QUALITY ASSESSMENT OF SOME ASSORTMENTS OF CHICKEN BREAST PASTRAMI

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Abstract

The purpose of this paper was the comparative assessment of the quality of some assortments of chicken breast pastrami sold in Romania. Two batches from five manufacturer of chicken breast pastrami were taken in the study: Marcel, Aldis, Caroli, Jumbo, Prodprosper, coded from A to E. Sensory (five-point scale method) and physico-chemical properties were analyzed. Were determined the pH of the products, the content of water, lipids, proteins, collagen and salt (with the Food-Check infrared spectrophotometer). The results showed significant differences between products in terms of fat content (between 0.9% and 5.5%), the variability was lower for proteins (between 21.1% and 21.9%) and water content (between 72.9% and 76,1%). The salt content had the highest value of 4.03%, exceeding the maximum standard limit, only in the case of C product. The pH value varied between 5.49 for E product, and 6.28 for B product. The results of the sensory analysis revealed a minimum score for product E (12.58 points/ "satisfactory product" according to quality standards), compared to product D which obtained the best score among all the analyzed assortments (18.06 points/ "very good product ").

Key words: *quality, chicken meat, pastrami, sensory*

Meat and meat products, are of important in terms of adequate and balanced nutrition and known as a good source of protein, B vitamins and iron. Pastrami is a meat product obtained by subjecting all the muscles extracted from certain parts of animal carcasses to various processes and made ready for consumption by cutting them into thin slices. Salt brought together with pastrami in the curing step dissolves functional myofibrillar proteins, increasing the water-holding capacity and binding properties of proteins as well as its concentration-dependent bacteriostatic effect, which plays a critical role in establishing microbial stability in pastrami (Gurun G., *et al,* 2021).

Chicken breast meat is recognized as a healthy food source with an excellent nutrient composition (Jung D.Y., *et al,* 2022; Da Silva *et al,* 2017). It is high in protein content and low in cholesterol and fat content, as well as low in calories (Kim H.J., *et al*, 2020). Therefore, in terms of nutrition, it is more attractive to the modern health-conscious consumer (Petracci M., *et al*, 2014). With the increasing trend in wellness-oriented consumerism, the consumption of chicken breast meat has increased along with the consumers' interest in improving meat quality such as texture, flavor, juiciness, appearance, health, organic, and safety (Henchion M., *et al,* 2014). The consumer's request for animal welfare during the meat production process has raised the question as to whether animal-friendly rearing has an impact on the meat quality (Enfalt *et al,* 1997; Lin et al., 2014; da Silva *et al,* 2017). A method of valorization with added value to poultry meat is represented by the processing of chicken breast through heat treatment and smoking.

The purpose of this paper was the comparative assessment of the quality of some assortments of chicken breast pastrami sold in Romania.

MATERIAL AND METHOD

Two batches from five manufacturer of chicken breast pastrami were taken in the study: Marcel, Aldis, Caroli, Jumbo, Prodprosper, coded from A to E. Sensory (five-point scale method) and physico-chemical properties were analyzed. Were determined the pH of the products, the content of water, lipids, proteins, collagen and salt (with the Food-Check infrared spectrophotometer). The data obtained were statistically processed, applying the *t-test* and *ANOVA* multiple comparison/Graph Prism 10.3.1.

The evaluation of the sensory quality was carried out in the Sensory Analysis Laboratory of USV Iasi by the participation of a group of 41 students in food engineering, each receiving an individual sheet (*table 1* and *table 2)* according to the professional standard for meat industry (SP 3196-83).

Prior to analysis, the samples were brought to a temperature of 18-21°C, according to the provisions of the professional/product standards.

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The evaluation of each sensory characteristic was performed by comparing with scoring scales of 0-5 points, by obtaining the total average score for all the characteristics examined by the group of tasters and by comparing it with a scale from 0 to 20 points for weighted average score obtained after tasting (*table 2*).

