

INFLUENCE OF THE BASIL EXTRACTS AND *ARILLUS MYRISTICAE* ON ANTIOXIDATIVE CHANGES IN SEMIDURABLE SAUSAGES

Aco Kuzelov¹, Darko Andronikov², Nako Taškov³, Dušica Saneva³,
Dijana Naseva¹, Elenica Sofijanova⁴

¹Faculty of Agriculture, University “Goce Delčev”, Krste Misirkov bb, Štip, Republic of Macedonia

²Faculty of Technology, University “Goce Delčev”, Krste Misirkov bb, Štip, Republic of Macedonia

³Faculty of Tourism and Business logistics University “Goce Delčev”,
Krste Misirkov bb, Štip, Republic of Macedonia

⁴Faculty of Economics, University “Goce Delčev”, Krste Misirkov bb, Štip, Republic of Macedonia
aco.kuzelov@ugd.edu.mk

In this paper are given the test results of antioxidative effect of basil extract and extract of *Arillus myristicae* by examination of degree of acidity and peroxide number on lipid for semidurable national sausage. After manufacture sausage was vacuum and stored at temperature of +4°C. Degree of acidity and peroxide number were examined 1, 10, 20, 30, 40 and 50 days of production. Best results give the sample with the addition of 0.3 g of basil extract per kg mixture compared with samples with *Arillus myristicae* extract.

Key words: basil extract; *Arillus myristicae* extract; degree of acidity; peroxide number; antioxidative effect

ВЛИЈАНИЕ НА ЕКСТРАКТ ОД БОСИЛОК И ОД МУСКАТЕН ЦВЕТ ВРЗ АНТИОКСИДАТИВНИТЕ ПРОМЕНИ НА НАРОДЕН КОЛБАС

Во трудот се дадени резултатите од испитувањата на антиоксидативното дејство на екстракти од босилок и од мускатен цвет, преку испитување на параметрите киселински степен и пероксиден број, врз масите на народен колбас. По производството колбасот беше вакуумиран и чуван на температура од +4 °C. Киселинскиот степен и пероксидниот број беа испитувани 1, 10, 20, 30, 40 и 50 дена по производството. Најдобри резултати даде пробата со додаток на 0.3 грама екстракт од босилок на килограм смеса во споредба со пробите со екстракт од мускатен цвет.

Клучни зборови: екстракт од босилок; екстракт од мускатен цвет, киселински степен; пероксиден број; антиоксидативно дејство

INTRODUCTION

The most common form of chemical deterioration is the oxidation of lipids in meat and meat products, with which comes to a reduction in their quality and changes in taste and smell (Kanner, 1994, Aguirrezábal et al., 2000). Oxidation of meat products may be reduced or inhibited using antioxidants and that way can be improved their quality and shelf-life (Yin and Cheng, 2003). In recent years, increased research for natural antioxidants because there are many negative effects of synthetic antioxidants (BHA, BHT and tertiary

butyl hydroquinone (TBHQ) (Pokorný, 1991; Arihara, 2006). Recently, research are single-minded to the identification of antioxidants from sources of plants.

Here are given extracts of spices which contain biologically active compounds with antioxidative effect. In basil and basil extract key ingredients are chavicol, linalool and eugenol (Savić and Danon, 1985; Dragoev, 2004; Mondello et al., 2007; Leal et al., 2008). In *Arillus myristicae* and *Arillus myristicae* extract are eumicin, eugenol, safrol, izoeugenol, terpenes and alcohol (Savić and Danon, 1985). Some authors say that antioxi-

dant effect have basil, *Arillus myristicae* and their extracts (Savić and Danon, 1985; Nguefack et al., 2004; Nebedum, et al., 2009; Sanchez et al., 2010). Because there is very little literature on the impact of data extracts basil and *Arillus myristicae* on the quality and durability of semidurable sausage, the aim of our study was to examine the effect of different concentrations of the extract of basil and extract of *Arillus myristicae* on the oxidative changes on semidurable national sausage.

MATERIAL AND METHOD

As material for examination we have used the semidurable sausage of the type produced home – national sausage. Sausage was produced in compliance with all veterinary sanitary regulations which apply in the Republic of Macedonia. For the production of the sausage the following raw material was used: beef second category (25%), pork second category (20%), fat tissue (30%), meat steak (10%) and hard water-ice (15%). Per 1 kg is added: 18 grams of nitrite curing salt and 3 grams phosphate product, emulsifier 0.020 g, spices mixture semidurable national sausage 0.040 g (*Koleks Ljubljana, Slovenia*). The mixture is stuffed into small pork's intestine. For the experiment four samples were prepared.

At first, samples were prepared with adding extract of basil:

Sample 1 – control sample without adding extract of basil.

Sample 2 – sample by adding 0.1 g of basil extract per kg mixture.

Sample 3 – sample by adding 0.2 g extract of basil per kg mixture.

