

SUMMARY

The present paper attempts to verify the hypothesis that physically modified starches and animal proteins affect the physico-chemical properties of smoked, cooked loin, but do not change its sensory quality.

The research material consisted of loins made with physically modified starches (such as tapioca starch, potato starch, and instant potato starch), loins made with animal proteins (such as functional collagen protein, blood plasma protein and sodium caseinate), and two reference loins, i.e. loin with phosphate additives, and loin with no additives. The analyses included technological and physico-chemical parameters, analysis of key aroma compounds, and sensory evaluation. The final yields were calculated and the drip loss was determined after 4 weeks. The studies covered determination of the content of water, protein, fat, salt, phosphates and ash, measurement of the shear force, texture profile analysis, and measurement of colour parameters. The analysis of the key aroma compounds was carried out in two stages: first one consisting of determination of the key volatile compounds in loin without additives, second one being the analysis of changes in contents of the identified aromatic compounds in the remaining loins. The measurements were performed by means of gas chromatography and olfactometry analysis. On the basis of sensory analysis qualitative differences between the tested products were indicated.

The types of used protein and starch preparates differentiated the final yields of tested products. As a result, tapioca starch and plasma protein were considered to be the best substitutes for phosphates in terms of obtained yields. The lowest weight losses during the 4-week storage were found in the loins containing functional collagen protein and tapioca starch. The resulting products differed in content of water, protein, salt and ash, but no difference in fat content was demonstrated. The addition of protein and starch preparates, as against loins containing phosphates, caused brightening of the colour and an increase in intensity of the yellow colour of loins; at the same time, no similar differences were observed as regards loins without additives. The lowest value of the shear force was obtained for loin containing the additive of plasma proteins. It has been found that the addition of protein and starch preparates caused a decrease of springiness of the loins as against the product containing phosphates. In the loin containing no additives were identified thirty-one key aroma compounds of the odour activity values ranging from 10 to 12,710. The compounds were: phenols, sulfur compounds, aldehydes and ketons, and nitrogen compounds. The loin without additives was a product of the highest content of volatile compounds. The used protein and starch additives, as well as phosphates, caused reduction of key volatile compounds content. The greatest differentiation in the contents of volatile compounds, as regards the loin without additives and loin containing phosphates, was found in loin with plasma protein additive. The analysis of volatiles revealed the occurrence of characteristic volatile substances depending on the additives used. For the loins containing modified starch additive was determined 2-methyl-3-buten-1-ol, whereas for the loins with protein preparates - pentane. In the case of loin containing plasma protein,

the characteristic volatile compound found was 2,3-butanedione, and in case of loin with protein collagen additive - *p*-xylene. The loin containing phosphates indicated increased amounts of furan derivatives. The quantitative descriptive analysis of taste and odour characteristics revealed differentiation of odour intensity of cooked meat, smoked, and animal descriptors, and of taste, which ranged from smoked, animal, sweet, salty, sour, to umami. In the case of loin containing plasma proteins, as compared to other products, a modified taste and odour profile was determined. The analysis by five-point method for sensory evaluation revealed differences in sensory quality of the evaluated loins. No significant variations in colour were determined, but there was a significant reduction observed in the quality of odour, taste, texture and cross section appearance in the case of loin containing blood plasma additive. The addition of modified starches preparates did not cause reduction in the overall quality of loins. In the case of protein preparates, a significant decrease in sensory quality was found for the loin containing plasma protein additive.

The conducted research has demonstrated that the use of physically modified starches does affect the physico-chemical properties, and does not cause a reduction in sensory quality. It can also be concluded that tapioca starch may be considered the best substitute for phosphates.

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