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

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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 **temperature** and **atmosphere**
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**INTRODUCTION – BACKGROUND**

- **ULg – Faculté de Médecine Vétérinaire - FARAH**

  - Vacuum packed *longissimus dorsi*
  - Australian origin
  - Commercial shelf life = **140 days** at –1 °C

  - Bacterial diversity in British vs. Australian beef (metagenetics)

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

Isolation of *C. maltaromaticum*

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

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)
To perform a sensory evaluation of beef patties inoculated with strains of *C. maltaromaticum* with potential as biopreservatives.
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**MATERIALS AND METHODS**

1. **Vacuum packed longissimus dorsi**  
   Australian origin  
   Commercial shelf life = **140 days** at –1 °C

2. **Inoculation of commercial beef patties (1% v/w)**  
   at two levels  
   10⁴ or 10⁶ CFU *C. maltaromaticum*/g meat

   **Isolation of three**  
   *C. maltaromaticum* strains  
   (lab. ref.)  
   CM_824  
   CM_827  
   CM_829

   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
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**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 Tecninox 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.
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.
• 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.
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QUESTIONS?