Sample 4 – sample by adding 0.3 g extract of basil per kg mixture.

After prepared samples with adding extract of basil and full examination of samples were prepared samples with adding extract of *Arillus myristicae*:

Sample 1 – control sample without adding extract of *Arillus myristicae*.

Sample 2 – sample by adding 0.1 g extract of *Arillus myristicae* per kg mixture.

Sample 3 – sample by adding 0.2 g extract of *Arillus myristicae* per kg mixture.

Sample 4 – sample by adding 0.3 g extract of *Arillus myristicae* per kg mixture.

The extracts of basil and garlic are produced in the company of ECOL Canada. Extracts were 100% pure, their microbiological picture was spotlessly and they were applied in production – grinding the mixture. After filling and leaving the water to come out of the sausage, it was thermally prepared. Thermal processing is implemented by the following formula: 35 minutes drying, 20 minutes smoked at 62°C, 35 minutes of boiling at 78°C or until the center of the product does not reach a temperature of 69–72°C. After thermal processing, it was vacuumed with vacuum machine Vebomak. After vacuum packaging, sausage was stored in a chamber at a temperature of +4°C.

During storage on the 1st, 10th, 20th, 30th, 40th and 50th day of production, sausages were examined for degree of acidity and peroxide number.

Degree of acidity was examined by the method of ISO 660 (2000), peroxide number by ISO 3960 (2001). Each parameter is determined by three repetitions and the results are presented as mean value ± SD. The obtained results were processed by mathematical statistical method Microsoft Excel 1997–2003.

RESULTS AND DISCUSSION

The results of hydrolytic and oxidative changes in all four groups studied samples are shown in charts 1, 2, 3 and 4.

The charts show that during storing sausages, the acid number (quantity of free fat) is increasing in all tested sausages, especially in the control group. In samples with adding of basil extract, peroxide number in the control is 0.70 mmol/kg ± SD 0.02 and in the sample with the addition of 0.3 g extract per kg mixture is 0.48 mmol/kg ± SD 0.05. In samples with adding of *Arillus myristicae* extract, peroxide number in the control is 0.81 mmol/kg ± SD 0.05 and in the sample with the addition of 0.3 g extract per kg mixture is 0.49 mmol/kg ± SD 0.05. During storage the temperature of the sausages +4°C in the samples with addition of basil and *Arillus myristicae* extract, peroxide number is constantly increasing. In samples with basil extract and *Arillus myristicae* extract, the peroxide number in the control samples is (1.50 mmol/kg ± SD 0.2 and 1.53 mmol/kg ± SD 0.5) and reducing in samples 3 (0.69 mmol/kg ± SD 0.02 and 1.17 mmol/kg ± SD 0.4).

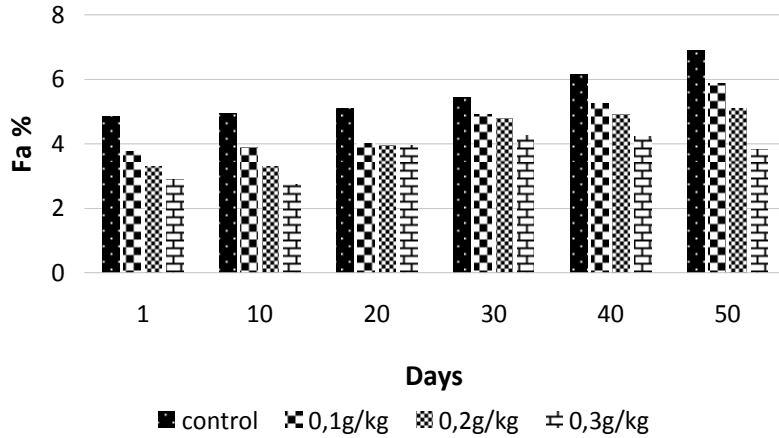


Chart 1. Changes in the degree of acidity in the four samples of tested sausages treated with basil extract during vacuum storage

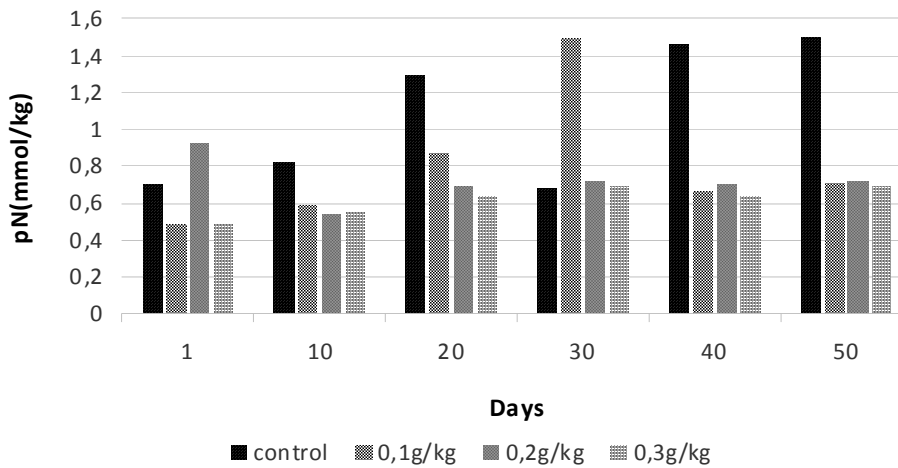


Chart 2. Changes of peroxide number in the four samples of tested sausages treated with basil extract during vacuum storage