Table 1

The sensory characteristics of meat products

Score	Positive and negative characteristics
5	Very good = specific positive characteristic, very well defined. It does not present any kind of lacks or perceptible defects.
4	Good = specific positive characteristic, quite defined, but also very small, insignificant shortcomings or defects.
3	Satisfactory = specific positive characteristic, poorly outlined and small deficiencies or defects; the quality is at the minimum level allowed by the standard.
2	Unsatisfactory = lacks or defects in the appropriation, does not meet the minimum condition in the standard, but can be used under certain conditions.
1	Bad = lacks or defects in the property such that it can no longer be used for consumption except after appropriate processing (if possible).
0	Altered = specific obvious defects of the altered product – it cannot be used as food.

Table 2

The quality class of meat product

Total average score	Quality
18.01 ÷20	Very good
15.01÷18	Good
11.01÷15	Satisfactorily/acceptably
7.01÷11.0	Unsatisfactory
0÷7	Altered

The analysis of shape- appearance and color is performed in natural light. The appearance and color were examined on the outside of the products, then on the inside.

The smell analysis was performed by simple inspiration.

The tasting of the samples was done carefully, without haste, with relaxation breaks of about 2 minutes between the portions of the sample; 5-10 g of product were taken for tasting.

Before and after tasting each sample, the tasters rinsed the oral cavity with drinking water to eliminate the remaining taste.

RESULTS AND DISCUSSIONS

From the analysis of ingredients (*table* 3), it is observed that three out of five producers (A, B and D), added monosodium glutamate (a controversial flavor enhancer that should not be present in high-quality meat products), thus emphasizing the distrust of educated consumers in this regard in the loyalty of industrial production practices, specific to ready-to-eat meat preparations. The same three manufacturers added carbohydrates in the form of maltodextrins, dextrose and in addition glucose (D product), which deceives the consumers, also enhancing the flavors. Producer B had also added flavors, without the legal obligation to present them on the label.

Table 3

The ingredients of the products analyzed

Ingredients	A	B	C	D	E
Chicken breast	85%	91%	?	?	90%
Water	?	?	?	?	?
Salt	Salt	Salt	Salt	Salt	Salt
Stabilizers	sodium diphosphate, sodium triphosphate	sodium polyphosphates	diphosphates, triphosphates, polyphosphates	triphosphates, polyphosphates	polyphosphates
Thickening agents	carrageenan	carrageenan	xanthan gum	carrageenan	-
Sugars	maltodextrins, dextrose	dextrose, maltodextrin	-	dextrose, glucose, maltodextrin	-
Flavor enhancers	sodium monoglutamate	sodium monoglutamate	-	sodium monoglutamate	-
Antioxidants	sodium ascorbate	ascorbic acid	sodium erythorbate	sodium erythorbate	sodium erythorbate
Preservatives	sodium nitrite	-	sodium nitrite	sodium nitrite+sulfites	sodium nitrite
Dyes	carmine	carmine	-	carmine	paprika emulsion
Other ingredients	paprika extract	soy protein, potato extract, spices and spice extracts, flavors?	starch, spices	spice extract, vegetable soy protein	polyphosphates

Following the sensory evaluation of the five products studied (*figure* 1), it was observed that product D had the highest score, being the most appreciated by the tasters (by average 4.6 points for smell, 4.5 points for taste and global assessment, and 4.4 points for color and appearance). Close values were obtained by the products A, B and C. The smallest average score was obtained by the product E (3.6 points for appearance, 3.3 points for color, 3.2 for global assessment and 3.1 for taste and smell.

