

PE4.115 The influence of skin emulsions on sensory quality of meat products 430.00

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I. INTRODUCTION

In Central and Eastern Europe, pork skins are in meat industry being processed especially for so called skin emulsions (SE), which are then added into many types of meat products. The amount of the skin emulsion additive influences not only technological and economical features, but also sensory qualities of meat products.

SE is not an emulsion per se, but this is the common term used in Central and Eastern Europe. SE is mixture of expand skin in acid water with phosphate, emulgators, salt, water and chopped into pudding-like structure. SEs are made mainly of pork, but also of chicken skin. They are added into meat products especially to improve their texture and to lower their price. The addition of SE fluctuates in application recipes between 10 and 50 %. The production process of SE uses the ability of collagen to expand in acid solutions, in more concentrated solutions it dissolves /Pipek, 1995/. On the other hand, collagen is insoluble in water, as well as in salt and phosphor solutions /Feiner, 2006/. The skins are being soaked in an organic acid solution - the most commonly used ones are: milk, vinegar, lemon, or wine acids and their combinations. When soaking, the skins swell and absorb an amount of water that is approximately equal to half of their weight. Once saturated, the skins provide less wear and tear to the machinery (cutter) during further processing. The skins should be soaked for at least 24 hours, maximally 7 days (even longer when stored appropriately). Before the production of SE the skins are taken out of the solution and cut at high revolutions with ice, nitric salt and emulsifiers until a fine emulsion with pudding-like structure is made. An especially soft structure of the emulsion can be achieved while using of mincer (Schnell cutter). During the emulsification, some of the allowed colouring substances can be added /Juchnevi?, 1998, Ranken, 2000/. This emulsion is put in a cooling box and is further used during the production of

sausages, salami, pates, ham, canned meat etc. Production of the emulsion without a previous soaking is not very common because the required fine consistency of the emulsion is not achieved because of remaining uncut pieces. The consuming of meat products with SE is seen as positive mainly from the dietetic point of view. Pathological and degenerative forms of collagen can cause an amount of connective tissues which affect joints, skin, heart, veins etc /Pánek et. al., 2002/. An addition of different amount of skin emulsion also has an influence on the sensory quality of the product.

II. OBJECTIVES

The objective of this experiment was to rate the sensory quality of meat products (junior-pariser, sausage) made with a different amount of added SE. This rating was to be done by trained judges.

III. MATERIAL AND METHODS

Fresh pork skins were used for the production of skin emulsion (SE). These were soaked in a mixture of organic acids for 24 hours and further processed according to the procedure below /Table 1, Table 2/. The final rate between skins and the added water for producing SE was 1:1.5.

The recipe for the meat production is shown below /Table 3/. The SE was then added at different rates (+10, 20, 30, 40, and 50 %; + control sample without SE). A finely cut product was stuffed into artificial casings (caliber 70 mm-type junior or pariser) and natural pork casing (sausage). The products were heat-processed through smoking and cooking and consequently cooled down through showering to the temperature approx. 5 °C. Table 1 Dosage of Raw Materials and Additives while soaking of the skins Table 2 Dosage of Raw Materials and the Technological Procedure of the SE Production Table 3 The original recipe for the product The evaluation took place in the sensory laboratory of the company

TRUMF International s.r.o. and in the sensory laboratory at the Tomas Bata University in Zlin. The number of the trained judges was 106, their age was between 16 and 65 years. For the rating itself the samples were coded with a four-digit number. A five-position scale was used with a standard vector of 5 points (5 being the most pleasant and 0 being the least pleasant sample). White bread and water were used as neutralizers. The results are displayed in tables /Table 4, Table 5/ and a web chart /Chart 1, Chart 2/ (a transcription on a 100-point scale for better illustration). The results were interpreted as statistically significant ($P < 0.05$, $P < 0.01$). Table 4 Results of sensory rating pariser in artificial casing with a different SE addition Chart 1 The result projection of the sensory rating of pariser in artificial casing in a web chart Table 5 Results of sensory rating of sausages in natural pork casing with a different SE addition Chart 2 The result projection of the sensory rating of sausages in natural pork casing in a web chart

IV. RESULTS

In the sensory rating of products made in artificial casing (junior, pariser) it was found, that the colour, smell, texture, taste, and the overall acceptability were the best rated in samples with the addition of 30% skin emulsion (SE). On the contrary, the worst were those with 50% of added SE. The differences except for the smell were statistically highly significant ($P < 0.01$).

In the sensory rating of the products made in natural pork casing all the descriptors were the worst rated in the samples with 50 and 40% added SE. The colour was rated as the best without an SE additive and the smell in the sample with 30% of added SE. The texture, taste, and the overall acceptability were rated as the best with 30% added SE, while the overall

acceptability was also very positive with a 20% additive.

V. CONCLUSION

Among the sausages type junior or pariser in artificial casing the most pleasant sensory rating was granted to the sample with the additive of 30% skin emulsion (SE). On the contrary, the worst rating was submitted to samples with 50 and 40% SE. Samples without added SE were rated average. In the sausages in natural pork casing a decrease of colour intensity was notable with increasing amount of added SE. Other descriptors (smell, texture, taste, and the overall acceptability) were rated the best in the samples with 30 and 20% SE. The worst rating was assigned to sausages with 50 and 40% SE. The stated results imply that the addition of SE up to 30% has a positive influence on sensory quality of meat products. The addition over 30% was not rated positively. The use of SE is important in meat industry not only from the technological and economical point of view, but also - as shown by the results of this experiment - from a sensory point of view.

