Evaluation of the sensory quality of beef patties inoculated with *Carnobacterium maltaromaticum* strains with biopreservative potential

BAMST Symposium – Melle, December 2nd 2015

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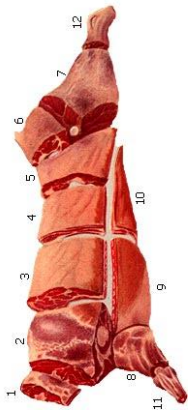
INTRODUCTION

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

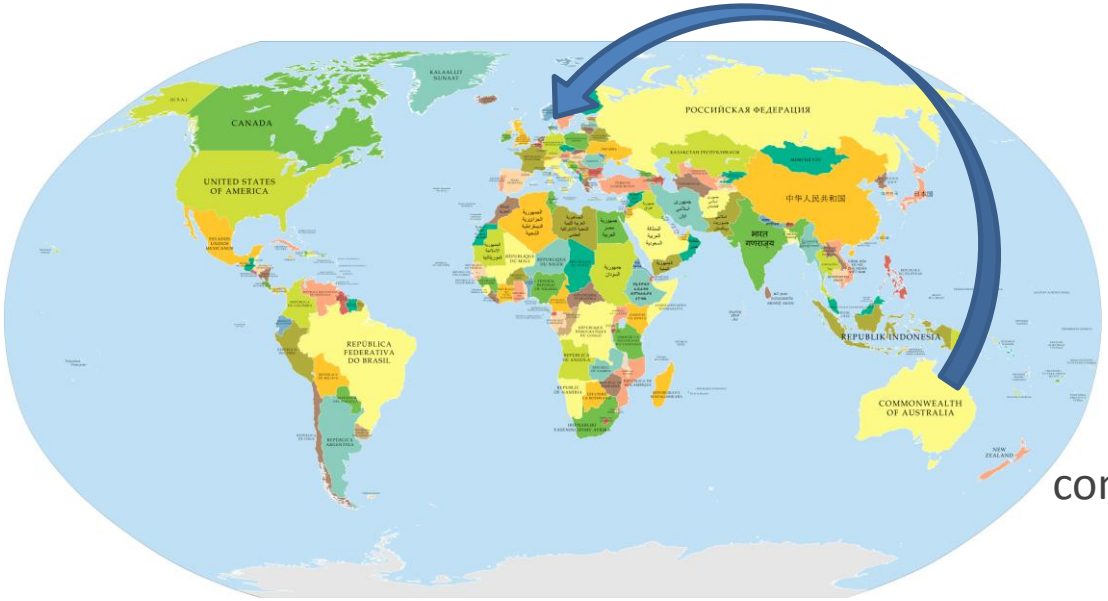
- Some lactic acid bacteria (LAB) are known for their bactericidal and/or bacteriostatic activity

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



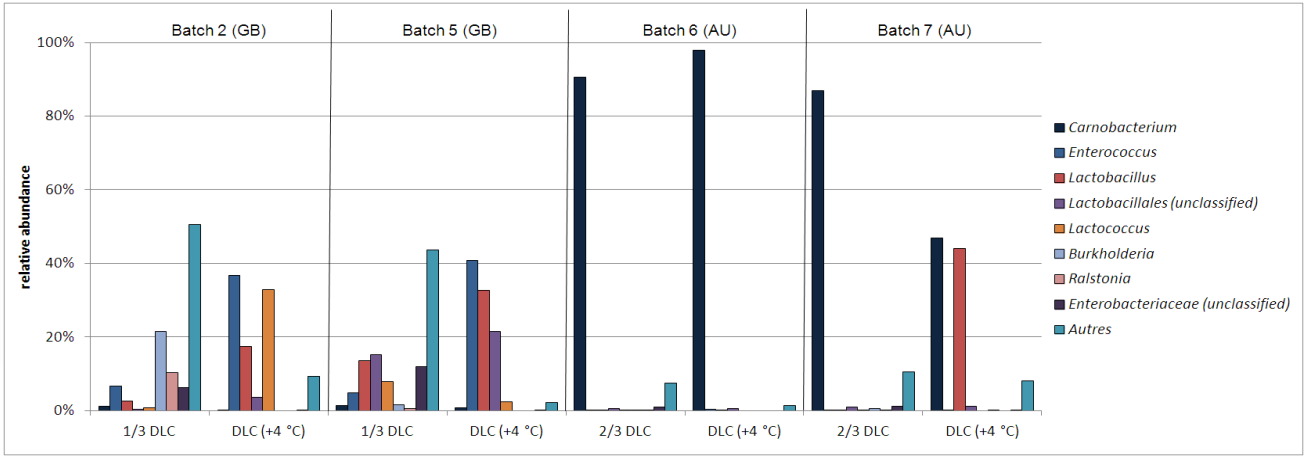
Selection of specific flora on meat depending on <u>temperature</u> and <u>atmosphere</u>