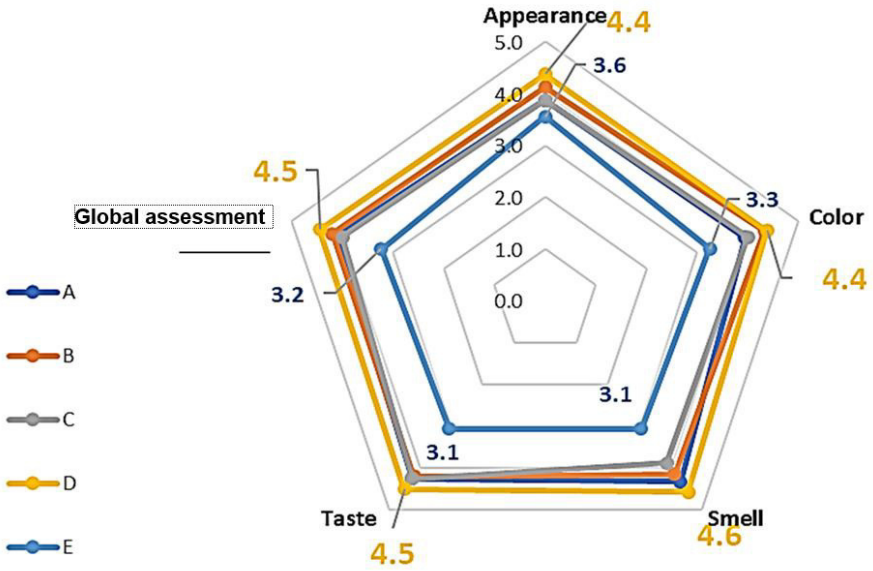


Figure 1 **The average score for the product studied**

Total weighted score for the product studied (*figure* 2) classified the products into three quality classes, based on the values obtained. Thus, three products A, B and C were classified into the quality class "good products", one product (product E) was into "satisfactory /acceptably" quality class and only one product (product D) was classified into the quality class "very good" product, at the lower limit (with 18.06 weighted score), otherwise showing the lack of high quality of this product's analyzed.

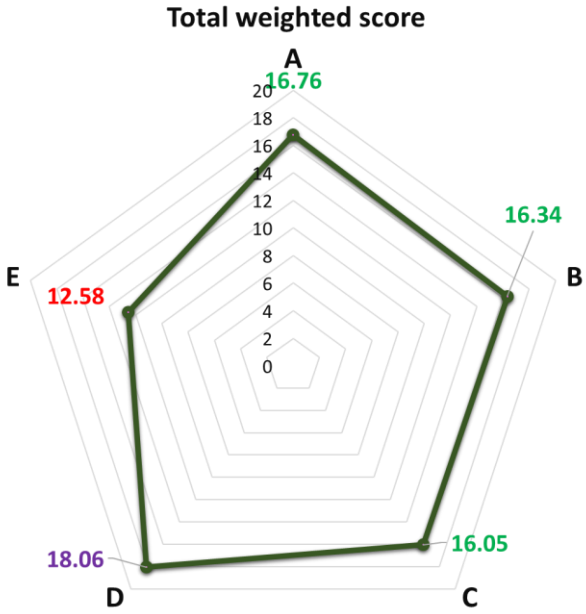
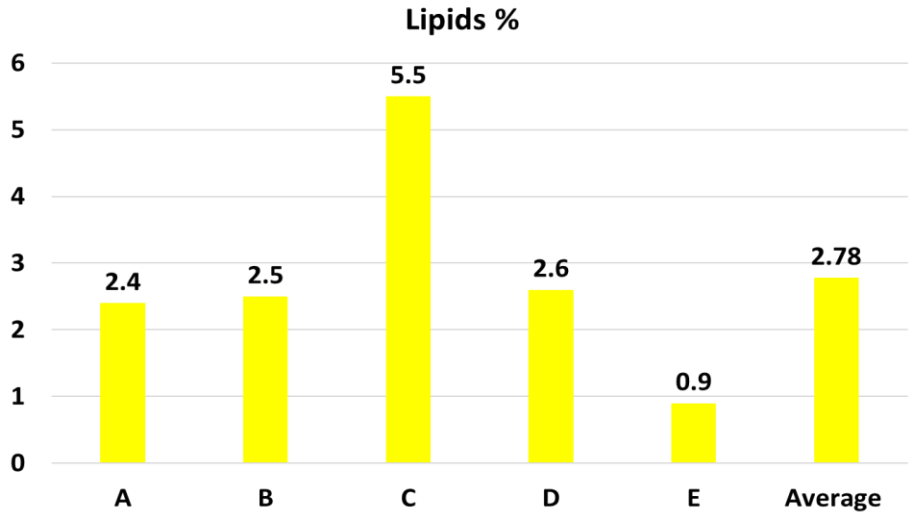


Figure 2 **Total weighted score for the product studied**

The content of lipids in the five products analyzed show very significant differences between E product and the other four products (*figure* 3).

