

Poster, 46th International Congress of Meat Science & Technology, 27.08.-01.09.2000, Buenos Aires, Argentinien
The influence of Glutamal *bioactive*® on the carcasses of lamb and pig using the surface spraying method

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Background

Glutamal *bioactive*® - a surface-active substance - has been successfully employed in chicken slaughtering for some years in several European and non-European countries using the surface spraying method. This method leads to a distinct improvement in the microbiological hygienic and sensory quality.

Objective

The objective of this study was to examine whether such an improvement in the quality can be achieved in lamb and pork slaughtering. It should be considered that in contrast to the chickens, where only the skin is sprayed, various types of tissue must be treated in the case of skinned lambs and pork cuttings. For this reason this study deals especially with the effects of the spray treatment on muscle tissue, muscles covered with fascia and connective tissue underneath as well as the effect deep in the muscles.

Material and Methods

Freshly slaughtered lamb and pork carcasses were treated with a 10% solution of activated Glutamal *bioactive*® (with lactic acid as activator) using the surface spraying method and were compared to water-treated carcasses of the control group. After the treatment the carcasses were cut up as usual and stored in a refrigerator at + 4 °C until the end of the tests.

The lamb samples were bacteriologically examined on the 1st, 4th and 8th day. To determine the bacterial count, 10 g of surface tissue was removed from the area of the hind leg, the cutlet, the shoulder-blade and the neck. The quantitative bacterial identification covered the aerobe mesophile total viable count (according to L 06.00-19 of the Official Collection of Test Methods, § 35 of the German Law for Food and Commodities), the count of *Enterobacteriaceae* (L 06.00-25) and Staphylococci (L 06.00-22). In addition, the pH-values were determined on the surface of the fore leg, of the interscapular area and of the dorsolateral abdomen wall on every day during the whole storage period.

The microbiological examination of the pork included the total viable count, the count of coliform bacteria (L 00.00-21) and of lactose-negative *Enterobacteriaceae* (L 00.00-21) at the 1st and 4th day of the tests. The samples were taken from the skin and from exposed muscle tissue. The pH-value of the skin and on the muscles was measured on the day of treatment and on the 4th day of storage.

Results and Discussion

The treatment of lamb and pig carcasses with Glutamal *bioactive*® led to a clear bacterial reduction on all tested tissues and increased during the whole test period.

The lamb samples (Tab.3) showed lower total bacterial counts on the 1st day of up to 1.7 lg cfu/g. On the 5th day there was, in comparison to the control group, a difference of up to 2.1 lg cfu/g, on the 8th day up to cfu/g. The *Enterobacteriaceae* count showed hardly any reduction on the 1st day. By the 8th day, however, a reduction of up to 2.8 lg cfu/g was shown. As a result of the treatment the Staphylococci count decreased over the whole test period by a factor of 10¹ to 10². The *Staph. aureus* count in both groups could hardly be traced, so that no clear statement about the effects of the surface treatment can be made.

The spray treatment of pig carcasses (Tab.1) led to a reduction of the total viable count of the skin and to a greater extent that of the exposed muscles by up to 2,5 lg cfu/g. The counts of the coliform bacteria and the lactose-negative *Enterobacteriaceae* on the skin and the exposed muscles were also significantly reduced.

The pH-value on the surface of all Glutamal *bioactive*®-treated samples decreased only on the 1st day (Tab.2), but always lay in the physiological meat ripening range.

Conclusions:

The results of these examinations show that the surface treatment with Glutamal *bioactive*® clearly increases the microbiological hygienic quality of lamb and pig carcasses. The antibacterial effect of Glutamal *bioactive*® works on skin tissue as well as on muscle tissue. Slaughter hygiene, however, must be observed, as bad hygienic defects cannot be compensated for by a subsequent surface treatment. Glutamal *bioactive*® is ideal for further increasing the quality of high-quality meat and achieving an extension of the storability.

Literature:

Official Collection of Test Methods according to § 35 of the German Law for Food and Commodities

Tab. 1: Microbiological tests of pork after treatment with Glutamal bioactive® or water

Bacterial counts in lg cfu/g							
Day	Sample	Total viable count		coliform bacteria		laktose-negative <i>Enterobacteriaceae</i>	
		Glutamal	Control	Glutamal	Control	Glutamal	Control
1	skin	4.9	5.9	1.8	1.6	2.5	2.8
	muscle	3.0	4.4	1.4	1.5	1.3	2.8
4	skin	2.4	5.9	1.0	1.0	3.4	3.5
	muscle	3.2	6.8	2.3	3.6	5.3	6.2

Tab.2: pH-values of the lamb after treatment with Glutamal bioactive® or water

Sample	Group	Test day							
		1	2	3	4	5	6	7	8
fore leg	Glutamal	6.62	6.56	6.44	6.59	6.21	6.15	6.25	6.24
	Control	8.24	6.74	5.80	6.12	5.90	6.43	6.27	6.23
inter-scapular	Glutamal	5.90	6.47	6.39	6.27	6.22	6.30	6.19	6.32
	Control	8.25	6.45	6.19	6.45	6.15	6.10	6.21	6.28
abdomen	Glutamal	5.57	6.36	6.63	6.77	6.17	6.05	6.00	6.25
	Control	7.80	6.44	6.26	6.45	6.08	6.28	6.10	6.39

Tab. 3: Microbiological tests of the lamb after treatment with Glutamal bioactive® or water

bacterial counts in lg cfu/g									
Day	Sample	Total bacterial count		Enterobacteriaceae		Staphylococci		<i>Staph. aureus</i>	
		Glutamal	Control	Glutamal	Control	Glutamal	Control	Glutamal	Control
1	hind leg	3.5	4.4	1.1	1.4	2.6	4.3	1.0	1.8
	cutlet	2.8	3.7	1.0	1.7	2.3	3.1	1.0	1.0
	shoulder	2.8	4.5	1.0	1.0	2.1	3.3	1.0	1.7
	neck	3.1	4.0	1.1	1.1	2.6	3.5	1.3	1.0
5	hind leg	4.8	4.9	1.6	1.5	3.0	2.5	1.0	1.0
	cutlet	3.6	4.7	1.0	1.9	2.0	2.5	1.3	1.0
	shoulder	3.9	6.0	1.4	2.6	2.6	3.8	1.0	1.0
	neck	4.0	5.9	1.6	2.9	1.7	3.7	1.0	1.0
8	hind leg	6.7	7.2	2.6	3.3	3.6	4.6	1.4	1.0
	cutlet	5.0	6.3	1.8	3.8	2.2	3.4	1.0	1.0
	shoulder	5.7	7.5	1.8	4.6	2.4	3.7	1.0	1.0
	neck	5.8	6.7	3.1	3.8	2.6	3.6	1.4	1.3