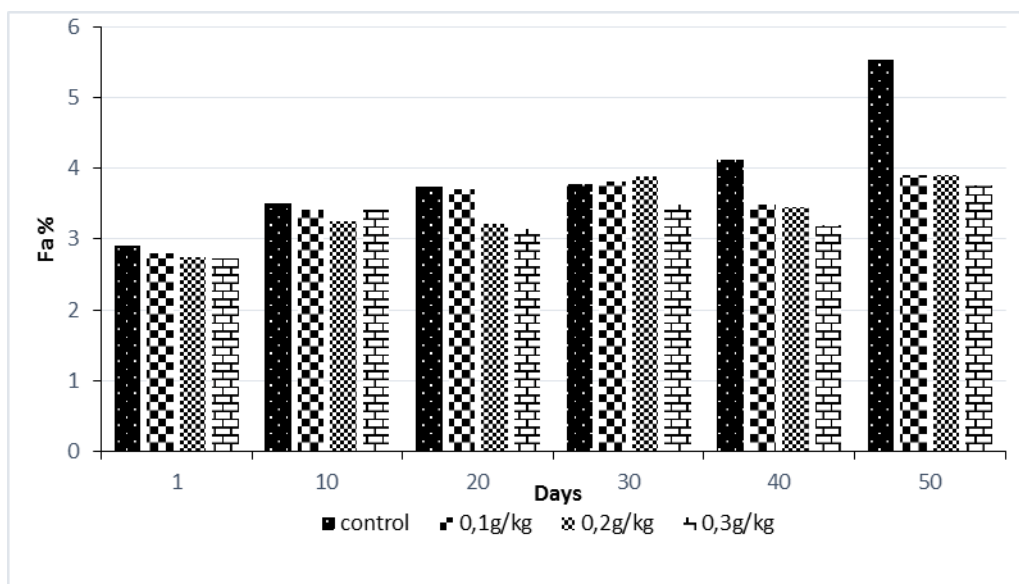


Chart 3. Changes in the degree of acidity in the four samples of tested sausages treated with *Arillus myristicae* extract during vacuum storage

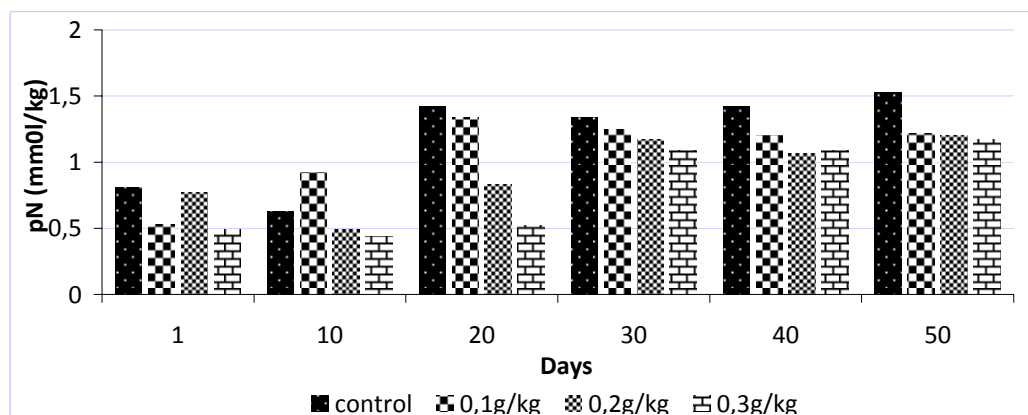


Chart 4. Changes of peroxide number in the four samples of tested sausages treated with *Arillus myristicae* extract during in vacuum storage

According Ostrić-Matijašević B. (1963) sensory changes of sausages are visible even when the value of the peroxide number is greater than 5 mmol/kg. It can be concluded that the process of oxidation in the tested samples is not expressed. Pičurić-Jovanović et al. (2000) have examined the antioxidative activity of basil and basil extract and found that the extract of basil shows relatively little antioxidative effect.

The results that we have obtained are probably as a result of antioxidative effect of extracts of basil and *Arillus myristicae* or any their own ingredients and vacuum packaging sausages.

CONCLUSIONS

According to the above written, we can conclude the following: The best results of antioxidative properties have in sample 3 with 0.3 g/kg extract of basil compared with *Arillus myristicae* extract. The extract of basil has something better antioxidative properties compared to *Arillus myristicae* extract.

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