The highest amount of lipids was observed in C product, 5.5%, surprisingly high compared to the other products analyzed, being the only product that had added starch in its composition, (this fact being found in the list of ingredients); a possible explanation would be that starch binds the fats in the products, thus there is no lipids loss through the applied heat treatment compared to A, B, D and E products.

The lowest lipid content was found in product E (0.9%), being the only product, of those analyzed, that did not have a thickening agent added to the ingredients.



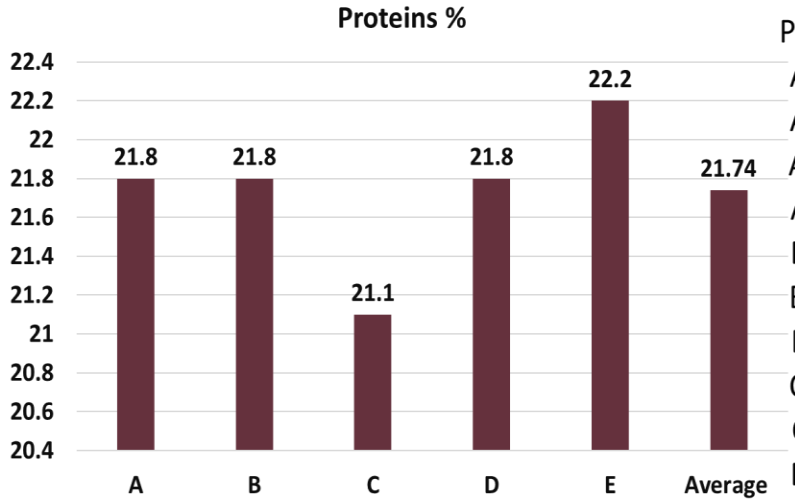
Lipids %	Signif.
A vs B	ns
A vs C	**
A vs D	ns
A vs E	***
B vs C	**
B vs D	ns
B vs E	***
C vs D	**
C vs E	***
D vs E	***

Figure 3 **The lipids content of the product studied**

The highest content of proteins (*figure* 4) was found in product E (22.2%) and the lowest in the product C (21.1%), being inversely proportional to the amount of lipids determined.

Statistically, the differences were predominantly insignificant between the products analyzed, and distinctly significant between products A vs B, A vs C, and A vs E.

On average

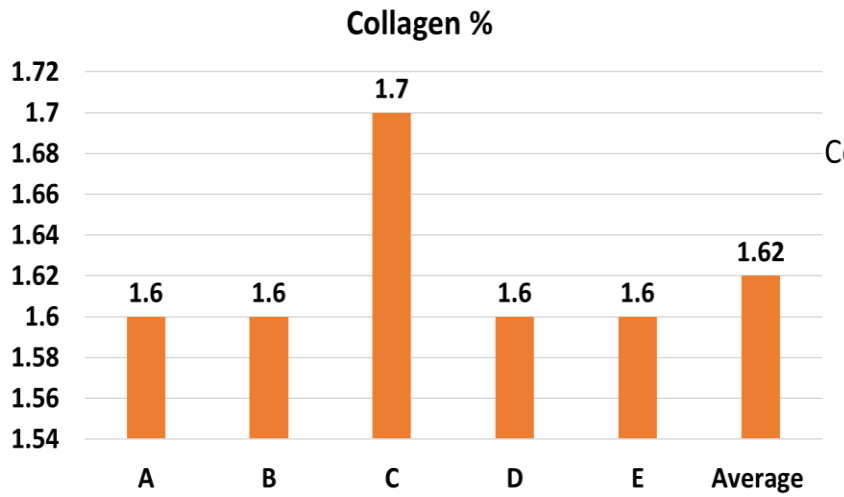


Proteins	t	p	Signif.
A vs. B	4.97	<0.001	**
A vs. C	4.20	0.00	**
A vs. D	1.29	0.23	ns
A vs. E	4.97	<0.001	**
B vs. C	0.29	0.78	ns
B vs. D	0.60	0.56	ns
B vs. E	0.00	1.00	ns
C vs. D	1.54	0.16	ns
C vs. E	0.00	1.00	ns
D vs. E	0.00	1.00	ns