INTRODUCTION – BACKGROUND



vacuum packed *longissimus dorsi*
Australian origin
commercial shelf life = **<u>140 days</u>** at –1 ˚C

Bacterial diversity in British vs. Australian beef (metagenetics)



(Imazaki *et al.*, SFM – Colloque Ecosystèmes Microbiens et Bioprotection des Aliments, 2011)

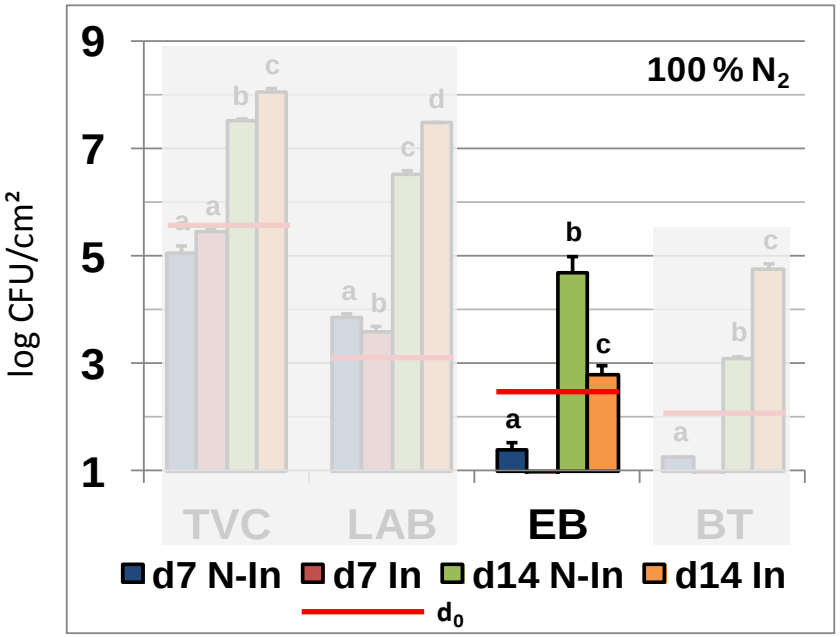
INTRODUCTION – BACKGROUND

vacuum packed *longissimus dorsi*
Australian origin
commercial shelf life = **140 days** at –1 ˚C

Isolation of *C. maltaromaticum*

Microbiological stability of Belgian fresh beef inoculated with *C. maltaromaticum*

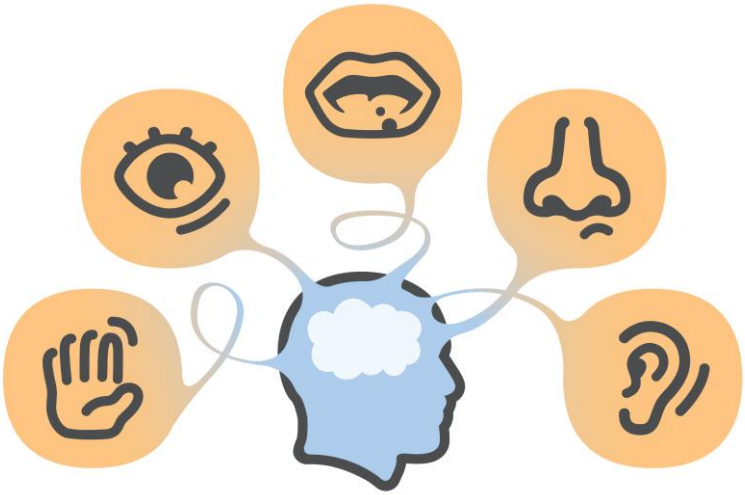
Inoculum **inhibited the growth of *Enterobacteriaceae***



(Imazaki *et al.*, 60th International Congress of Meat Science and Technology, 2014)

INTRODUCTION – AIM

- To perform a sensory evaluation of beef patties inoculated with strains of *C. maltaromaticum* with potential as biopreservatives.



