



Study of the microbial diversity in vacuum-packed chilled beef from different origins through a metagenomics approach

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INTRODUCTION

Food contamination and food spoilage by bacterial organisms have always been a source of concern in human populations. Despite a diverse initial microbial population, bacterial spoilage of vacuum-packed chilled beef is mainly due to the growth of psychrotrophic bacteria. The study of the microflora of vacuum-packed chilled beef remains a challenge since some members of the microflora may be missed or not identified by cultivation-based methods.

OBJECTIVE

To evaluate the microbial diversity in vacuum-packed chilled beef from different origins (Australia, Belgium, Brazil, Ireland and United Kingdom) in early and late stages of their shelf life using a metagenomics approach.

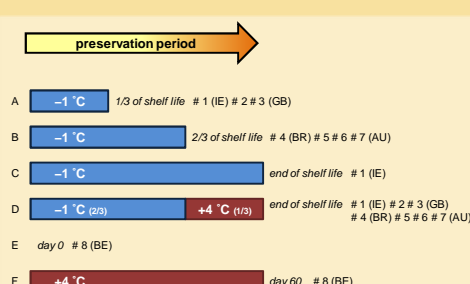
MATERIAL AND METHODS

Sampling

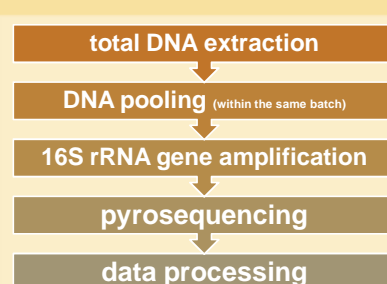
Batch #	Origin	Shelf life
1	Ireland (IE)	35 days
2	United Kingdom (GB)	45 days
3		
4	Brazil (BR)	120 days
5	Australia (AU)	140 days
6		
7		
8	Belgium (BE)	28 days

Batches 1-7 = 3 striploins
Batch 8 = 4 striploins

Storage temperature

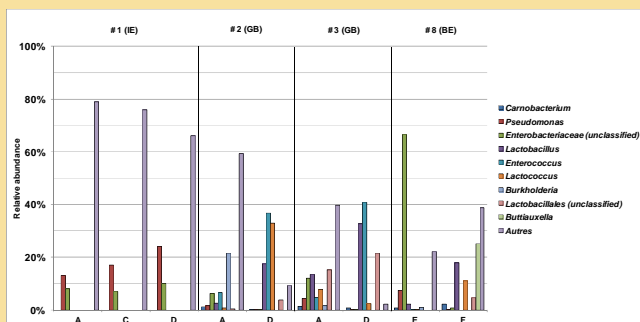


Experimental design



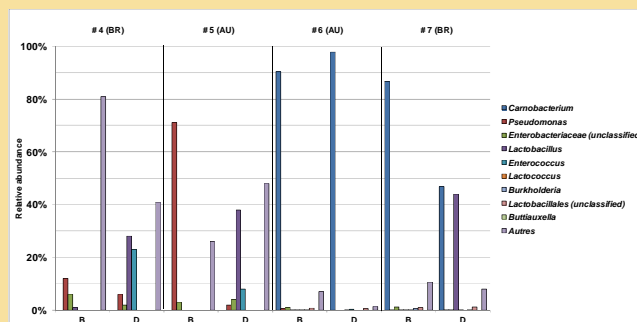
RESULTS

Ireland, United Kingdom and Belgium



- High microbial diversity
- At early stage of shelf life presence of bacteria from environmental contamination
- At late stage of shelf life no predominance of specific genus

Australia and Brazil



- Low microbial diversity
- At early stage of shelf life predominance of lactic acid bacteria (for batches # 6 and # 7)
- At late stage of shelf life predominance of lactic acid bacteria potentially producing bacteriocins (*Lactobacillus* and *Carnobacterium*)

CONCLUSIONS

Metagenomics showed to be a very useful tool to study the microbial population of a complex matrix such as meat since some of the identified genera such as *Lactobacillus* and *Carnobacterium* are known not to grow or to grow slowly in media commonly used for the isolation and cultivation of total viable counts.

Carnobacterium remained the dominant flora in Australian batches #6 and #7, which could explain the long shelf life applicable to this meat (140 days) as some *Carnobacterium* strains induce a biopreservative effect especially by producing bacteriocins with a wide inhibition spectrum.

ACKNOWLEDGEMENTS



This study was funded by the General Operational Direction of Agriculture, Natural Resources and Environment (DGARNE) of the Walloon Region (Belgium)