Figure 4 **The proteins content of the product studied**

The collagen content of the studied products (*figure* 5) was higher in product C compared to the rest of the products, being the same (1.6% average values) with an average of 1.62% for all five products. The statistically differences for collagen were predominantly insignificant between the products analyzed, and distinctly significant between products A vs C, and C vs E.

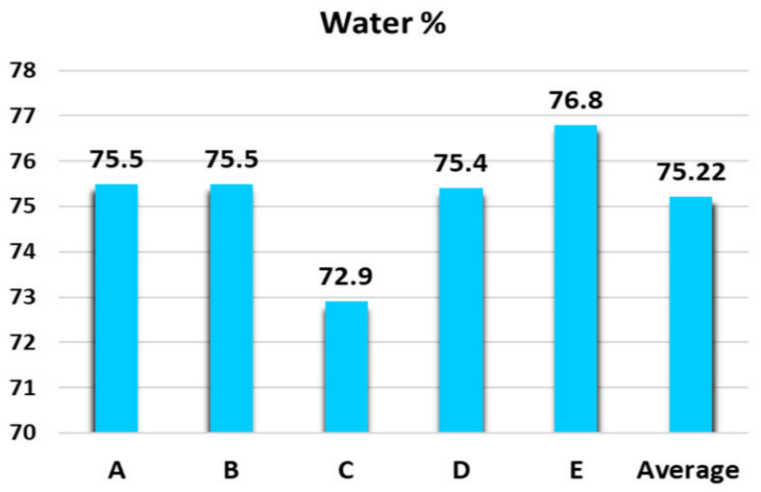
The water content (*figure* 6) was the highest for E product (76.8 %) and smallest for C product (72.9%) being inversely proportional to the lipid content (*figure* 3) and in close correlation with the protein content (*figure* 4) of the analyzed products.



Collagen %	t	p	Signif.
A vs B	0.52	0.617	ns
A vs C	2.552	0.034	**
A vs D	0.053	0.959	ns
A vs E	1.683	0.133	ns
C vs E	3.177	0.013	**

Figure 5 **The collagen content of the product studied**

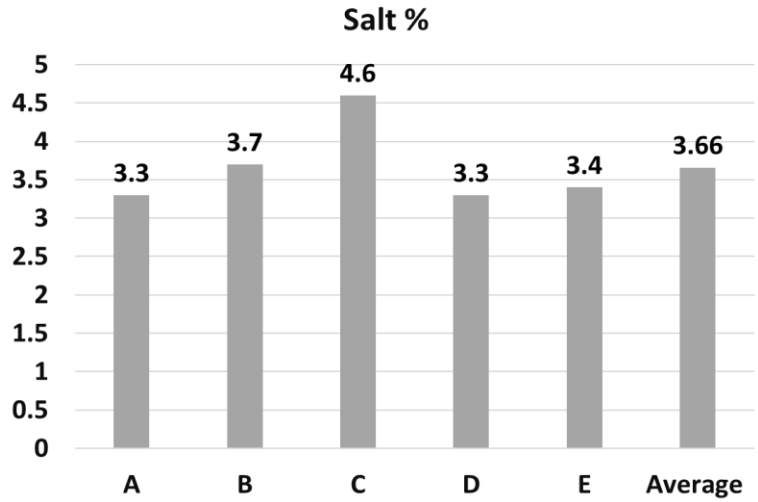
The statistically differences for water content were predominantly insignificant between the products analyzed, and significant between products A vs C, B vs C and C vs E.



