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AN ATTEMPTS OF NON-CONVENTIONAL USE OF PORK RINDS

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Background

Much attention has been devoted to works on optimal use of less valuable meat raw materials in literature in recent years. One of the by-products not fully used by meat industry is pork rind. Polish meat industry has been obliged for many years to deskinning pig carcasses. During the past there have been observed some shifts in pork rinds use manner in meat industry. Nowadays, also in Poland, pork rinds are food materials processed together with others edible by-products on variety products, particularly as a recipe component of comminuted scalded sausages.

One of the other potential possibilities, not practised in Poland so far, is using pork rinds to manufacturing snack-type products. Additionally, taking into account the growing demand by consumers for snack-type products we considered as justified a non-conventional use of pork rinds. Developing the new product is not however simple mainly because of undesirable sensory characteristics of final products. These faults we tried to overcome or diminish in our work.

Objective

The objective of our study was an attempt of enhancing the sensory profile of product made from pork rind by addition, during manufacturing process, varying levels of flavouring substances.

Methods

The study was conducted using defatted pork rinds derived from pork hams deskinning. The raw material was frozen in polyethylene bags and kept frozen at -22^{O}C prior to use. Pork rinds were thawed at 4^{O}C for 18 hr before processing. Red pepper, bacon and cheese and onion flavourings served as test ingredients. They were the original flavourings used by Bahlsen in potato chips manufacturing.

All spices, at 5, 10, 15% levels (on weight basis in relation to final product), were added to final product at the end of manufacturing process. Three stages process of non-conventional use of pork rinds is presented on chart 1.

Final products were cooled down in air to reach room temperature and thereafter they were flavoured by mixing with experimental ingredients. The following variables were measured: production yield, dry matter, fat and protein contents (1). Colour paramerers were evaluated using a reflectance colorimeter Minolta CR 200b. L*,a*,b*. "hue" and "chroma" were determined (2). Organoleptic parameters were analysed by multiple comparison and evaluation of desirability of: colour, odour, and palatability of the products using a 5 point scale. Two-ways analysis of variance with an F-test, and least significant difference ($p<0.005$) in means between pairs was used to obtain confidence intervals. Statistical analysis was done using the STATISTICA^{TM} (3).

Results and discussion

The effects of experimental flavours levels on sensory attributes and colour parameters are shown in Table 1. Analysis of variance indicated that sort of flavours used had a significant influence on desirability of experimental chips colour. Colour scores were the highest for snacks manufactured with red pepper and bacon spice addition. Although, compared to the control treatment, use of cheese and onion flavour did not produced a significant effect on colour it was observed the worsening of this attribute notes.

The results show that increasing levels of experimental preparates used influence the desirability of colour sensory parameter, but the effect depends on the sort of the additive used. The highest value of this parameter was recorded for snacks manufactured with 5% bacon spice. The variable that most influenced odour of final products was the kind of flavour used. The best results, according to the panelists, had been reported for snacks processed with bacon preparate. Cheese and onion appeared to have no influence on this parameter. The varying levels of flavouring substances did not affected the odour parameter. Having used the red pepper and bacon spices significant increase in odour desirability, in comparison to control sample, was observed at 5% ingredients addition. Further increase of spices dose did not improve the scores for this parameter. Slightly different variations were observed in the case of cheese and onion spice, where significant improvement of this attribute desirability was indicated only at 15% spice level.

Statistical analysis of results indicated that sort of evaluated preparates was the factor that most influenced the desirability of palatability perception. Addition all of ingredients chosen for the experiment led to increase in values of the variable. The best results, according to evaluation panel, scored bacon and red pepper. However, improvement in notes with increasing level of evaluated ingredients was observed only to 5% or 10% levels of addition, respectively. Further increasing of doses did not affected this attribute or even led to worsening palatability. Cheese and onion had only slight effect on palatability scores as only products with 15% addition of this spice were assessed better than control samples. Overall, acceptable snacks due to the average results of organoleptic evaluation were processed with bacon when the addition of preparate did not exceed 5%.

Both experimental preparates and their addition levels significantly affected L* colour parameter determined for model snacks. The most appreciable effect on the lightness of final products was produced by varying cheese and onion spice level. The greater the proportion of flavour, the higher values of L* parameter. Red pepper and bacon spice level appeared to have little influence on this variable, only snacks with 15% red pepper addition fell within the 95% limit of significance and exhibit lower lightness in relation to ones manufactured without additives. The data determined for a* were influenced both by spice sort and varying levels of additive used. As it could be predicted the greatest redness was observed for snacks processed with red pepper preparate while the cheese and onion addition resulted in lower redness compared to control. There was no difference reported in redness for snacks processed with increasing levels of bacon and cheese and onion addition. Significant increase in red colour contribution of snacks with increasing level red pepper content resulting in higher values of a* parameter could be noticed. All tested ingredients, compared to control treatment, significantly increased the yellowness of experimental snacks. The highest yellowness of chips (b*parameter) was recorded when they were processed with 15% addition of cheese and onion flavour.

Conclusions

1. The highest consumer acceptability was recorded for snacks flavoured with 5% bacon addition.
2. Addition of cheese and onion spice had no significant effect on sensory characteristics of snacks.
3. No significant influence of increasing levels of spices on overall sensory quality of snacks was observed.
4. Addition of tested ingredients affects the snacks' colour parameters, but the effect depends on the amount of the additive used.

