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The influence of corn syrup solids and dextrose on the organoleptic gualities of canned, pasteurized hams.

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During the last decennium the use of various carbohydrates in canned hams has become increasingly common. This practice has both technological and economical reasons. In the experiment reported here, 5 combinations of canned hams containing up to 3% dextrose and 2% corn syrup solids were subjected to sensory evaluation by a trained panel. The results indicate that within a concentration of up to about 2.5 per cent carbohydrate, expressed as reducing sugars, the organoleptic qualities of the hams were not affected.

Einfluss von Trockenglukosesirup und Glukose auf die organoleptischen Eigenschaften von Pasteurisierten Dosenschinken

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Im Laufe der letzten 10 Jahre ist man in zunehmendem Masse darzu übergegangen, pasteurisierte Dosenschinken mit Zusätzen von verschiedenen Kohlenhydraten zu versehen. Dieses Hinzufügen von Zusätzen hat sowohl technologische als ökonomische Gründe. In der hier beschriebenen Untersuchung wurden 5 Kombinationen von Schinken mit einem Zusatz von bis zu 3% Glukose und 2% Trockenglukosesirup von einem erfahrenen Team geschmacksgetestet. Die Ergebnisse deuten darauf hin, dass sich die organoleptischen Eigenschaften von Dosenschinken innerhalb einer Konzentration von bis zu ca. 2,5% als reduzierender Zucker dargestelltem Kohlenhydrat nich verschlechtern.

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L'influence du sirop de glucose deshydrate et de la glucose sur les qualités organoleptiques du jambon pasteurisé en bôite

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Au cours de la dernière dizaine d'années l'addition de divers hydrates carboniques au jambon pasteurisé en boite est devenue de plus en plus fréquente. Cette addition s'est faite pour des reisons à la fois technologiques et économiques.

Dans l'analyse décrite ci-dessous le goût de cinq combinaisons de jambon additionné de jusqu'à 3% de glucose et 2% de sirop de glucose deshydrate a été jugé par une équipe qui a l'expérience de l'analyse gustative.

Les résultats indiquent que dans une concentration de jusqu'é 2,5% d'hydrate carbonique, représenté par du sucre réducteur, les qualités organoleptiques du jambon ne sont pas réduites.

Влияние крахмального сиропа и декстроза на органолептические покозатели ветчины

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В последные 20 лет широко распространено применение различных углеводов в производстве пастеризованной ветчины. Применение углеводов важно не только с точки зрения технологии, но и экономии. В производстве названных в докладе продуктов выработали пять вариаций, добовлением углеводов в количестве максимум 3% декстроза и максимум 2% крахмального сиропа. Проводили органолептическую оценку готовых продуктов. В результате проведенных исследований установленно, что углеводы в количестве 2,5% к редуцирующему сахару ещё не вызывает ухудщение в органолептических покозателях. The influence of corn syrup solids and dextrose on the organoleptic quality of canned, pasteurized hams.

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Introduction

In recent years the use of various carbohydrates as additives for canned hams have become increasingly common.

Originally this practice was introduced as a safeguard against food poisoning of consumers. The reasoning behind this was that if sliced, vacuumpacked ham contained some sort of low-molecular carbohydrate, a package which was left at room temperature would very quickly visibly be unfit for sale because the microflora in the package would convert the carbohydrate to carbondioxide and build up so much gas in the package that the consumer would automatically be warned against eating the content. Also it is wellknown that the microorganisms frequently present in such packages and which are capable of heterofermentative break-down of carbohydrates are usually antagonists to several food poisoning organisms, including <u>S.aureus</u> and <u>Cl.botulinum</u>.(Mossel,1971.)

The economic aspects of the use of carbohydrates are of couse also obvious, if the legal requirements of the composition of ham is related to a certain protein-water ratio. The carbohydrate will then replace some of the water and thus increase the production-yield. However, the investigation reported here concerns the effect increasing amounts of carbohydrates has on the organoleptic quality of canned hams.

