

The effect of the addition of chilli pepper fruits and refrigerated storage time on the quality of pasteurised canned meat

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Electronic supplementary material

Supplementary Figure S1 (A,B)

Supplementary Table S1

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Sample preparation. The experimental material was canned pork prepared according to the following proximate composition: ham (40%), hock (32%), bacon (20%), hock skin (8%), salt (1% relative to total meat weight) and water (1% relative to total weight of the meat mass). Four variants of canned pork were prepared: control (C – no additives), with ground chili peppers (CHP – 3% relative to total weight), with sodium ascorbate (AS – 0.5 g·kg⁻¹), and with butylated hydroxytoluene (BHT – 0.2 g·kg⁻¹).

Chili peppers fruit were rinsed under running water, the top part with the stalk was cut off, peppers were sliced, seeds were removed, and peppers were ground in the Robot Coupe model R301 food processor (Vincennes, France).

Meat was cleaned, diced (20 × 20 × 20 mm), preserved with dry salt (1% salt relative to meat weight) and stored at a temperature of 4 °C for 24 h. After storage, meat was ground in the MESKO-AGD KU2-4E grinder (Skarżysko-Kamienna, Poland) with a 5 mm grinding plate. Ham, hock and bacon were ground once, and hock skin was ground three times. Every ground component was stirred separately in the IZI MANKIEWICZ SP-100A-B

mixer (Poland) for 10 min. The components were combined and mixed for another 10 min to produce a homogenous mass, which was divided into four portions. The additives (chili peppers, sodium ascorbate and BHT) were first combined with 1% water and next with a small portion of the meat mass, and then the remaining meat was added to thoroughly combine all ingredients. The meat mass with additives was stirred for 20 min in the meat mixer. Meat samples of 180 g each (net weight) were placed in sterilized glass jars with a volume of 235 mL.

Jars were pasteurized in the Rational SCCWE-101 convection oven/steamer (Landsberg am Lech, Germany) with 100% steam saturation at 100 °C for 90 min. After pasteurization, jars were immediately cooled in ice water with a temperature of 0 °C (water + ice cubes) until the achievement of room temperature of approximately 20 °C and stored at 5 °C. Canned meat was analyzed after 24 h (day 0) and after 10, 20, 30, 40 and 50 days of refrigerated storage (*n* = 16 meat jars per formulation per storage time). The experiment was conducted twice and analyses were performed in replicates.

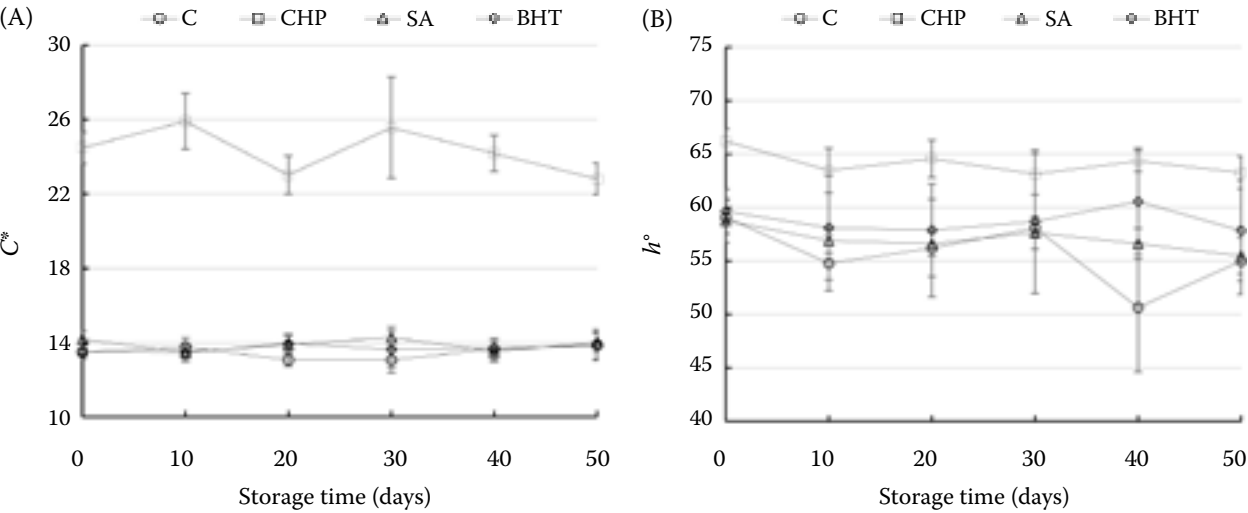


Figure S1. The effect of the formulation and storage time on the colour parameters of canned meat: (A) *C*^{*} (chroma); (B) *h*[°] (hue angle)

Samples: C – control; CHP – with chilli peppers; SA – with sodium ascorbate; BHT – with butylated hydroxytoluene

