

Pisula A., Mroczek J.

Der Einfluss von NaCl auf den Gehalt von Nukleotiden und Nukleosiden in Schweinefleisch.

Landwirtschaftliche Universität zu Warschau, Fakultätsinstitut für Lebensmitteltechnologie

Es wurde der Einfluss verschiedenen Mengen von NaCl in Schweinefleisch und Zeitdauer des Salzens auf den Gehalt der Nukleotidverbindungen untersucht. Das NaCl wurde ins Warmfleisch /2 Std. nach schlachten/ auch zu gewöhnlich gekühlten /48 Std. nach dem Schlachten/ eingeführt.

Wir haben festgestellt, dass der Gehalt der untersuchten Nukleotide im gesalzenen Fleisch von Salzmenge, Zeitpunkt des Salzens, sowie auch Dauer der Salzung abhängt.

Die Zugabe von NaCl zum gekühlten Fleisch fördert der Übergang von Nukleotiden besonders IMP, zu Nukleosiden, dagegen das wurde im Warmfleisch nicht bestätigt. Der IMP-Gehalt im Fleisch sinkt mit der wachsenden Zugabe von NaCl.

In Rücksicht an höhere Gehalt der Nukleotide, besonders 5'-IMP es ist Empfehlenswert NaCl /bis 3%/ zum Warmfleisch bevor der Totenstarre zuzufügen.

Pisula A., Mroczek J.

Influence de l'addition du NaCl sur le contenu des nucléotides et nucléosides dans la viande de porc.

Université Agronomique de Varsovie, Institut de Technologie Alimentaire

Le but de ce travail est de déterminer l'influence de diverses quantités du chlore de soude ajouté à la viande dans deux heures après l'abattage, la viande frigorifiée d'une façon traditionnelle, c'est-à-dire après 48 heures, et de définir la durée de l'action de ce composant sur le contenu des combinaisons de nucléotides dans la viande salée.

On a constaté que le contenu de certaines combinaisons de nucléotides dans la viande salée dépend de la quantité du sel ajouté et du moment de l'addition du sel /post mortem/ ainsi que de la durée du processus de salaison.

L'addition du sel de cuisine à la viande frigorifiée provoque la décomposition plus rapide et tout particulièrement de IMP aux nucléosides, ce qu'on n'observe pas dans le cas de la salaison de la viande chaude. Le contenu de IMP diminue avec l'accroissement du sel de cuisine additionné à la viande.

Prenant en considération le contenu des nucléotides et spécialement de 5'-IMP, il est indiqué d'ajouter le sel de cuisine à la viande chaude /avant l'apparition de concentration post mortem/ en quantité au-dessous de 3%, car telle viande conserve la plus grande quantité de ce composant.

Pisula A., Mroczek J.

Influence of the addition of sodium chloride on the amount of nucleotides and nucleosides in pork meat.

Agricultural University of Warsaw, Department of Food Technology

The purpose of this work was to establish the influence of various amounts of sodium chloride added to meat 2 hours after slaughter /unchilled processed meat/ and to traditionally chilled meat, that is after 48 hours, and of the time of action of that component upon the amount of nucleotide compounds in salted meat.

It was established that the amount of certain nucleotide compounds in salted pork depends on the percent of added salt and on the moment of adding salt after slaughter as well as on the length of the salting process.

The addition of salt to chilled meat causes quicker breakdown of nucleotides and especially IMP to nucleosides, which is not the case with salting unchilled meat. The amount of IMP decreases together with the rise of the percent of salt added to meat.

Having taken into account the percentage of nucleotides and especially 5'-IMP, it seems purposeful to add salt to unchilled meat /before the occurrence of rigor mortis/ in amounts lower than 3 percent, because such meat preserves the largest amounts of that components.

Писула А., Мрочек Я.

Влияние добавления хлорида натрия на содержание нуклеотидов и нуклеосидов в свином мясе.

Варшавская Сельскохозяйственная Академия, факультетский Институт по Технологии Пищевой Промышленности

Целью работы является определение влияния различного количества хлорида натрия, добавленного в мясо через 2 часа после убоя и в мясо охлажденное традиционным способом, т.е. через 48 часов после убоя а также времени действия этого компонента на содержание соединений нуклеотидов в соленном мясе.

Установлено, что содержание некоторых соединений нуклеотидов в соленном мясе зависит от момента добавления соли после убоя и от времени продолжения процесса соления.

Добавление поваренной соли в охлажденное мясо вызывает более быстрый распад, а особенно ИМП до нуклеотидов, этом процессе не наблюдается в случае соления парного мяса. Содержание ИМП уменьшается вместе с увеличением добавления поваренной соли в мясо.

Учитывая содержание нуклеотидов, а особенно 5'-ИМП рекомендуется добавлять поваренную соль в парное мясо /до появления признаков послеубойного остывания/ в количестве меньше 3 процентов, так как в таком мясе сохраняется наибольшее количество этого компонента.

Pisula A., Mroczek J.

Influence of the addition of sodium chloride on the amount of nucleotides and nucleosides in pork meat.

Agricultural University of Warsaw, Department of Food Technology
/Chairmen: prof. dr A. Rutkowski/

Ribonucleotides have become a very significant factor in metabolic processes in living tissues. From the point of view of a food technologist, most important are derivatives of adenosine and their transformation products. There is a great deal of information about the concentration of nucleotides /mainly ATP and IMP/ in the muscles of certain animals and fish, but there is not enough information about the influence of the technological processes upon the changes and concentration of these compounds in meat.

