Enzymatic, sensory and microbiological changes in marinated vacuum packedhigh pressure treated pork tenderloins during cold storage.

Søltoft-Jensen, Jakob; Grossi, Alberto

Publication date:
2010

Document version
Early version, also known as pre-print

Enzymatic, Sensory and Microbiological Changes in Marinated Vacuum Packed High Pressure Treated Pork Tenderloins During Cold Storage

Authors & affiliations:

Jakob Søltoft-Jensen, Danish Meat Research Institute – Danish Technological Institute

Alberto Grossi, Faculty of Life Sciences, University of Copenhagen

Abstract: (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text/diagrams into it.)

Introduction

The purpose was to investigate the:

- activity of cathepsins
- sensory properties
- growth of specific spoilage organisms

in marinated, vaccumpacked high pressure processed (HPP) tenderloins during 12 weeks of storage at 2 °C.

Methods

Tenderloins (5% brine-gain containing 10% NaCl). HPP (5°C; 500/600 MPa; 3/6 minutes). Storage (2°C). Analyses (1 day (week 0), 1, 4, 8 and 12 weeks). Non-HPP treated samples as reference. Analyses:

- activity of cathepsins B+L
- sensory assessment after oven roasting
- number of aerobic total count and lactic acid bacteria.

Results

Table 1 Cathepsin activity (n=3) expressed in velocity of the reaction values (I/sec) in HPP-treated tenderloins during storage at 2°C. Ref: non-HPP treated tenderloin.

MPa/min	Week 0 (day 1)	Week1	Week4	Week8	Week12
Ref	16.445				
500/3	21.407	27.848	37.927	27.416	25.765
500/6	22.792	29.614	36.991	33.413	28.117
600/3	25.878	36.362	52.337	40.678	32.937
600/6	28.277	37.58	55.347	47.049	32.948

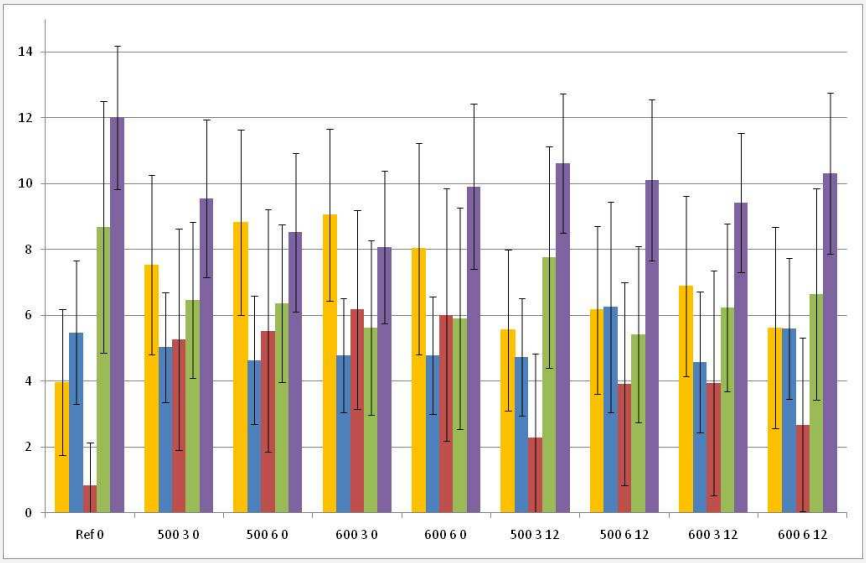

Figure 1 Sensory assessment (n=24) of meat structure (yellow), juiciness (blue), stringiness (red), crumbliness (green) and tenderness (purple) of oven roasted tenderloins after storage at 2°C. (scale 0: low; 15: high). 500 and 600: HPP in MPa; 3 and 6: holding time in minutes; 0 and 12: storage time in weeks. Ref: non-HPP treated tenderloins.

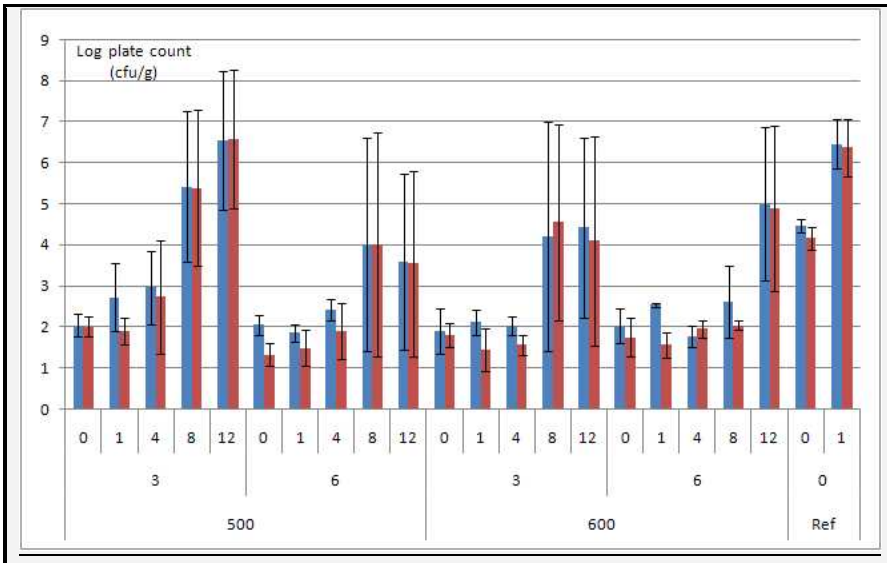

Figure 2 Aerobic total count (blue) and acidic acid bacteria count (red) (n=3) in HPP-treated tenderloins during storage at 2°C. 500 and 600: HPP in MPa; 3 and 6: holding time in minutes.; 0, 1, 4, 8 and 12: storage time in weeks. Ref: non-HPP treated tenderloin.

Discussion

The activity of cathepsins B+L was higher after HPP, increasing with pressure (table 1). The holding time had no effect. HPP treated meat with higher cathepsin activity was not sensorically perceived more tender as expected (Lawrie, 1998; Sikes et al. 2010), but instead more stringy and meat-structured (figure 1). The textural properties were unchanged during storage. Initial bacteria count was reached after 12 weeks of storage (600 MPa/6 min) and after 8 weeks of storage (other combinations) (figure 2). These lag-phases of injured bacteria were shorter than in literature (Aymerich et al., 2008).

References

Aymerich, T., Picouet, P.A., Monfort, J.M. (2008). Decontamination technologies for meat products, *Meat Science*, 78, 114-129.

Lawrie, R.A. (1998). The Conversion of muscle to meat in *Lawrie's Meat Science*, p.114, Woodhead Publishing Services, Sixth Ed., Cambridge, England.

Sikes, A., Tornberg, E., Tume, R. (2010). A proposed mechanism of tenderising post-rigor beef using high pressure-heat treatment, *Meat Science*, 84, 390-399.