THE EFFECT OF PROTEIN INGREDIENT APPLICATION ON CURED PRODUCT QUALITY.

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ABSTRACT: The main purpose of this study was to evaluate the effect of two protein additive from animal origin: Sodium Caseinate and " Pelcer Gel 80 " on " cooked ham " having into account the following parameters: yields, organoleptic quality, and texture. The work was carried out in two stages (A and B). The stage A consisted of 4 experimental runnings at pilot plant level where both additives were evaluated at 4 % and 5 % against a pattern, being controlled for each process the following: yields, texture, and sensory quality. The second stage consisted of the effect evaluation which on weight increases, had the brines with additives mentioned before on pork muscles from different post-mortem times (24, 48, and 72 hours) so it was checked through the results obtained from this study that the additives used at added levels did not improve significantly the yields and texture of products but they did improve the organoleptic characteristics when using " Pelcer Gel 80 ". And it was determined that the increased post-mortem time put up brine absorption and yields consequently.

INTRODUCTION: For the processing of meat products, the protein ingredients from non- meat origin play a basic role.

An element which favours the use of such additives is based on its functional properties very useful from the technological point of view and according to protein by-product concerned.

The protein ingredients can be from animal, vegetal, or unicellular origin such as Sodium Caseinate and " Pelcer Gel 80 ".

Sodium Caseinate favours emulsifying and stabilizing action of the product (Gerhardt, 1980) while " Pelcer 80 " which is produced in Mexico from pork skin, presents a high gelatinizing power, facilitates emulsion formation, and offers strength when cutting.

Therefore, the present work was aimed to evaluate the effect of two protein additives: Sodium Caseinate and " Pelcer Gel 80 " on cooked ham and to determine the effect of post-morter time of pork muscle on above mentioned brine absorption and product yields.

MATERIALS AND METHODS: During the first stage of this work it was tested the use of Sodium Caseinate and " Pelcer 80 " at 4 % and 5 % in cooked ham. The samples were prepared gradually having into account the following additives and ingredients in the brine: sodium tripolyphosphate 2.23 %, sodium pyrophosphate 0.240 %, common salt 8.2 %. sodium

nitrite 0.130 %, sodium ascorbate 0.4 %, hydrolyzate of vegetal protein 0.3 %, monosodic glutamate 0.33 %, liquid smoke 0.005 %, and water 88.165 %.

The meat used for this work was obtained from deboned and cleaned pork legs trying that it remained as whole as possible to enable injection which was done by using a low pressure multi-needle injector, Junior model BI 18 from the " INJECT STAR " company at a 35 % brine rate to the fresh weight of the meat to be injected.

Inmediately after the injection, meat passed to 2 massages for 60 minutes; the first one was carried out after the injection and the second one 24 hours passed away from the curing process beginning which continued to 48 hours (2 - 4° C) and later on the meat was pressed in 4 Kg moulds lined with vegetal paper while controlling its weight.

The cooking process was done in an open boiler having hot water (80° C) up to 70° C at the thermal center. Then they were tempered by cooling (2 - 6° C) for 24 hours, the moulds were removed and the final weight was taken for each treatment.

Samples from each variant were analyzed to determine the texture through an Instron Universal texturemeter model 1140, by using the Kramer cell. And the curve maximum value as the product strength expressed in Kgf was obtained from the graph of strength vs distance.

The sensory characterization was analyzed by a group of 12 skilled tasters who evaluated cutting appearance, consistency, and flavour through a 7 point- score test (Amerine 1965).

The results will be processed by a variance analysis of simple clasification, and for the required cases a Duncan's multiple range test was done.

For the second stage of this work a Longessimun dorsi muscle was taken. This muscle was removed after 24 hours from the animal slaughtering and dorsal fat was eliminated. Two muscles of canals were obtained with the purpose of using the same meat for the three post-mortem times to be evaluated.

Sixty portions of 20mm in height x 20mm wide x 30mm in length were cutted from both muscles while matching the length with the longitudinal length of muscle fibers. Five treatments were carried out for each one of post-mortem times studied (24, 48, and 72 hours) ; pattern I, caseinate 4 and 5 % (II,III), " Pelcer - Gel 80 ", 4 and 5 % (IV and V) and each one was quadruplicated.

