Effect of reheating and storage temperature on the growth of psychrotrophic *C. botulinum* spores in LTLT cooked meat

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INTRODUCTION

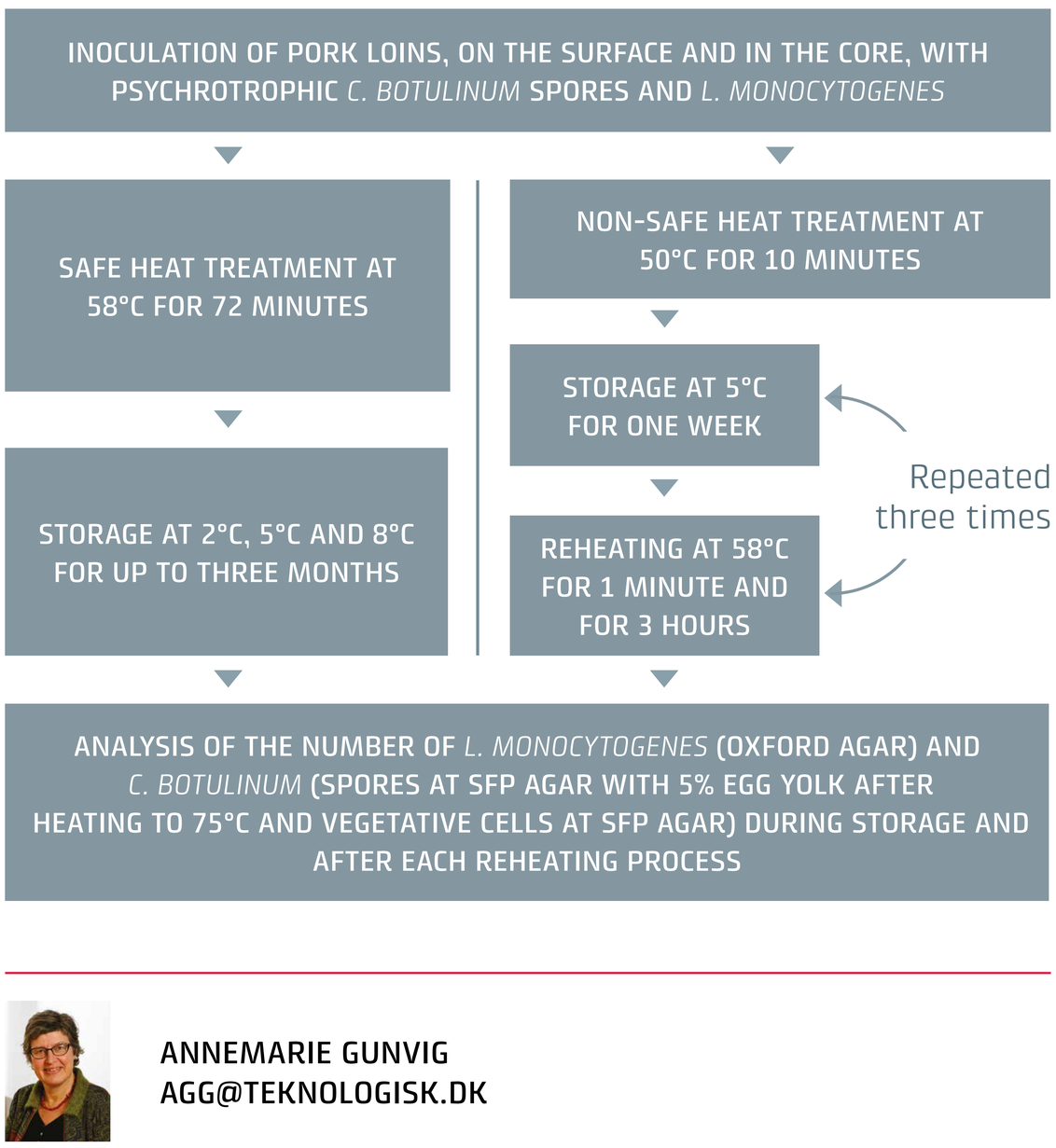
Prolonged cooking of meat at a low temperature, less than 65°C (LTLT), is ideal for enhancing the eating quality of meat by reducing toughness and cooking loss. To ensure food safety and a long shelf life, both vegetative cells and psychrotrophic *C. botulinum* spores must be eliminated during the heat treatment, or the growth of the bacteria must be inhibited.

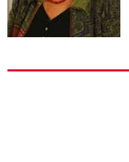
According to the international food safety authorities, heat treatment and reheating of food must be carried out with a time/temperature profile that ensures food safety. The Food Standard Agency (FSA) recommends a maximum of 10 days' shelf life of vacuum packed foods stored at 3-8°C. For a shelf life longer than 10 days, a heat treatment of 90°C for minimum 10 minutes or storage below 3°C is necessary.

AIM

The aim is to provide the catering sector with recommendations for reheating and storage of LTLT cooked products based on data from experiments with reheating and storage of meat inoculated with pathogenes.

MATERIALS AND METHODS





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CONCLUSION

Vegetative cells of psychrotrophic *C. botulinum* and *L. monocytogenes* are inactivated during heat treatment at 58°C for 72 minutes

The number of *C. botulinum* spores is unaffected by heat treatment at 58°C for 72 minutes

The time for storage (5°C) between reheating of LTLT pork should be less than 10 days due to potential growth of psychrotrophic *C. botulinum*.

Storage at 8°C results in "blown packs", which indicates heavy/ strong growth of *C. botulinum*

To achieve a shelf life longer than 10 days, storage below 3°C is necessary

Apply DMRI's guidelines for safe LTLT (please take a copy in the folder

- ✓ 5°C for 10 days or
- ✓ 2°C for 90 days (Baldwin, 2010)

- ✓ Maximum 1 reheating
- ✓ It is safe to maintain the temperature ≥58°C for
- ✓ 3 hours

RESULTS

Figure 1: Growth of psychrotrophic *C. botulinum* and *L. monocytogenes* during storage of LTLT cooked pork (58°C for 72 minutes)

	2°C	5°C	8°C
Growth of *C. botulinum* on the surface and in the core	No	Yes/No	Yes
Growth of *L. monocytogenes* on the surface and in the core	Inactivated during heat treatment at 58°C for 72 minutes		

Table 1: Change in the number of *C. botulinum* spores and vegetative cells of *C. botulinum* and *L. monocytogenes* in LTLT cooked pork (50°C for 10 minutes)

	First reheating		Second reheating		Third reheating	
Bacteria	Heating to 58°C	Holding time (3 h)	Heating to 58°C	Holding time (3 h)	Heating to 58°C	Holding time (3 h)
Psychrotrophic *C. botulinum* spores on the surface or in the core	UC[1]	UC[1]	▲	▲	▲	UC[1]
Vegetative cells (LM and CB) on the surface or in the core	>4 log reduction	>4 log reduction	>4 log reduction	>4 log reduction	>4 log reduction	>4 log reduction

1) unchanged compared to second heating

UC = Unchanged, LM = Listeria monocytogenes, CB = C. botulinum pil op= increase in number