MATERIALS AND METHODS

1

vacuum packed *longissimus dorsi*
Australian origin
commercial shelf life = **140 days** at –1 ˚C

Isolation of three *C. maltaromaticum* strains

(lab. ref.)
CM_824 CM_827
CM_829

2

CM_824
CM_827
CM_829

Inoculation of commercial beef patties (1 % v/w)

at two levels

10^4 or 10^6 CFU *C. maltaromaticum*/g meat

beef patties
(89 % beef, water, 0.9 % vegetal fibers, salt, silicon dioxide, ascorbic acid, sodium acetate and sodium citrate)
shelf life = 8 days at 4 ˚C

MATERIALS AND METHODS

3

storage of raw samples
(80 % O_2 : 20 % CO_2)

5 days at 4 ˚C
+
5 days at 8 ˚C
(simulation of domestic storage)

4

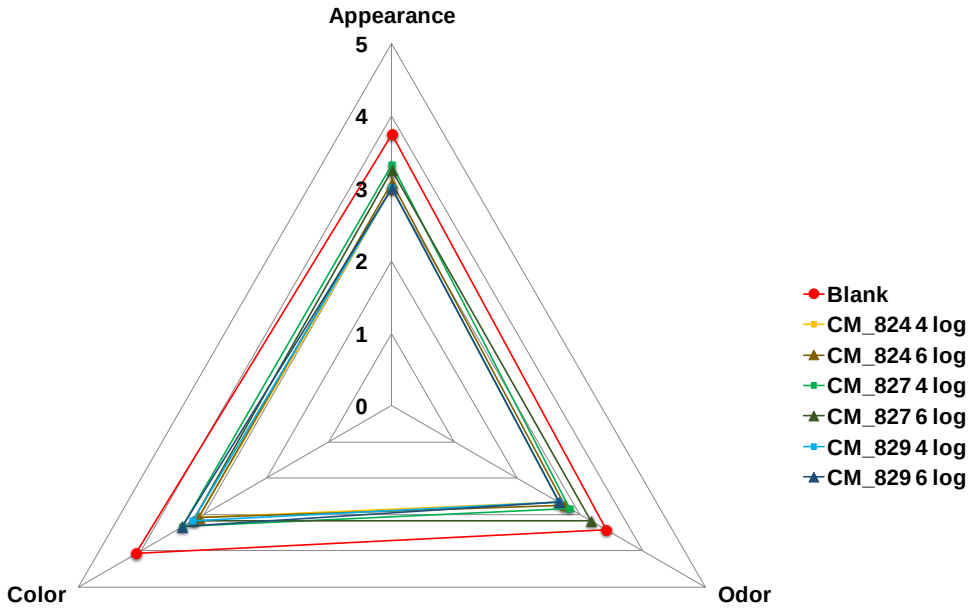
Sensory analysis

- untrained panel (7 to 12 members)
- raw samples and cooked samples* (after storage)
- six attributes (appearance, odor, color, tenderness, flavor and juiciness)
- scoring from 1 (= dislike) to 5 (= like)

* Cooked samples were grilled (frying top Tecnoinox FTL35E/6/0) until they reached an internal temperature of +75 °C.