SOURCES

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4. Pipek, P. (1998): Technologie masa II, Praha: Karmelitánské nakladatelství, 1. ed., 360 s., ISBN 80-7192-283-8.
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Table 1 Dosage of Raw Materials and Additives while soaking of the skins

Used raw materials and additives	Raw materials weight in kg
Pork skin	100
Drinking water	100
Mixture of organic acids	3

Table 2 Dosage of Raw Materials and the Technological Procedure of the SE Production

Used raw materials	Raw materials weight in kg
Soaked pork skins	150
Ice	100
Used additives	
Nitric salt mixture	7
Mixture of emulsifiers, phosphates and other additives	2.5
Technological procedure:	
<ol style="list-style-type: none"> 1. Soaked skins (or another collagen material) is to be weighed before cutting, the amount of ice is determined. We will obtain the correct amount of ice from this figure: 250 – weight of soaking skins = amount of ice. 2. The soaked skins are put in the cutter and are cut at high revolution until the temperature 35 °C is achieved. 3. Then 1/2 of the ice, and the emulsifier mixture is added. It is cut until 20 °C (maximally up to 30°C) is achieved. 4. The second half of ice and nitric salt mixture is added and cut until 7°C. When using a chopper we only cut until 2-3°C. 5. The emulsion is to be stored in a cooling box at the temperature 5°C. 	

Table 3 The original recipe for the product

Raw Material	Weight [kg]
H3	28
S5	38
Ice	29
NPS	2
Starch	2
Seasoning mixture	0.8
Hydrocolloid mixture	0.2
Sum:	100

Table 4 Results of sensory rating pariser in artificial casing with a different SE addition

Addition of skin emulsion	without KE	+10 %	+20 %	+30 %	+40 %	+50 %
Colour	3.48 ^{BC}	3.40	3.11 ^{B^{AC}b}	3.69 ^B	3.42 ^b	2.96 ^{Aa}
Smell	3.26	3.27	3.16	3.36	3.27	3.06
Texture	3.42 ^a	3.35	3.12	3.52 ^A	3.25	3.00 ^{Bb}
Taste	3.42 ^a	3.09 ^{abc}	2.97 ^{Bb}	3.53 ^{Aabd}	3.11	2.90 ^{Bb}
Overall acceptability	3.37 ^a	3.27	2.99 ^B	3.49 ^A	3.20	2.97 ^{Bb}

Notes:

1. Yellow marked column – the sample rated as the most pleasant one.
2. Scale: 5 – the sample rated as the most pleasant one, 0 – the sample was rated as the least pleasant.
3. Marking the significance by letters – if the same letters are to be found on one line = the difference is not significant. If different small letters are to be found = the significance of the difference is on level P<0.05.

Chart 1 The result projection of the sensory rating of pariser in artificial casing in a web chart

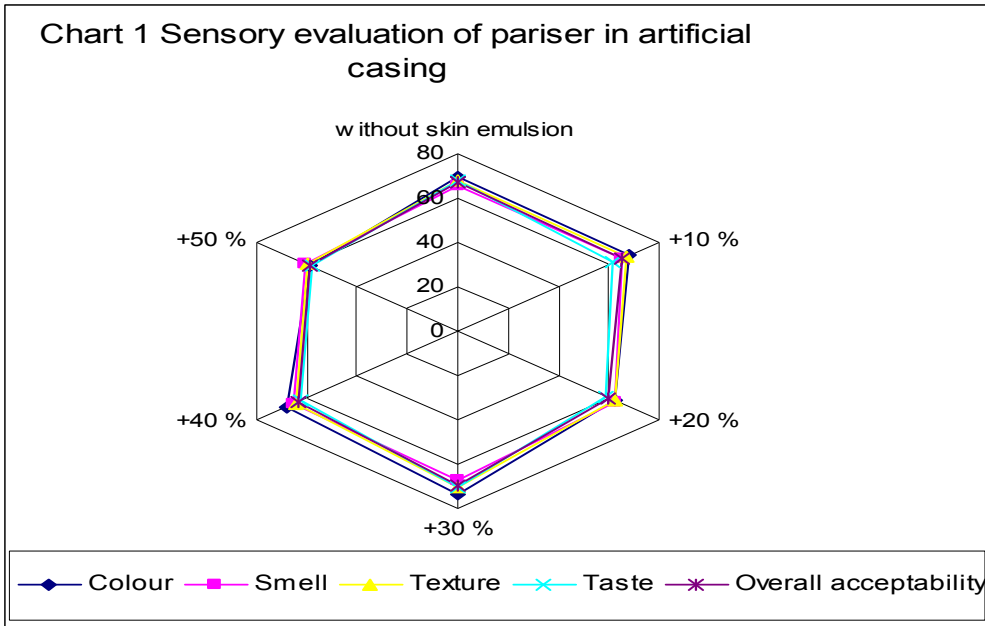


Table 5 Results of sensory rating of sausages in natural pork casing with a different SE addition

Addition of skin emulsion	without KE	+10 %	+20 %	+30 %	+40 %	+50 %
Colour	3.58 ^B	3.40 ^B	3.52 ^{Ba}	3.54 ^{BC}	2.95 ^{ABb}	2.73 ^A
Smell	3.33 ^b	3.35 ^b	3.36 ^b	3.35 ^b	2.96	2.86 ^a
Texture	3.37 ^{bc}	3.35 ^{bc}	3.33 ^c	3.42 ^c	2.87 ^a	2.76 ^{Ba}
Taste	3.18	3.29 ^B	3.26 ^a	3.38 ^{Babc}	2.80 ^{abc}	2.68 ^{Ab}
Overall acceptability	3.27 ^{BC}	3.33 ^{BCa}	3.41 ^B	3.41 ^B	2.83 ^{ACb}	2.67 ^A

Notes: see the notes to Table 4

Chart 2 The result projection of the sensory rating of sausages in natural pork casing in a web chart