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Table S1. The effect of additives and storage time on the sensory quality of canned meat (mean ± SD)							
Samples	Storage time (days)					Effect	P
	0	10	20	30	40		
Intensity of fatty aroma							
C	4.90 ± 0.74 ^{aAB}	5.00 ± 1.15 ^{aB}	5.00 ± 0.94 ^{aBC}	5.20 ± 0.92 ^{aBC}	5.20 ± 1.14 ^{aC}	additives (A)	< 0.001
CHP	3.80 ± 0.92 ^{cA}	3.60 ± 0.52 ^{bca}	3.60 ± 0.52 ^{bcA}	3.70 ± 0.82 ^{cA}	2.70 ± 0.67 ^{abA}	storage time (T)	< 0.001
SA	5.50 ± 1.18 ^{bcb}	5.10 ± 1.10 ^{bcb}	5.40 ± 0.97 ^{bcb}	5.90 ± 0.74 ^{cC}	4.60 ± 0.52 ^{bBC}	A × T	NS
BHT	4.60 ± 0.97 ^{aAB}	4.30 ± 0.82 ^{aAB}	4.30 ± 0.48 ^{aAB}	4.50 ± 0.53 ^{aAB}	3.80 ± 0.79 ^{aB}		
Intensity of off-odour							
C	1.00 ± 0.00 ^{aA}	1.00 ± 0.00 ^{aA}	1.10 ± 0.32 ^{aAB}	1.40 ± 0.52 ^{aAB}	2.20 ± 0.42 ^{bb}	additives (A)	< 0.001
CHP	1.00 ± 0.00 ^{aA}	1.00 ± 0.00 ^{aA}	1.00 ± 0.00 ^{aA}	1.00 ± 0.00 ^{aA}	1.00 ± 0.00 ^{aA}	storage time (T)	< 0.001
SA	1.00 ± 0.00 ^{aA}	1.00 ± 0.00 ^{aA}	1.40 ± 0.52 ^{abAB}	1.60 ± 0.52 ^{bb}	1.70 ± 0.48 ^{abAB}	A × T	< 0.001
BHT	1.00 ± 0.00 ^{aA}	1.60 ± 0.70 ^{aB}	1.50 ± 0.53 ^{aB}	3.10 ± 0.57 ^{bc}	3.20 ± 1.03 ^{bc}		
Intensity of off-flavour							
C	1.00 ± 0.00 ^{aA}	1.20 ± 0.42 ^{aAB}	1.50 ± 0.53 ^{abAB}	2.00 ± 0.00 ^{bcb}	2.30 ± 0.48 ^{cb}	additives (A)	< 0.001
CHP	1.00 ± 0.00 ^{aA}	1.00 ± 0.00 ^{aA}	1.00 ± 0.00 ^{aA}	1.00 ± 0.00 ^{aA}	1.00 ± 0.00 ^{aA}	storage time (T)	< 0.001
SA	1.00 ± 0.00 ^{aA}	1.70 ± 0.48 ^{bB}	1.70 ± 0.48 ^{bb}	2.20 ± 0.42 ^{bcb}	2.30 ± 0.48 ^{cb}	A × T	< 0.001
BHT	1.00 ± 0.00 ^{aA}	1.80 ± 0.79 ^{abB}	2.10 ± 0.74 ^{bb}	3.60 ± 1.17 ^{cC}	3.90 ± 0.57 ^{cC}		
Juiciness							
C	6.90 ± 1.29 ^{bBC}	5.70 ± 0.67 ^{aAB}	5.80 ± 1.14 ^{abA}	5.60 ± 0.70 ^{aA}	5.80 ± 0.42 ^{abA}	additives (A)	< 0.001
CHP	7.20 ± 1.14 ^{aC}	6.70 ± 0.95 ^{aB}	6.90 ± 0.88 ^{aB}	6.80 ± 1.23 ^{aB}	6.40 ± 0.84 ^{aA}	storage time (T)	< 0.01
SA	5.40 ± 0.97 ^{aA}	5.40 ± 1.17 ^{aA}	5.60 ± 0.97 ^{aA}	5.30 ± 1.06 ^{aA}	5.60 ± 0.84 ^{aA}	A × T	NS
BHT	5.60 ± 1.35 ^{abAB}	5.90 ± 0.74 ^{bAB}	5.90 ± 0.57 ^{baB}	6.00 ± 0.67 ^{bAB}	6.00 ± 0.94 ^{ba}		
Softness							
C	6.60 ± 1.17 ^{aA}	6.50 ± 0.97 ^{aA}	6.60 ± 0.52 ^{aA}	6.80 ± 1.40 ^{aA}	6.50 ± 0.97 ^{aA}	additives (A)	< 0.001
CHP	7.40 ± 0.84 ^{aA}	7.10 ± 0.57 ^{aA}	7.10 ± 0.88 ^{aA}	7.20 ± 0.79 ^{aA}	7.40 ± 0.70 ^{aA}	storage time (T)	< 0.05
SA	6.70 ± 1.16 ^{aA}	6.40 ± 0.84 ^{aA}	6.50 ± 0.97 ^{aA}	6.60 ± 0.84 ^{aA}	6.70 ± 1.06 ^{aA}	A × T	NS
BHT	6.80 ± 1.03 ^{ba}	6.50 ± 1.08 ^{abA}	6.30 ± 0.48 ^{abA}	6.30 ± 1.06 ^{abA}	6.40 ± 0.70 ^{abA}		

