

INTRODUCTION

The spoilage of perishable foods is mainly caused by bacterial activity.

The risk of unwanted bacterial growth is particularly high in the minced pork meat.

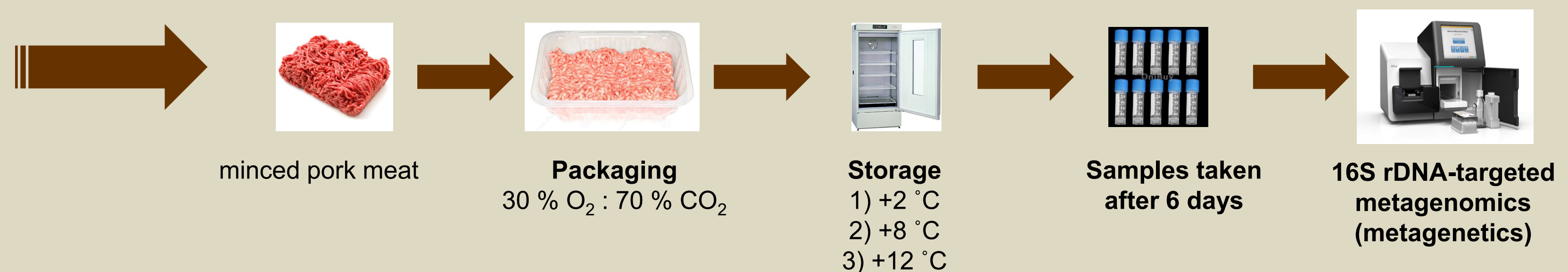
OBJECTIVES

1. Performing aging tests of minced pork meat at different temperatures
2. Studying the growth of the microorganism which was dominant during aging tests : this growth is followed at different temperature, in minced pork meat previously sterilized ("Challenge testing")
3. Identifying the metabolites used and produced by this microorganism during testing challenge ("metabolomic study")

MATERIALS AND METHODS

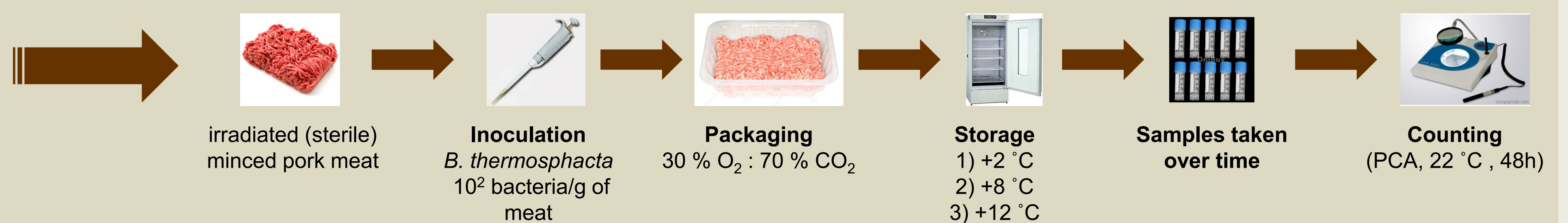
1. Aging tests :

Minced pork meat samples are placed in modified atmosphere packs (70% of CO₂ and 30% d'O₂) and incubated at different temperatures (2°C, 8°C and 12°C). Samples are taken after 6 days.



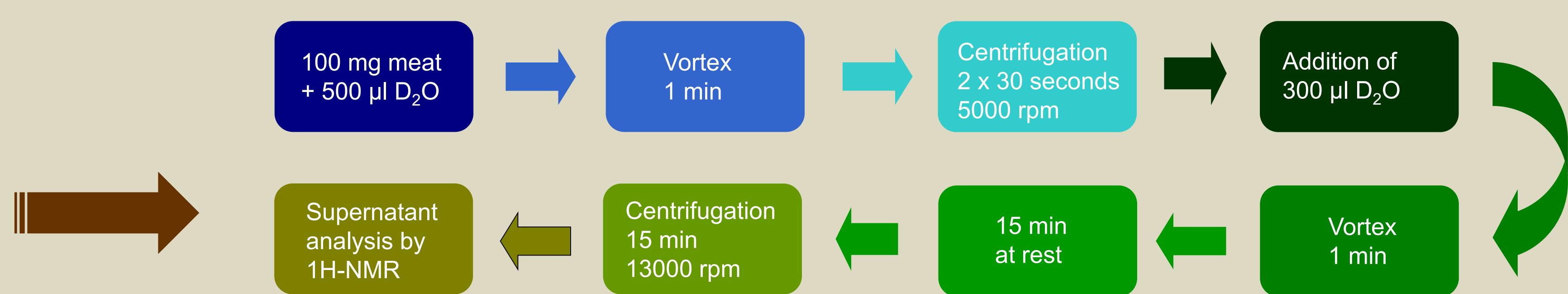
2. Challenge tests:

Minced pork meat is sterilized by gamma irradiation and inoculated in depth with aliquots of a culture of *B. thermosphacta* MM008. Minced pork samples are placed in modified atmosphere packs (70% of CO₂ and 30% O₂) and incubated at different temperatures (2°C, 8°C and 12°C). Samples are taken over time: cell concentration of *B. thermosphacta* is determined by counting the colonies on PCA medium



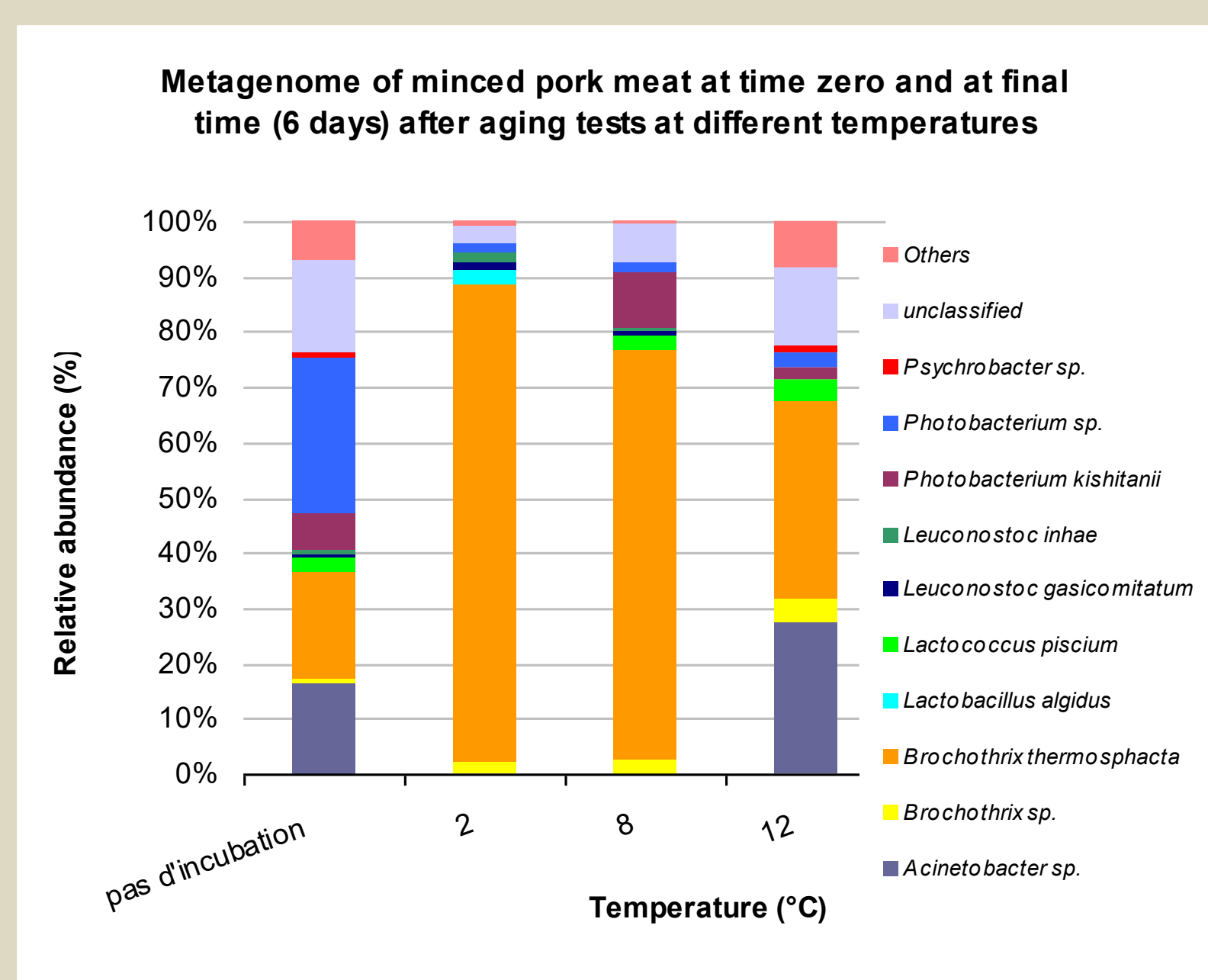
3. Metabolomic study :

Meat samples are extracted twice by D₂O and analyzed by 1H-NMR.



