8-4 "MODIFICATION OF FLAVOR OF BOVINE BLOOD PLASMA DRIED PREPARATIONS" x

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1. Introduction

The experimental findings indicate the possibility of the use of blood plasma and its preparations /f.e. dried plasma/ as a substitute of meat protein /1-4/.

Flavor is, however, the most critical factor limiting the range of application of these preparations in commercial meat processing.

It is well know that the flavor of some products can be modified, in part, by using various spices /5/.

However, there are no rules in this respect and each preparation separate tests must be carried out.

The recognition of possibilities of improving the flavor of some dried plasma preparations, by the use of spiece preparations, was the aim of the presented work.

2. Material and methods

Optimal doses /found during the preliminary studies/ of the spices and its mixtures were added to the samples of fresh liquid plasma. The sub-threshold values of the spices in the water solution were taken as the optimal modifying dose. The mixtures of blood plasma with spices obtained in this way were dried and subjected to sensory evaluation /6/.

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The spray- and drum-drying methods were used /7/.

The commercial preparations of following spices were used: marjoram, lovage, nutmeg, dried ga rlic preparation. The water solutions of non-modified dried plasma preparations were used for the checking of the detection and recognition thresholds of their odor. That was determined in two series /ninemember panel/ using the method of limits /8,9/. Investigations were carried out at the following temperatures:

20°C - as "room" temperature,
40°C - as temperature of the hot-served sausages.

The differences found in the flavor of the non-modified and modified plasma preparations /as %/ indicated the degree of the flavor modification.

All results were analyzed statistically and the mean values only are presented in attached tables.

3. Results

A. Flavor modification of the spray-dried plasma:

The detection and recognition thresholds of the spray dried modified plasma preparations and changes of these values in comparison to non-modified plasma preparations are shown in Table 1.

The best effect was obtained with the dried garlic, which altered the detection threshold by 440%. Good modification properties were noted in the use of lovage and marjoram.

The highest detection threshold in the preparation modified with the double-component mixture was obtained for dried garlic + marjoram at 20°C /680 %/, and for lovage root and marjoram at 40°C /360 %/. The highest detection threshold in the preparation modified with the triple-component mixture was found for dried garlic + marjoram + lovage root /1080 %/.

The recognition threshold in the non-modified plasma was found higher at 40°C. The spray-dried preparations modified with each spice demonstrated a higher recognition threshold at 40°C and a lower at 20°C. For spice a percentage calculation was made concerning the shift in the recognition threshold of the modified to the non-modified plasma. The highest recognition threshold in the non-modified plasma was found for lovage root at 20° and 40°C.

Dried garlic and nutmeg increased the recognition threshold considerably. The highest recognition threshold in the plasma modified with the double-com-

Table 1. Values of determined thresholds of spray-dried plasma preparations

Used Herbs /concentration in mg %/	Detection threshold				Recognition threshold			
	20°C		40°C		20°C		40°C	
	V	C	V	C	V	C	V	C
Lovage /1,5/	36	360	35	233	69	164	76	152
Nutmeg /1,0/	29	290	41	273	52	124	60	120
Black paper /3,0/	31	310	24	160	52	124	54	108
Garlic /1,0/	44	440	50	333	62	148	72	144
Marjoram /4,0/	42	420	32	213	53	126	55	110
Garlic+lovage /1,0+1,5/	62	620	53	353	92	219	94	188
Lovage+marjoram /1,5+4,0/	51	510	54	360	85	202	91	182
Garlic+marjoram /1,0+4,0/	68	680	41	273	107	254	86	172
Garlic+marjoram+ lovage /1,0+4,0+1,5/	108	1080	101	673	141	336	137	274
Marjoram+garlic+ nutmeg /4,0+1,0+1,0/	78	780	63	420	122	291	91	182

V - determined values / x 10^{-3}g/

C - change of value /%/

ponent spice mixture was observed for dried garlic + marjoram at 20°C and for dried garlic + lovage root at 40°C.

However, the highest recognition threshold in the plasma preparation modified with triple-component spice mixture was found for dried garlic + marjoram + lovage root /336 %/

B. Flavor modification of the drum-dried plasma:

Detection and recognition threshold values of the drum-dried plasma preparations are shown in Table 2.

In the non-modified plasma, the detection threshold was higher at 20°C that at 40°C.

The drum-dried preparations modified alternately with each spice demonstrated a higher detection threshold at 20°C. The modification with lovage root resulted in a shift of the detection threshold in the non-modified plasma preparations by 223%. This exhibited excellent properties of "off-odor" modification in plasma preparation both at 20°C and 40°C. Among the double-component mixture prepared from three spices, the mixture of lovage root + marjoram resulted in the largest shift of the detection threshold which attained 243%. The highest detection threshold in the modified drum-dried plasma was found in the triple-component spice mixture containing lovage root + marjoram + dried garlic /260 %/.

Detection threshold in the non-modified plasma was higher at 20°C. Similarly, the recognition thresholds in the drum-dried preparations modified alternately with each spice were all higher at 20°C.

The highest recognition threshold was noted in the plasma preparation modified with lovage root thus indicating its excellent modification properties. The recognition threshold was shifted by nearly 160%.

The highest recognition threshold in the plasma preparation modified with the double-component spice mixture was found for dried garlic + marjoram. However, the everall highest recognition threshold was noted in the triple-component mixture: dried garlic + marjoram + lovage root. So it may be concluded that this mixture demonstrated the best modification properties for the protein preparations both spray- and drum-dried.

Table 2. Values of determined thresholds of drum-dried plasma preparations

Used Herbs /concentration in mg %/	Detection threshold				Recognition threshold			
	20°C		40°C		20°C		40°C	
	V	C	V	C	V	C	V	C
Lovage /1,5/	67	223	60	240	99	160	92	156
Nutmeg /1,0/	43	143	35	140	79	127	76	129
Black paper /3,0/	37	123	35	140	63	102	62	105
Garlic /1,0/	47	157	41	164	72	116	62	105
Marjoram /4,0/	51	170	39	156	68	110	65	110
Garlic+lovage /1,0+1,5/	43	143	45	180	69	111	70	119
Lovage+marjoram /1,5+4,0/	74	247	58	232	114	184	92	156
Garlic+marjoram /1,0+4,0/	73	243	48	192	121	195	84	142
Garlic+marjoram+ lovage /1,0+4,0+1,5/	78	260	93	372	130	210	144	244
Marjoram+garlic+ nutmeg /4,0+1,0+1,0/	60	200	75	300	920	1484	112	190

V - determined value /x 10^{-3} g/

C - change of value /%/

4. Conclusions

The experimental findings presented above indicate that there is a possibility of diminishing the specific odor of the plasma preparations. It can be realized by threshold quantities of selected herb spices added to the liquid plasma prior to its drying. The recognition and detection thresholds in these preparations were several times higher than in case of the non-modified preparations.

These preparations produced in the way described above were used in the production of model meat products. Their organoleptic quality was better than in the case of the non-modified preparations. Such results could not be reached by an increased additive of spices during processing. The application of adequete quantities of selected spices prior to drying of plasma contributed presumably to significant changes in the composition of the chemical compounds responsible for plasma odor. Such changes can not result only from mixing the spices and formation a new "resultant" flavor. During thermal processing new chemical reactions occured between the flavor compounds. However, this problem requires separate studies.

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