Water %	t	p	Signif.
A vs B	0.168	0.872	ns
A vs C	9.980	0	*
A vs D	0.292	0.781	ns
A vs E	2.005	0.078	ns
B vs C	9.972	0	*
B vs D	0.16	0.876	ns
B vs E	2.959	0.018	*

Figure 6 **The water content of the product studied**

The salt content (*figure* 7) was highest for C product 4.6%, exceeding the maximum standard limit, followed by B product with 3.7 %. Products A, D and E had similar mean value for salt content (3.3 to 3.4), with an average value of 3.66%.



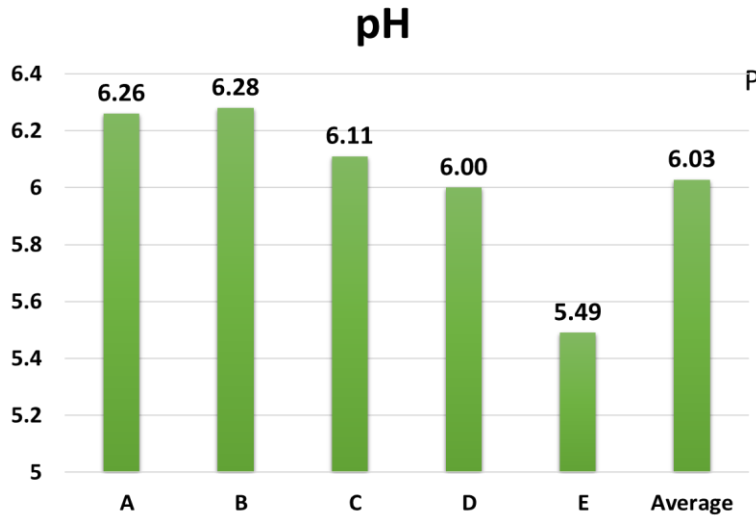
Salt	t	p	Signif.
A vs. B	2.67	0.03	**
A vs. C	2.00	0.08	*
A vs. D	0.33	0.75	ns
A vs. E	0.00	1.00	ns
B vs. C	1.00	0.35	ns
B vs. D	0.25	0.81	ns
B vs. E	0.00	1.00	ns
C vs. D	1.50	0.16	ns
C vs. E	1.00	0.35	ns
D vs. E	0.00	1.00	ns

Figure 7 **The salt content of the product studied**

The statistically differences were predominantly insignificant, with the exception of A vs B products where distinctly significant differences were highlighted, and A vs C products, where significant differences were found.

The pH values (*figure* 8) of the products analyzed was smallest for E product (5.49) and highest for B and A products (6.26 for A product and 6.28 for B product).

The mean values were 6.03 for all products studied. The pH value indicates a good state of freshness of the analyzed products.



Products	t	p	Signif.
A vs. B	0.37	0.717	ns
A vs. C	2.256	0.052	*
A vs. D	2.905	0.015	**
A vs. E	5.295	<0.001	**
B vs. C	1.649	0.144	ns
B vs. D	2.297	0.048	**
B vs. E	4.811	<0.001	**
C vs. D	0.735	0.486	ns
C vs. E	3.979	0.002	**
D vs. E	1.827	0.093	ns

Figure 8 **The pH value of the product studied**

The statistically differences were distinct significant for A vs D and E products, for B vs D and E product and C vs E products. Significant differences were found for A vs C products and insignificant differences for A vs B, B vs C, C vs D, and D vs E.

CONCLUSIONS

The results showed significant differences between products in terms of fat content (between 0.9% and 5.5%), the variability was lower for proteins (between 21.1% and 21.9%) and water content (between 72.9% and 76.1%).

The salt content had the highest value of 4.03%, exceeding the maximum standard limit, only in the case of C product.

The pH value varied between 5.49 for E product, and 6.28 for B product.

The results of the sensory analysis revealed a minimum score for product E (12.58 points/ "satisfactory product" according to quality standards), compared to product D which obtained the best score among all the analyzed assortments (18.06 points/ " very good product ").

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