RESULTS

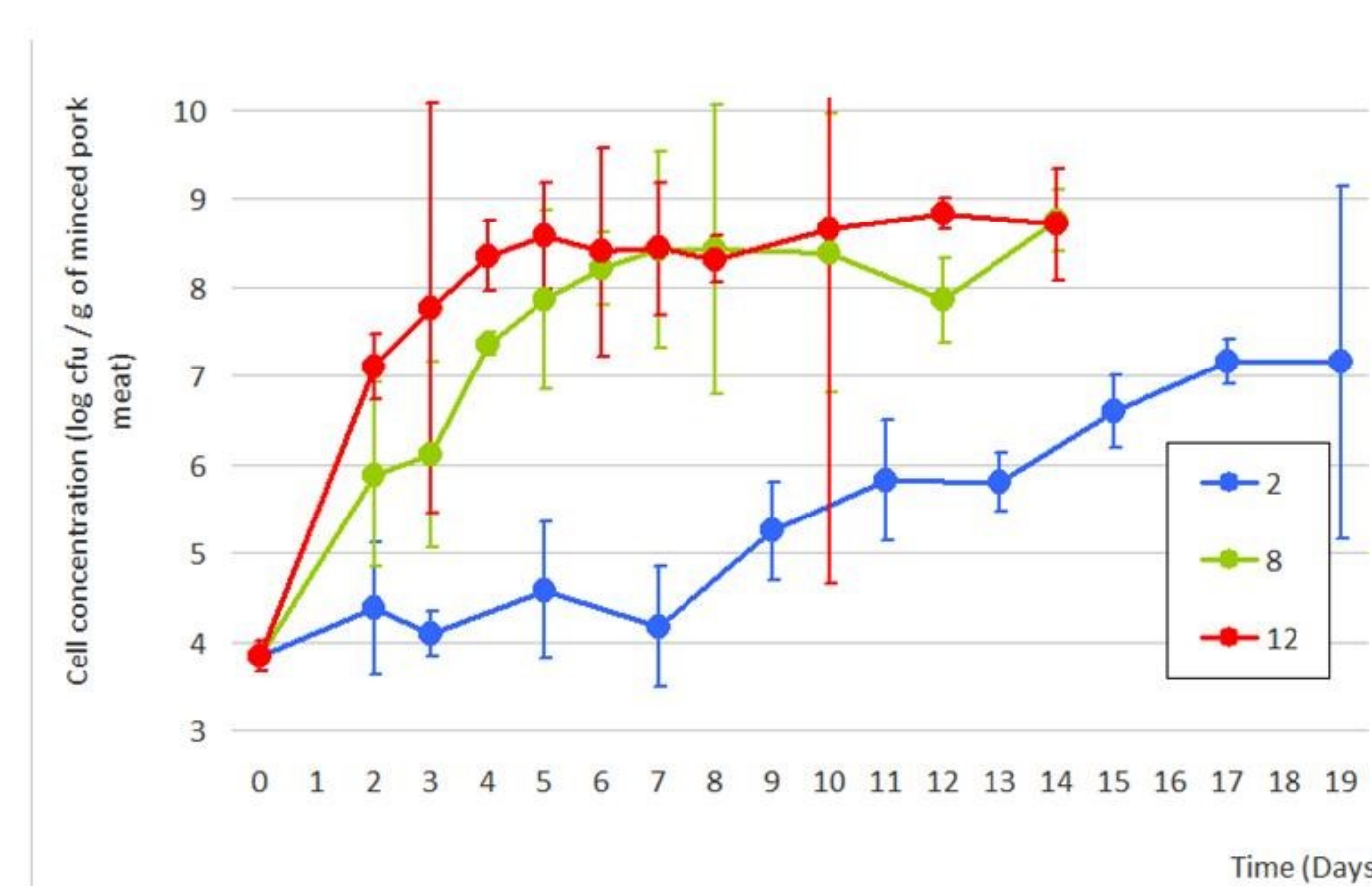
1. Aging test



Brochothrix thermosphacta is the dominant microorganism in all aging conditions (in modified atmosphere packs)

