31st EFFoST International Conference

DANISH MEAT RESEARCH INSTITUTE

How to reduce cooking time of sous vide cooked pulled pork with proteolytic enzymes

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INTRODUCTION

Sous vide cooking has become more commonly used in both private households, foodservice and in industrial scale. The reason for this success might be the benefits such as low cooking loss, quality improvement and long shelf life of the cooked meat. The benefits are caused by a time and temperature controlled process, often performed at 55-65°C/131-149°F for a prolonged time. If sous vide cooking is to be optimized for large-scale production, the cooking time must be reduced and productivity increased.

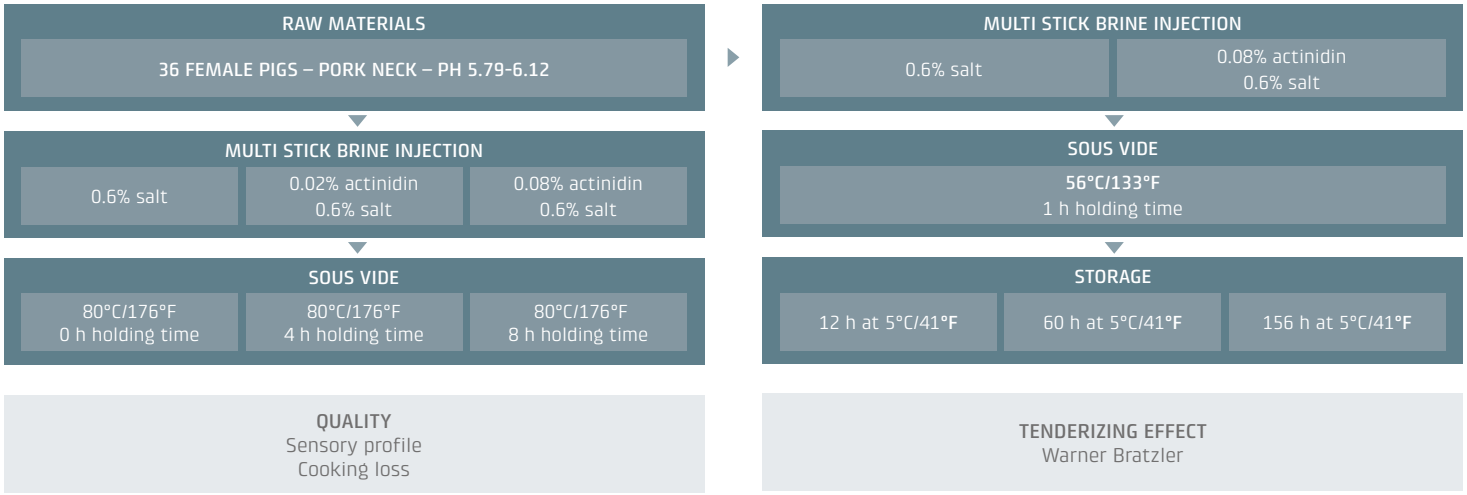
AIM

Investigate cooking time reduction by actinidin (Ingredient Resources, Warriewood, Australia) injection and determine the tenderizing effect of actinidin for process and quality control.

CONCLUSION

Injection of a brine containing actinidin did not affect flavour, colour, juiciness or cooking loss. For pulled pork, it was possible to obtain comparable tenderness at a reduced cooking time of 4 hours, when actinidin was added as a tenderizer. Actinidin did not have any tenderizing effect after heat treatment with sous vide to 56°C/133°F.

MATERIALS & METHODS



RESULTS

Table 1: Sensory attributes of pulled pork with different actinidin concentrations and holding time at 80°C/176°F. Different letters within a row indicate significant difference between treatments at 5% level.

	Actinidin						Reference
Concentration Holding time	0.02% 0 h	0.08% 0 h	0.02% 4 h	0.08% 4 h	0.02% 8 h	0.08% 8 h	0.00% 8 h
Cooking loss	33.6^{a}	36.0^{b}	40.4^{d}	39.4^{cd}	38.8^{c}	38.8^{c}	38.7^{c}
Tenderness	7.6^{a}	7.7^{a}	9.9^{b}	10.4^{bc}	12.4^{c}	12.5^{c}	11.6^{bc}
Pulliness	3.0^{a}	4.3^{b}	9.0^{c}	9.4^{c}	13.2^{e}	13.2^{e}	12.2^{d}
Juiciness	7.2^{a}	7.0^{a}	7.3^{a}	7.2^{a}	7.6^{a}	8.8^{a}	8.0^{a}
Flavour	1.6^{b}	2.0^{b}	2.1^{b}	1.5^{ab}	1.3^{ab}	1.6^{ab}	0.5^{a}
Colour	10.2^{a}	10.3^{a}	10.5^{ab}	11.2^{ab}	11.4^{b}	11.0^{ab}	10.6^{ab}

Injection of actinidin in the pork neck muscle had a positive effect on the tenderness of pulled pork. Tenderness was maintained by using 0.02% actinidin, and the holding time was reduced to 4 hours. Colour, juiciness and flavour were not affected when adding actinidin as a tenderizer, Table 1.

The concentration of actinidin did not have a measurable effect, thus, to optimize the technology, it should be considered to keep the enzymes active for a longer time.

Acknowledgement: This study was supported by the Danish Agency for Institutions and Educational Grants and the Danish Pig Levy Fund. Collaborators are greatly acknowledged.

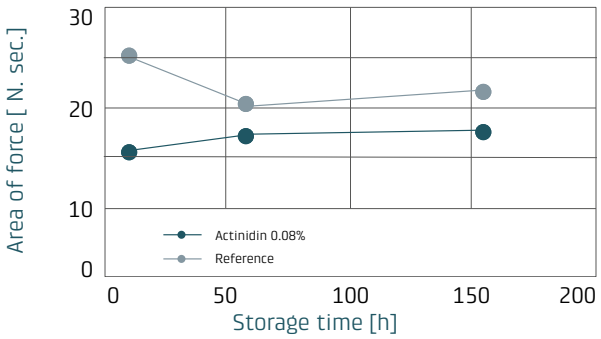


Figure 1: Total force needed to cut through the muscle Serratus ventralis cervicis.

The total force needed to cut through the samples did not change during storage at 5°C/41°F (Figure 1) indicating that the tenderizing effect of actinidin had been stopped.

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