The objective of this work was to establish the influence of different amount of sodium chloride added to minced pork immediately after slaughter /2 hours - unchilled meat/ and after chilling /48 hours after slaughter/. The same samples were checked as to the influence of duration of salting on the amount of nucleotides in meat.

The samples were obtained from biceps femoris muscles of pigs which were not PSE. The amounts 1, 2, 3 percent of sodium chloride were added to unchilled after 2 hours after slaughter and to chilled meat after 48 hours from slaughter.

The amount of total nucleotides, adenil nucleotides, 5'-IMP, nucleosides and bases as hypoxanthine and the total of nucleotides and nucleosides were established in the period starting as salt was added until the end of 48 hours salting process.

of nucleotides were lower than in control samples.

The analysis of the results from the determination of nucleosides /Fig. 2/ have shown a tendency that the increase of the amount of NaCl added to meat there was an increase in the amount of nucleosides, and in unchilled processed pork the amount of these compounds were lower than in control meat. In chilled meat was different - the amounts of nucleosides were higher in salted samples. The amounts of nucleosides were higher on the average by about 100 $\mu\text{M}/100\text{g}$ in meat salted after chilling than in unchilled processed meat and this corresponds to the observed decrease of nucleotides.

The changes in the amount of inosinic acid /Fig. 3/ were similar to the changes of the total of nucleotides. In meat with higher percentage of NaCl that was found a lower level of inosinic acid. The addition of NaCl to meat after chilling has caused a decrease in the level of 5'-IMP in comparison with control samples. This was not observed in unchilled processed meat. At the same time, the amounts of 5'-IMP in unchilled salted meat were on the average higher by about 90 $\mu\text{M}/100\text{g}$ in comparison with chilled samples. A similar tendency was observed after 48 hours of salting.

The amount of inosinic acid /Tab. 1/ was almost doubled in the first 24 hours after slaughter in comparison with the level 2 h. after slaughter. This increase was caused by the breakdown of adenil nucleotides /the amount of these compounds was largely decreased in the first 24 hours after slaughter and later kept at about the same level about 50-60 $\mu\text{M}/100\text{g}$ / independent from the moment of salting, the percentage of added salt and the time of processing. This was a very good proof that these processes

Muscle nucleotides and related compounds were extracted by means of 0,6 M perchloric acid. Muscles extracts were analyzed by means of column chromatography on syntetic Dowex ion exchangers.

Results and discussion.

Looking of the obtained results of the total concentration of nucleotides in salted pork with different amount of sodium chloride at 2 and 48 hours after slaughter /Fig. 1/ it was observed, that with the increase of NaCl there was the decrease of the total amount of nucleotides - independent to the time of addition of salt /to unchilled or to chilled meat/. It has to be noticed, that in samples of unchilled meat the amounts of nucleotides were higher than in control samples, but at the same time in meat salted after chilling the total amounts of nucleotides were lower than in samples without an addition of sodium chloride, from which one can conclude that sodium chloride is a factor which accelerates the transformation of nucleotides in chilled meat. These dependencies exist after 48 hours of salting but the amounts of nucleotides in the respective samples were about 30-40 $\mu\text{M}/100\text{g}$ lower. Moreover, it was possible to maintain that the total amounts of nucleotides in unchilled salted meat were on the average higher by about 100 $\mu\text{M}/100\text{g}$ than in meat salted after chilling.

While watching /Tab. 1/ changes occurring in the time of salting process /from 0 to 48 hours/ it was observed, that as early as after 6 hours from salting in unchilled meat, the total amounts of nucleotides were higher than in control meat. At the same time, it was observed in meat salted after chilling, that the amounts

occur very slowly. The sum of nucleotides and nucleosides were on the same level /about 690-700 $\mu\text{M}/100\text{g}$ / independent from the amount of the sodium chloride added, the period of time from slaughter to salting and from the time of this process.

To sum up the obtained results we may state that the percentage of certain nucleotide compounds in salted pork depends on the amount of salt added to meat, on the time from slaughter to salting and on the time of this process.

The addition of salt to chilled meat causes quicker breakdown of nucleotides, especially IMP to nucleosides, which is not the case with salting unchilled meat. The percentage of IMP lowers with the increase of the amount of salt added to meat.

Having taken into account the percentage of nucleotides and especially 5'-IMP, it seems purposeful to add salt to unchilled meat /before the occurrence of rigor mortis/ in amounts lower than 3 percent, because such meat preserves the largest amounts of that components.

Table 1. The amount of nucleotides, nucleosides and inosinic acid in salted meat / $\mu\text{M}/100\text{g}$ tissue/

Tested compound	sample	salt added 2 h.a.f.slaught.										48 h.a.f.slaughter			
		time in hours /started at the moment of salting /													
		0	2	6	24	48	2	6	24	48	2	6	24	48	
TOTAL nucleotides	control	479	412	362	338	328	328	327	316	301					
	2% NaCl	-	446	423	404	381	310	282	274	271					
nucleosides	control	196	298	323	338	368	369	360	388	419					
	2% NaCl	-	256	272	280	309	386	408	421	442					
inosinic acid 5'-IMP	control	183	257	284	276	269	269	268	262	249					
	2% NaCl	-	388	357	343	310	254	230	226	223					

Average amount of nucleotides in meat with addition of NaCl in 2 or 48 hours post mortem / $\mu\text{M}/100\text{g}$ tissue/