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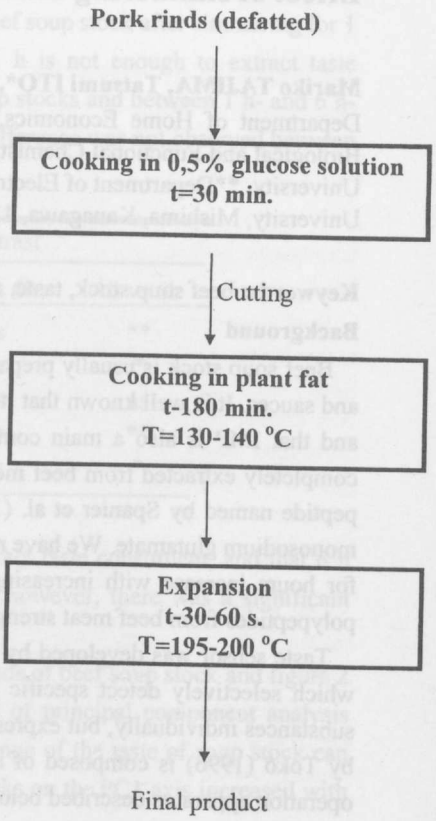

Table 1. Sensory attributes and colour parameters of snack-type products as influenced by sort and level of experimental flavours[1].

Samples	Colour	Odour	Palatability	Overall acceptability	L*	a*	b*
C	$3,60^{ac}$	$3,50^{a}$	$3,20^{a}$	$3,43^{a}$	$67,22^{b}$	$14,76^{ab}$	$29,98^{a}$
P5	$4,05^{bc}$	$3,89^{b}$	$3,96^{c}$	$3,97^{bd}$	$67,70^{b}$	$15,89^{cd}$	$30,95^{ab}$
P10	$4,06^{bc}$	$3,85^{b}$	$4,00^{c}$	$3,97^{bd}$	$66,96^{b}$	$16,59^{de}$	$31,49^{bc}$
P15	$4,06^{bc}$	$3,89^{b}$	$3,35^{ab}$	$3,77^{ad}$	$65,71^{a}$	$17,47^{e}$	$30,73^{ab}$
B5	$4,27^{c}$	$4,00^{b}$	$4,08^{c}$	$4,12^{d}$	$68,00^{b}$	$15,41^{bc}$	$32,51^{cd}$
B10	$4,18^{c}$	$4,08^{b}$	$3,85^{bc}$	$4,04^{cd}$	$67,87^{b}$	$15,21^{bc}$	$32,54^{cd}$
B15	$4,07^{bc}$	$4,09^{b}$	$4,05^{c}$	$4,07^{d}$	$67,23^{b}$	$14,98^{ac}$	$32,28^{c}$
CO5	$3,60^{ac}$	$3,45^{a}$	$3,58^{ac}$	$3,54^{ac}$	$68,00^{b}$	$14,61^{ab}$	$33,44^{de}$
CO10	$3,40^{ab}$	$3,38^{a}$	$3,66^{ac}$	$3,48^{ab}$	$70,56^{c}$	$14,50^{ab}$	$33,98^{e}$
CO15	$3,30^{a}$	$3,80^{b}$	$3,80^{bc}$	$3,63^{ad}$	$70,74^{c}$	$14,18^{a}$	$35,15^{f}$
LSD	0,71	0,29	0,55	0,52	1,24	0,94	1,11
Tested ingredients							
C	$3,60^{a}$	$3,50^{a}$	$3,20^{a}$	$3,43^{a}$	$67,22^{ab}$	$14,76^{b}$	$29,98^{a}$
P	$4,06^{b}$	$3,88^{b}$	$4,00^{c}$	$3,97^{b}$	$66,77^{a}$	$16,65^{d}$	$31,05^{b}$
B	$4,17^{b}$	$4,05^{c}$	$3,99^{b}$	$4,07^{b}$	$67,65^{b}$	$15,16^{c}$	$32,44^{c}$
CO	$3,47^{a}$	$3,54^{a}$	$3,68^{bc}$	$3,56^{a}$	$69,76^{c}$	$14,43^{a}$	$34,19^{d}$
LSD	0,19	0,16	0,31	0,37	0,72	0,16	0,19
Level of tested ingredients							
C	$3,60^{a}$	$3,50^{a}$	$3,20^{a}$	$3,55^{a}$	$67,22^{a}$	$14,76^{a}$	$29,98^{a}$
5	$3,78^{ab}$	$3,97^{b}$	$3,92^{b}$	$3,87^{b}$	$67,85^{a}$	$15,30^{b}$	$32,30^{b}$
10	$3,77^{ab}$	$3,89^{b}$	$3,84^{b}$	$3,83^{b}$	$67,89^{a}$	$15,43^{bc}$	$32,67^{c}$
15	$3,92^{b}$	$3,83^{b}$	$3,96^{b}$	$3,90^{b}$	$68,46^{b}$	$15,51^{c}$	$32,72^{c}$
LSD	0,19	0,16	0,31	0,18	0,72	0,16	0,19

[1]Means within same column with unlike superscript letters are significantly different at the 95% level. C: Control treatment; P, B, CO - snacks flavoured with red pepper, bacon, cheese and onion spice, respectively; 5, 10, 15 - snacks flavoured with 5, 10 and 15 % level of tested ingredients. LSD - the lowest significant difference.