Table S1. The effect of additives and storage time on the sensory quality of canned meat (mean ± SD)

4 Table S1. To be continued

Samples	Storage time (days)					Effect	P	
	0	10	20	30	40			50
Intensity of fatty taste								
C	5.90 ± 2.28 ^{ab}	5.50 ± 1.51 ^{ab}	5.30 ± 1.57 ^{ab}	5.80 ± 1.03 ^{aC}	4.70 ± 0.67 ^{ab}	4.90 ± 0.88 ^{ab}	additives (A)	< 0.001
CHP	3.50 ± 0.71 ^{aA}	3.40 ± 0.97 ^{aA}	3.20 ± 0.92 ^{aA}	3.30 ± 0.48 ^{aA}	3.00 ± 1.76 ^{aA}	2.80 ± 0.79 ^{aA}	storage time (T)	< 0.001
SA	4.90 ± 0.88 ^{bAB}	4.60 ± 0.52 ^{bAB}	4.70 ± 0.82 ^{bbB}	4.70 ± 0.48 ^{bbB}	4.40 ± 0.52 ^{bbB}	3.40 ± 0.97 ^{aA}	A × T	NS
BHT	5.80 ± 0.79 ^{dB}	5.00 ± 0.82 ^{cdB}	4.40 ± 0.52 ^{bcAB}	4.50 ± 0.71 ^{bcB}	3.80 ± 0.79 ^{abAB}	3.10 ± 0.74 ^{aA}		
Intensity of chili pepper aroma								
C	NE	NE	NE	NE	NE	NE	additives (A)	NE
CHP	6.00 ± 1.15 ^a	6.20 ± 1.14 ^a	6.10 ± 1.10 ^a	6.10 ± 0.57 ^a	6.40 ± 0.52 ^a	6.50 ± 0.71 ^a	storage time (T)	NS
SA	NE	NE	NE	NE	NE	NE	A × T	NE
BHT	NE	NE	NE	NE	NE	NE		NE
Intensity of chili pepper taste								
C	NE	NE	NE	NE	NE	NE	additives (A)	NE
CHP	8.10 ± 0.74 ^a	8.10 ± 0.88 ^a	7.70 ± 0.67 ^a	7.90 ± 0.99 ^a	7.90 ± 1.37 ^a	7.00 ± 0.82 ^a	storage time (T)	NS
SA	NE	NE	NE	NE	NE	NE	A × T	NE
BHT	NE	NE	NE	NE	NE	NE		NE
Overall quality								
C	7.80 ± 0.92 ^{bAB}	7.30 ± 0.82 ^{abA}	7.30 ± 1.34 ^{abA}	7.30 ± 0.95 ^{abB}	7.30 ± 1.16 ^{abB}	6.00 ± 0.82 ^{ab}	additives (A)	< 0.001
CHP	8.80 ± 0.92 ^{ab}	8.60 ± 0.70 ^{abB}	8.50 ± 0.53 ^{abB}	8.50 ± 0.53 ^{aC}	8.80 ± 0.63 ^{aC}	8.60 ± 0.84 ^{ab}	storage time (T)	< 0.001
SA	7.70 ± 0.95 ^{aAB}	7.70 ± 0.67 ^{aAB}	7.20 ± 0.92 ^{aA}	7.20 ± 0.92 ^{ab}	7.50 ± 0.85 ^{ab}	7.20 ± 0.92 ^{aC}	A × T	< 0.01
BHT	7.20 ± 1.40 ^{bA}	7.20 ± 0.92 ^{bA}	6.80 ± 0.92 ^{bA}	6.00 ± 0.94 ^{abA}	6.00 ± 1.25 ^{abA}	4.80 ± 0.79 ^{aA}		

Samples: C – control; CHP – with chili pepper; SA – with sodium ascorbate; BHT – with butylated hydroxytoluene; NS – not significant ($P > 0.05$); NE – not estimated; a–d – mean values within the row followed by the different letters are significantly different at $P < 0.05$; A–D – mean values within the column followed by the different letters are significantly different at $P < 0.05$; intensity of aromas and tastes (1 – undetectable, 10 – very intense); juiciness (1 – dry, 10 – very juicy), softness (1 – hard, 10 – very soft) and overall quality (1 – poor, 10 – very high)