The brine was prepared in an homogenizer " ATOMIX " set in its first speed and by using the same additives and ingredients as for the first stage.

After weighting of meat portions, these were introduced into beakers with brine at a 1 : 20 ratio (meat-brine) and trying that the connective tissue remained on the

the surface, meanwhile the remaining five faces were submerged into brines for 48 hours and the weights controlled later on so the portions of meat were dried by using filtering paper and the results were statistically processed through a factorial of 5 x 3 x 3.

Factors	Levels
Brine	I,II,III,IV,V
Post-mortem times	24 h. 48 h. 72 h
Dipping times	0 h, 24 h, 48 h

RESULTS AND DISCUSSIONS: The results of the texture instrumental analysis for cooked ham are showed in Table 1, and no significant differences ($P < 005$) between treatments were detected.

The sensory evaluation for features showed that there were no significant differences ($P < 005$) between the treatments, texture, and flavour but it did result positive for appearance. From the Duncan's multiple-range test it resulted that there are significant differences ($P < 005$) between variant V (5 % of Pelcer Gel 80) and the remaining variants including the pattern due to the presence of yellow strips as well as a slight jelly loosening.

The results obtained in the cooked ham yields, which are showed in Table 3, point out that there were significant differences ($P < 005$) between the treatments, contributing with the Duncan's multiple range test in the sense that no significant differences were found between the

pattern and variants II and III with sodium caseinate but there were such differences by treatments IV and V (with Pelcer Gel 80) to which the lowest yield was obtained.

The results for the second stage of this work are showed in tables 4 and 5.

In table 4, it is possible to observe that the increased weight in pattern was notably higher ($P < 0.05$) as compared to that of the remaining treatments with the exception of brine with 4 % of " Pelcer Gel 80 " where a totally anomalous result was obtained in respect of the remaining 3 brines having protein additives for which diminished yields were observed and even higher than in presence of large concentration of additives which could be due to an increase of the osmotic pressure of such brines by ion-chloride interaction and proteins scattered in the medium. (Callow, 1930).

The results of increased weight for the different post-mortem times are showed in Table 5. This way it is possible to observe that there is a significant increase in weight ($P < 0.05$), for a longer time, which could be determined by the meat maturing degree that provokes an increased water retention capacity (Lawrie, 1979)

The weight increase obtained through the extension of the dipping time was expected because of the brine absorption by the meat and in order to establish a concentration

balance between the solution and muscle (Callow 1930) which was not even reached to 48 hours, when differences in the concentration of chloride between solution (8,2 %) an meat (8 %) still remained.

CONCLUSIONS : The application of sodium caseinate and " Pelcer Gel 80 " through the studied level didn't offer advantages for cooked ham processing and therefore, it is not recommended for use.

The post-mortem time influences notably at the level of brine absorption in cured meat, resulting in an increased weight with the time (48 hours).

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Table 1. Instrumental texture mean values Kgf. in cooked ham.

Treatment	I	II	III	IV	V	significan
X	128.25	127.68	138.03	136.2	144.2	N.S

Table 2.

Sensory Evaluation. Mean Values. Cooked Ham.

	Treatments					
s	I	II	III	IV	V	significant P<0
nce	5.4a	5.6a	5.4a	5.1a	4.9b	*
	5.2	5.5	5.3	5.4	5.2	N.S
	5.1	5.3	4.9	5.1	5.0	N.S

The different letters (a,b) imply significant differences ($P < 0.05$) in Duncan's multiple range test.

Table 3.

Mean Values of Yields (%) in Cooked Ham

nts	I	II	III	IV	V	Signif
	117.25a	118.85a	116.46ab	112.58c	116.63cb	*

The different letters (a,b,c,d) imply significant differences ($P < 0.05$) in Ducan's multiple range test.

Table 4.

Increase of weight to different treatments in cooked ham

nts	I	II	III	IV	V	Signifi
	11.8a	9.1b	8.9b	9.2b	8.5b	*

The different letters imply significant differences ($P < 0.05$) in Duncan's multiple range test.

Table 5.

Increase of weight to different post-mortem times in cooked

.ts	24h	48h	72h	Significant (
	8.14a	9.68b	12.77c	*

The different letters (a,b,c) indicate significant difference