Various carbohydrates are being used for canned ham manufacture, including dextrose, sucrose, and acid-hydrolysed corn syrup solids, either alone or in combination. It had been claimed that some of these carbohydrates might impair the organoleptic quality of the hams by sweetening them excessively much. It was therefore tried out whether a trained taste panel would object against the flavour or any other organoleptic property of hams, if these were added carbohydrates up to concentrations commonly used.

Materials and methods

As materials were used 11 lbs. canned hams produced according to normal practice and from normal raw materials, so that the only difference of the hams in principle was a variation in carbohydrate content.

Table 1 shows the amounts of carbohydrate added to 5 different groups of ham used for the experiment.

			Group		
Carbohydrate,%	1	2	3	4	5
dextrose	2	3	3	2	0
corn syrup solids	0	0	2	2	2

The 5 groups of ham were cooked to center temperatures of about 70°C.

Analyses of the content of moisture, sodium chloride and of glucose measured as per cent reducing sugars were performed. Also the pH in the 5 groups were measured.

For the sensory evaluation a trained taste testing panel consisting of 8 members was used. The hams were tested over 5 sessions with 8 samples per session, so that the panel all together were judging each group 5 times.

A hedonic scale ranging from +5 to -5 was used, with "O" indicating neither good nor bad. The following parameters were judged: colour, saltiness, flavour, texture, and overallimpression.

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Results and discussion

Table 2 shows the results of the chemical analyses of the 5 groups of ham:

Group	Moisture % Av. Range	NaCl % Av. Range	g NaCl/loog H ₂ O Calculated average	pH Av. Range	Glucose,as % reducing sugar Av. Range
		1	1		
1	74.4 73.6-74.7	3.33 3.00-3.78	4.47	6.28 6.08-6.39	1.54 1.30-1.69
2	72.0 71.3-73.5	3.32 3.16-3.55	4.55	6.33 6.28-6.42	2.33 2.23-2.48
3	73.5 72.3-74.3	3.37 3.05-3.65	4.59	6.27 6.09-6.48	2.49 2.23-2.90
4	73.0 72.7-73.3	3.17 2.97-3.29	4.39	6.19 6.05-6.25	2.33 1.87-2.68
5	73.8 73.3-74.3	3.23 3.08-4.48	4.38	6.21 6.03-6.31	1.84 .84-1.55
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From the results it will appear that as far as salt, moisture, and pH are concerned, there are no real difference between the 5 groups of ham. However, the measurable amounts of glucose detected showed poor correlation with amounts of carbohydrates added to the various groups.

Other experiments carried out at the Danish Meat Research Institute (Bolund Jensen and Zeuthen,1974) show that an even distribution of carbohydrates, especially corn syrup solids, in whole pieces of meat generally is difficult to achieve.

Table 3 shows the results of the sensory evaluations of the 5 groups of ham.

As will be seen, no significant differences were found between the groups in saltiness and texture, whereas the differences in colour, flavour and overall impression are significant, for the two latter properties even at the 99% level. However, when comparing which groups are significantly better in the various parameters and comparing these results with the results of the chemical analyses, it seems quite clear that the differences found through sensory evaluation can not be explained as due to the concentrations and types of carbohydrates.

Group	Colour	Seltiness	Flavour	Texture	Overall-impression
1	1.17	.25	1.38	1.32	1.04
2	2.22	.17	1.94	1.74	1.75
3	1.32	.39	.99	1.25	.76
4	1.35	.24	1.82	1.89	1.57
5	1.22	.32	2.18	2.12	1.69
Least significa	nt				
difference	.78	- 1 A B B B B B B B B B B B B B B B B B B	.56	-	.65
	(p:>.05)		(p:>.01)		(p:>.01)

Table 3. Results of the sensory evaluation.

It would be tempting to suggest that the reason why the rating in flavour of group 3 is so low is due to the fact that it also has the highest content of carbohydrates, but partly the panelists claimed (after the sessions) that they did not find any group particularly sweet in taste, partly it would be dubious to conclude that the presence of .16 per cent extra glucose could have such a decisive influence on the sensory properties of cooked ham. It seems therefore likely that the addition of up to 2-3 per cent dextrose or corn syrup solids, or combinations of these, has no adverse effect on the organoleptic properties of pasteurized, canned hams.

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