RESULTS AND DISCUSSION

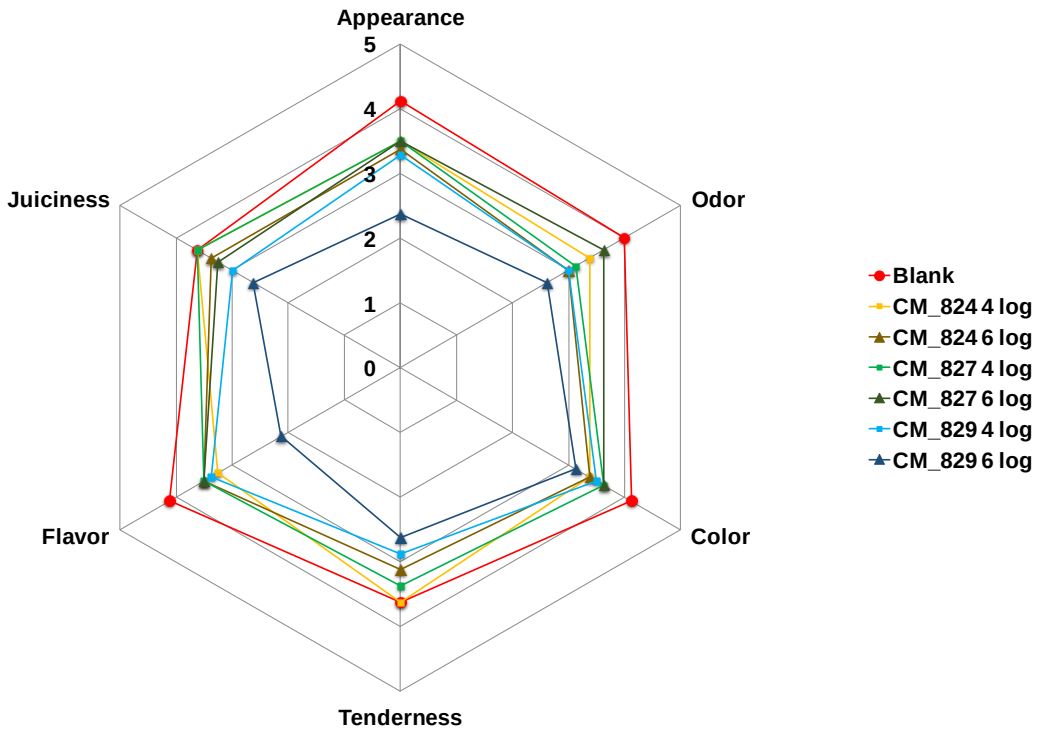
Sensory analysis of raw patties inoculated with 10^4 or 10^6 CFU C. *maltaromaticum*/g meat after 8 days of storage (5 days at 4 ˚C and 3 days at 8 ˚C) (*n* = 12)



- Non inoculated raw samples (blank) were perceived as having the best color ($P < 0.05$).
- Non inoculated raw samples and inoculated samples with strain CM_827 at 10^4 CFU *C. maltaromaticum*/g meat were perceived as having the best appearance ($P < 0.05$).
- Samples did not differ statistically for odor.

RESULTS AND DISCUSSION

Sensory analysis of patties inoculated with 10^4 or 10^6 CFU C. maltaromaticum/g meat after 8 days of storage (5 days at 4 ˚C and 3 days at 8 ˚C) and cooking (*n* = 8)

