

Physico-chemical characterisation of destructured areas in cooked ham

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1. Introduction

Destructured areas in cooked cured ham are of considerable economic interest (Hugenschmidt *et al.*, 2007):

- 7-8 % of the ham slices are affected (→ variations in degree)
- amount up to 1/3 of the total loss of cooked ham production

To what extent can destructured areas in cooked cured ham be characterised by using physical and chemical analyses?

→ of interest: main nutrients, colour, texture, structure

2. Material & Methods

- Production of 2x2 batches of 1 t cooked cured ham each
 - in 2 different meat-processing companies (A, B)
 - from 2 muscles:
 - ▶ *M. biceps femoris* (BF, silverside)
 - ▶ *M. semimembranosus* (SM, topside)
- Samples of normal and destructured areas: always taken from identical muscles
- Chemical analyses (pooled samples): main nutrients, connective tissue (*still open: amino acids, elements*)
- Physical analyses: hardness, pH, colour (CIE L*a*b*), myofibrillar fragmentation index (MFI)
- Statistical analysis: linear mixed model (fixed factors: *defect* (normal / destructured), *muscle* (BF / SM), and *company* (A / B))



Examples for destructured areas in cooked cured ham slices

4. Conclusions

Destructured areas are characterised by:

- Brighter and less intensive colour as well as a soft texture
- Slightly decreased pH ($\Delta = 0.07$ pH-units, significant)
- Elevated dry matter content → lower water holding capacity?
- Reduced content of crude ash and sugar → decreased brine absorption?
- Reduced strength of myofibrils (→ higher MFI, i.e. increased proteolytic activity) and of connective tissue (→ less insoluble connective tissue)

3. Results

Tab. 1: Main nutrient content in cooked cured ham (g/kg fresh[#] or dry matter*, respectively)

Attribute (n = 19)	normal	destruct.	P-value
Dry matter [#]	286	293	0.104
Crude protein*	795	814	0.002
Crude fat*	79.9	79.5	0.913
Crude ash*	111	101	0.102
Sugar*	26.8	24.2	0.034

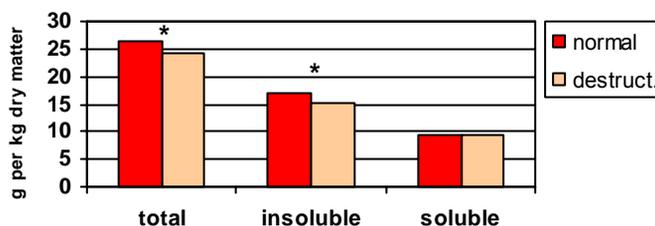


Fig. 1: Content of connective tissue protein (= 8-hydroxyproline) in cooked cured ham (* P < 0.001)

Tab. 2: Physical analyses of cooked cured ham

Attribute	normal	destruct.	P-value
L* value (n = 87)	55.9	66.6	0.000
a* value (n = 87)	13.6	9.6	0.000
b* value (n = 86)	9.5	10.1	0.014
pH (n = 87)	5.95	5.88	0.000
MFI (n = 37)	61.7	78.1	0.000
Hardness [N] (n = 87)	0.08	0.05	0.000

Influence of processing company / type of muscle:

Significant (P ≤ 0.05) for several of the upper-mentioned attributes

Possible colour variations in the raw material (topside) of cooked ham



Literature:
Hugenschmidt G., Hadorn R., Suter M., Scheeder M., Wenk C., 2007: Anteil und Schweregrad destrukturierter Zonen in Kochschinken. Fleischwirtschaft, 9, 100-103.