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## Microbiological profile of *Petrovska klobasa* made from warm meat in the traditional way depending on the method of packaging

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### Abstract

A study was carried out on a typical homemade *Petrovska klobasa* in order to characterize this traditional dry-fermented sausage, and to provide a basis for establishing the quality standard and protecting designation of origin. This paper reviews the microbiological profile of the produced from warm meat in the traditional way depending on the method of packaging (unpacked, vacuum-packed and MAP), with particular reference to the presence of aerobic mesophilic bacteria, micrococci and enterococci. According to the results, no significant practical difference was noticed between the use of either natural or artificial casings.

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### 1. Introduction

*Petrovska klobasa* is a dry-fermented sausage manufactured in the municipality of Bački Petrovac (Province of Vojvodina, Northern Serbia). *Petrovska klobasa* is a part of Slovaks' heritage, who inhabited Vojvodina in the 18th

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century, and who are still producing it in the traditional manner according to original recipes of their predecessors, without use of chemical additives and microbial starters<sup>1,2</sup>. In traditional conditions, this sausage is made at the end of November and during December, when temperatures are around 0°C or lower. The drying and ripening process lasts about 120 days, until it achieves specific and recognizable quality<sup>3,4</sup>. Due to its savoury taste, aromatic and spicy-hot flavour, dark red colour and hard consistency, *Petrovska klobasa* is highly appreciated by consumers and it has a Protected Designation of Origin (PDO) under Serbian law<sup>5,6</sup>.

## 2. Materials and methods

### 2.1. Preparation of *Petrovska klobasa*

*Petrovska klobasa* dry fermented sausages were manufactured from a mixture of lean minced pork (80%) and pig fat (20%) obtained from carcasses of large white cross breed animals. After grinding the meat and the fat to a size of about 10 mm (with adjustable plate holder diameter set), raw materials were mixed with seasonings (red hot paprika powder, salt, raw garlic paste, caraway and sucrose) for about 10 min<sup>7</sup>. The seasoned batter was immediately stuffed into collagen casings (the three packaging types, two type of collagen casings – one artificial, and one natural pig intestine 500 mm long and 55 mm in diameter), and raw sausages were entirely processed in traditional smoking/drying room during 120 days.

### 2.2. Samples

Samples of batches A1 (natural casing) and A2 (artificial casing) were taken before stuffing (at day 0) and during processing (on days 2,4, 6, 9, 12, 15, 30, 45, 60, 90, 120 and 150).

### 2.3. Microbiological methods

Each sample was tested for the presence of the following bacteria: (1) total viable count (SRPS ISO 4833), Plate Count Agar -PCA, Oxoid incubated at 30°C for 72h; (2) total count of *Micrococcaceae*, Mannitol salt phenol-red agar, Oxoid, incubated at 30°C for 72 h and, (3) *Enterococcus* on Bile esculin azide agar, Biokar diagnostics, incubated at 37°C for 48 h.

### 2.4. Statistical analysis

Statistical analysis was performed using Statistica 9.1 for Windows, Stat Soft, Tulsa, Oklahoma, USA.

## 3. Results and discussion

The impacts of the casing type and packaging method on sausages are presented in Figs. 1 and 2.

As far as aerobic bacteria were concerned, in the samples of unpacked *Petrovska klobasa*, the maximum count was  $3.39 \pm 0.94$  for the A2 group (Fig. 2), while the minimum was  $2.26 \pm 0.31$  (sausage packed in vacuum, the A2 group). In the A1 group for all three packaging types (unpackaged sausage, vacuum-packed sausage and MA), about the same contamination levels were observed. There was no statistically significant difference between the groups A1 and A2 depending on the method of packaging.

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