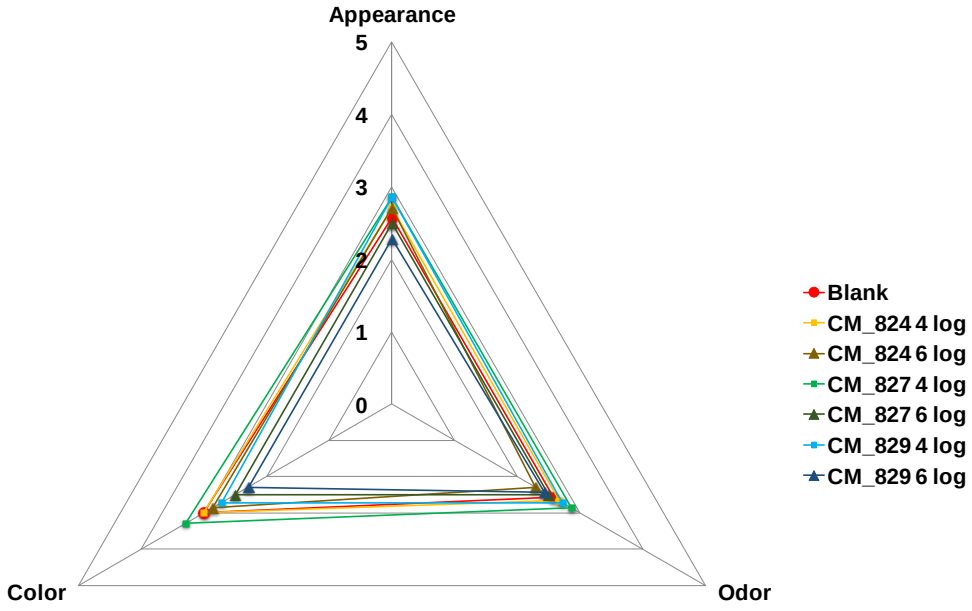


- Non inoculated beef patties (blank) received higher scores than inoculated patties, but no statistical difference was observed with samples inoculated with *C. maltaromaticum* at 10^4 CFU/g.

- Samples inoculated with the strain CM_829 at 10^6 CFU/g received the worst scores for appearance, odor and flavor ($P < 0.05$).

RESULTS AND DISCUSSION

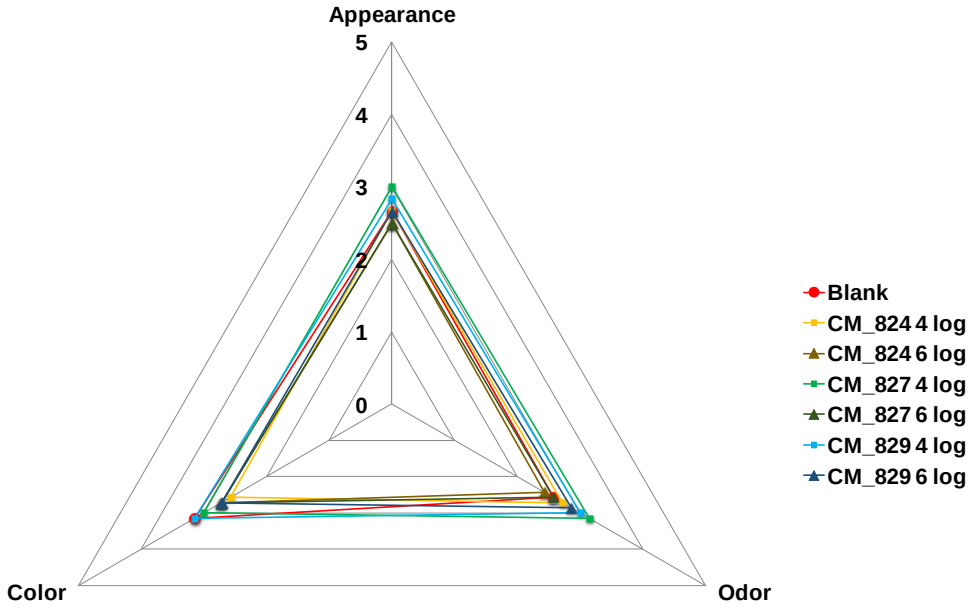
Sensory analysis of raw patties inoculated with 10^4 or 10^6 CFU C. *maltaromaticum*/g meat after 10 days of storage (5 days at 4 ˚C and 5 days at 8 ˚C) (*n* = 7)



- Samples inoculated with the strain CM_827 at 10^4 CFU/g received the highest scores for all attributes, but did not differ statistically from blank.

RESULTS AND DISCUSSION

Sensory analysis of patties inoculated with 10^4 or 10^6 CFU C. maltaromaticum/g meat after 10 days of storage (5 days at 4 ˚C and 5 days at 8 ˚C) and cooking (*n* = 7)



- Only appearance, color and odor were evaluated since samples were three days beyond commercial shelf life.

- A decrease in the sensory quality was observed during the last three days of storage.

CONCLUSIONS

- This preliminary study permitted to evaluate the effect of three *C. maltaromaticum* strains on the sensory quality of beef patties.

- Strain CM_827 did practically not change the sensory attributes of beef patties.

- Therefore, further research on the biopreservative capacity of *C. maltaromaticum* should be conducted with the strain CM_827.

ACKNOWLEDGEMENTS

Prof. Clinquart

Prof. Daube

Dr. Kergourlay

Dr. Jacques-Houssa

FARAH

THANKS FOR YOUR ATTENTION

QUESTIONS?

Université de Liège
Faculté de Médecine vétérinaire