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Effect of the addition of *Staphylococcus xylosum* on the oxidative stability of traditional sausage (*Petrovská klobása*)

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Abstract

The effect of adding *Staphylococcus xylosum* on the oxidative stability and sensory properties of the traditional sausage (*Petrovská klobása*) subjected to industrial conditions of ripening was studied at day 0 and after 1 and 2 months of storage. During storage, TBARS values in sausages with added *Staphylococcus xylosum* ranged from 0.13 to 0.52 mg malondialdehyde/kg significantly lower ($p < 0.05$) than those of control sausages. After 2 months storage, sensory properties of sausage with added *Staphylococcus xylosum* (4.52) was better compared to control sausage. Adding *Staphylococcus xylosum* can contribute to better oxidative and sensory stability of *Petrovská klobása* during storage.

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Keywords: *Petrovská klobása*; *Staphylococcus xylosum*; lipid oxidation; odour and taste

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1. Introduction

Petrovska klobasa is a traditional dry fermented sausage produced in Backi Petrovac (the province of Vojvodina, Serbia)^{1,2}. Due to the variability of the used meat, spices and other ingredients, effects of different processing and storage conditions, fermented sausages are subjected to chemical, microbiological and sensory degradation. The most common cause of chemical degradation is lipid oxidation. One way to slow down the oxidation of lipids is the use of starter cultures^{3,4}. *Staphylococcus xylosus* strains are one of the most active indigenous microorganisms in the lipolysis and the proteolysis of fermented sausage. Enzymes, catalase and superoxide dismutase produced by *Staphylococcus xylosus* decompose the hydrogen peroxide and prevent lipid oxidation^{5,6,7,8}.

Thus, the aim of this study was to evaluate the effect of the addition of *Staphylococcus xylosus* on lipid oxidative stability and sensory properties of odour and taste of traditional dry fermented sausage (*Petrovska klobasa*) subjected to industrial conditions of drying and ripening during storage.

2. Materials and methods

Batter for the experimental sausages was made from chilled lean pork and fat in the ratio 85:15. The procedure is described in detail in Sojic et al.³ Half of the batter obtained was inoculated with *Staphylococcus xylosus* (SC). Other half of batter was assigned as control. Sausages of SC and control groups were subjected to smoking, drying and ripening in industrial conditions ($t = 14.4 \pm 0.63^\circ\text{C}$, $\text{RH} = 80.2 \pm 3.53\%$). After the drying process, both groups of sausages were stored for 2 months.

TBARs (2-thiobarbituric acid reactive substances) test was performed using the method of Bostoglou et al.⁹ Sensory evaluation of odour and taste was performed according to quantitative descriptive analysis (QDA)¹⁰. Statistical analysis was carried out using STATISTICA 12.0. Results and discussion

Lipid oxidative changes expressed by TBARs test are shown in Table 1. During storage, there was an increase in TBARs values for both groups of sausages, probably as a result of lipid oxidation¹⁰.

Table 1. Effect of the addition of *Staphylococcus xylosus* on TBARs value of traditional sausage (*Petrovska klobasa*).

Sausage type	TBARS values		
	0 storage	1 month storage	2 month storage
Control	0.20±0.03 ^{c,A}	1.89±0.01 ^{b,A}	2.63±0.05 ^{a,A}
SC	0.13±0.01 ^{c,B}	0.17±0.02 ^{b,B}	0.52±0.03 ^{a,B}

^{A-B} The values of the same column significantly differ with 95% probability ($p < 0.05$).

^{a-c} The values of the same row significantly differ with 95% probability ($p < 0.05$).

After 2 months of storage, TBARs value in SC sausage reached 0.52 mg MDA/kg and was significantly ($p < 0.05$) lower, compared with this value in the control (2.63 mg MDA/kg). The reduced lipid oxidation in *Petrovska klobasa* could be attributed to the addition of *Staphylococcus xylosus*^{5,6}.

The effects of the addition of *Staphylococcus xylosus* on the sensory evaluation of odour and taste of traditional fermented sausages are shown in Fig. 1. After 2 months of storage, sensory evaluation of odour and taste for SC sausage (4.52) was significantly higher ($p < 0.05$), compared to the control (3.39).

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