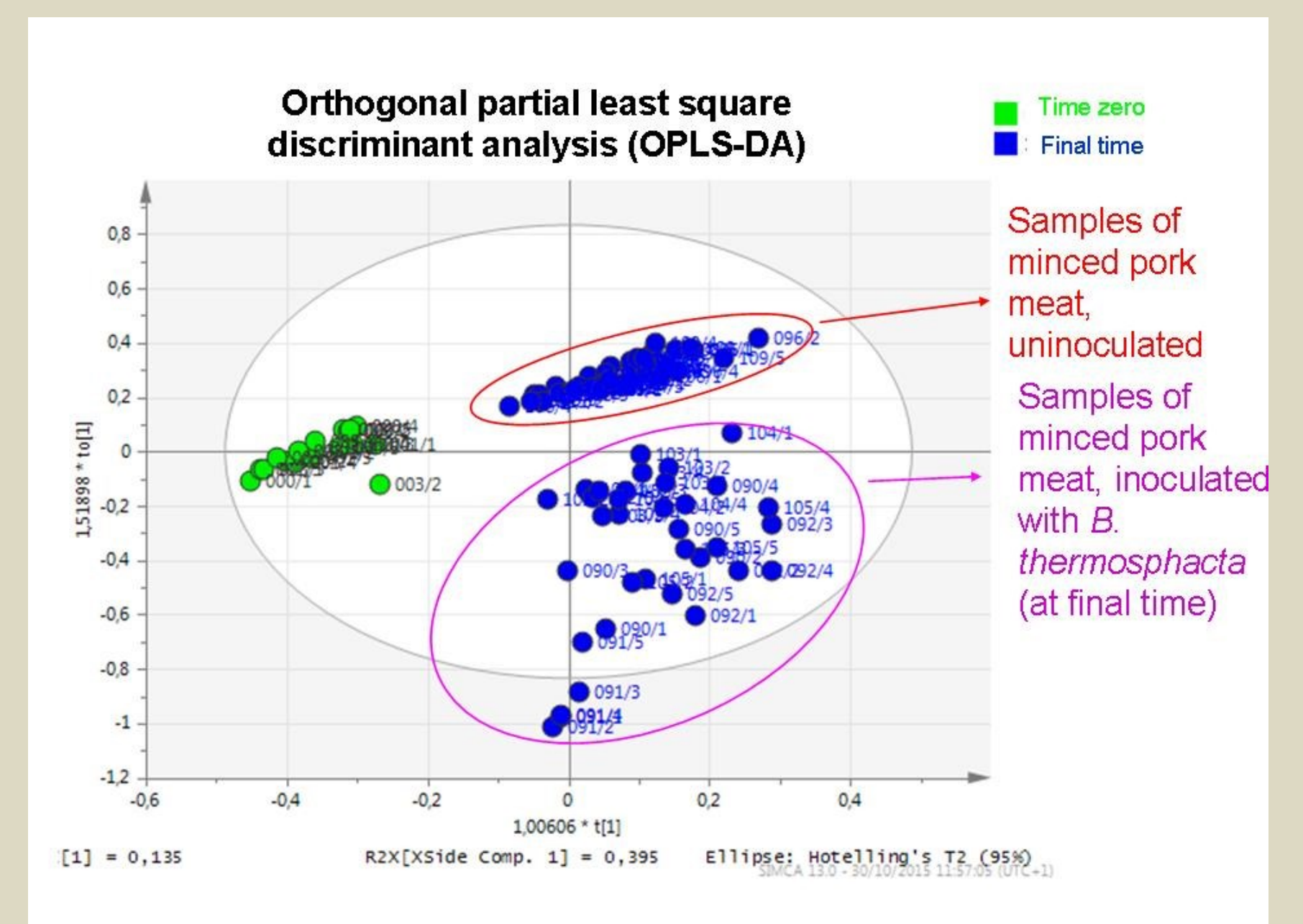
2. Challenge test

Growth of *B. thermosphacta* on sterile minced pork meat (challenge testing), at different temperatures (°C)



As expected, the higher the incubation temperature, the faster the growth of this strain is

3. Metabolomics



All samples can be splitted into 3 groups according to their spectral profile:
1) samples taken at time 0 (in green);
2) samples inoculated with *B. thermosphacta* and taken at final time (in pink);
3) samples uninoculated, taken at final time (in red).

RESULTS

3. Metabolomics (continuation)

Metabolites without inoculation (at final time)	Metabolites after inoculation with <i>B. thermosphacta</i> (at final time)
Glycerol, Glucose, Taurine, Lactate, Carnitine, Betaine, Glycine	Creatine, Acetate, Acetone

An increased production of creatine, acetone and acetate was found in the minced pork meat samples inoculated with *B. thermosphacta*. These molecules come likely from the catabolism of protein from meat and the degradation of metabolites such as lactate, glucose, carnitine, betaine, ...

CONCLUSIONS

⇒ This work showed that -omics technologies (metagenetics and metabolomics) can be used conclusively to study microbial spoilage of minced pork meat

ACKNOWLEDGMENTS

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