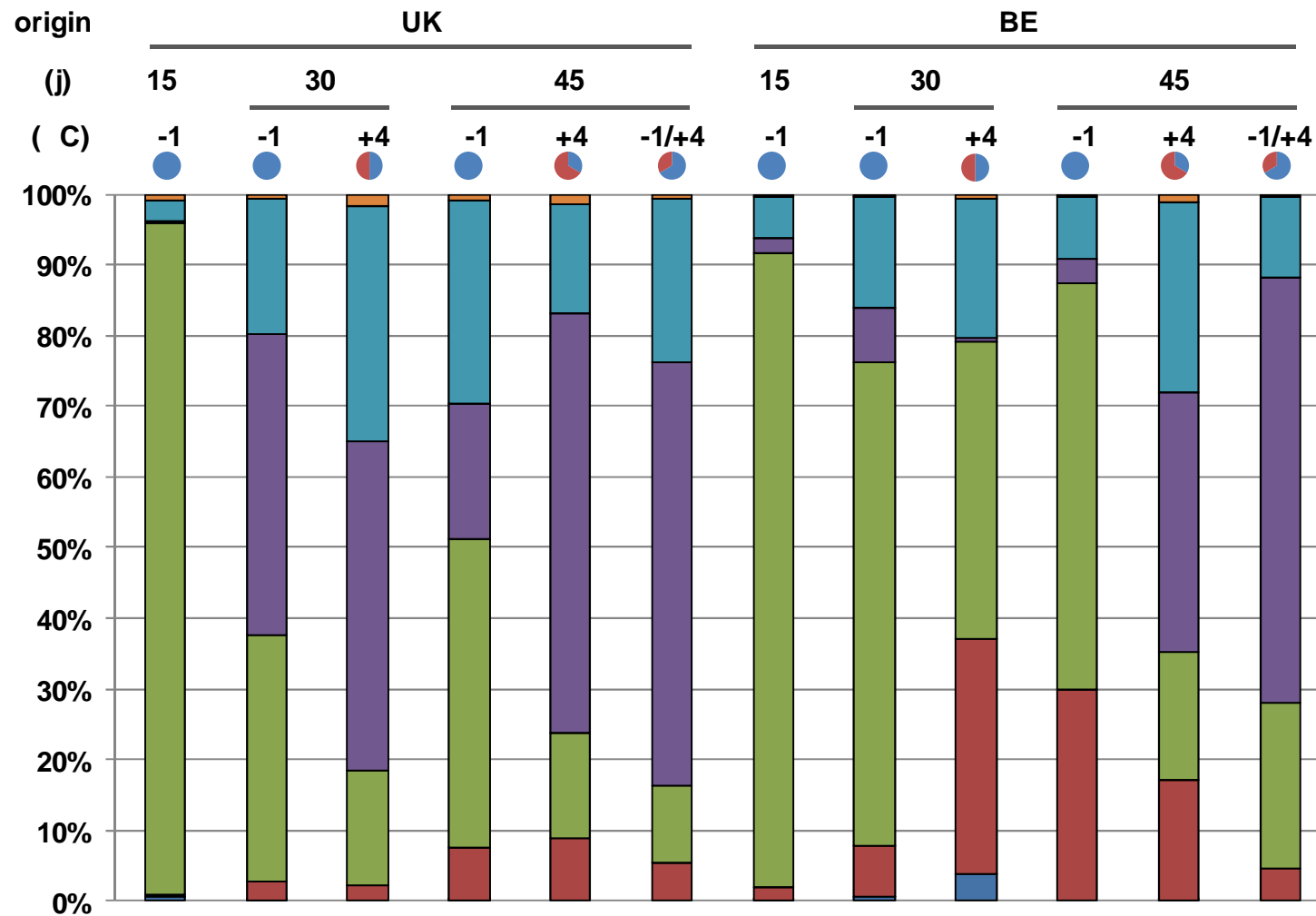
**VP samples**



**VP and -1 °C : favored *Lactobacillus algidus* growth**

**VP and +4 °C : favored *Lactococcus piscium* growth**

Already isolated from beef, but no study has evaluated their role in meat preservation.



### MAP samples



**MAP and T > +4 °C : favored *Leuconostoc gasicomitatum* growth**

**Spoilage of cold-stored, modified-atmosphere-packaged (MAP), nutrient-rich foods.**

# CONCLUSIONS

A decorative graphic consisting of a thick yellow horizontal bar at the top, followed by a thin orange horizontal bar, and then several thin, parallel white horizontal lines of varying lengths extending across the width of the page.

- **Metagenomics:** useful tool (culture independent) to study the microbial population of a complex matrix.
- It helped to clarify the **evolution of the bacterial ecosystem** associated to meat during its storage.
- **Perspective:** isolation and characterization of strains of *Lactobacillus algidus* from meat to assess their bioprotective potential.

# ACKNOWLEDGMENTS

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Wallonie

**Project CONSBB:** Long-time preservation of fresh meat from Belgian Blue cattle : constraints , evaluation and recommendations

(**Poster presentation:** Influence of two breeds (Belgian Blue and Limousin) and previous storage time on pigment and lipid stability of high-oxygen atmosphere packaged beef)



**Prof. Clinquart**



**Prof. Daube**



**Dr. Taminiau**



**Dr. Nezer**



**Mrs. Tahiri**

# THANKS FOR YOUR ATTENTION

## QUESTIONS?



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