

Section 5. Agricultural sciences

Ajçe Sulltanë,
Dr, Department Agronutrition
Faculty of Agriculture, Fan. S. Noli University, Korçë, Albania

NATURAL ANTIMICROBIAL IMPACT OF SAGE PLANT ON MICROBIOLOGICAL SAFETY OF BEEF IN KORÇA, ALBANIA

Abstract. Beef is a very necessary food product for our food diet. It contains: water, proteins, fats, minerals, and small amounts of carbohydrates, amino acids, as well as vitamins. Microorganisms in meat multiply very quickly causing such changes that make meat dangerous to the consumer. The sage plant (genus *Salvia*) in meat has a wide use in the kitchen. Sage extracts and essential oils have antioxidant, antifungal and antiseptic action. Studies have shown that: sage phenolic acids are potent against *Staphylococcus aureus*. Sage essential oil is effective against *Escherichia coli* and *Salmonella spp.*, Filamentous fungi and yeasts such as: *Candida albicans*. Therefore, the study consists of general microbiological control of fresh beef in two anatomical parts (neck, shoulders): before treatment with sage antimicrobial agent (genus *Salvia*) and after treatment with sage antimicrobial agent (genus *Salvia*). Samples were taken in sterile conditions from refrigerated meat shops in the Korça area. Analyzed samples of fresh beef (neck and shoulders) before and after treatment with sage show a reduction in overall microflora. Experimental measurements showed that the largest number of microorganisms (cfu/gr) were counted in the neck and less in the shoulder.

Keywords: general microflora; fresh beef; agent antimicrobial; genus *Salvia*; antiseptic.

I. Introduction

Beef has been used and is used as the main food source due to its nutritional value. The beef industry and their by-products is related not only to the technological side, optimal parameters, technological conditions of slaughter, the degree of mechanization. (Encyclopedia of meat sciences, 2004)¹. Therefore, being a protein food makes these products and by-products very attractive to

¹ Arnau Arboix J Cooked ham. In; Jensen WK, Devine M –Encyclopedia of meat sciences, 2004

the action of microorganisms, and consequently, to possible microbial contamination, including pathogenic microorganisms. Microorganisms can only be found in sick animals or those that are tired or hungry before slaughter. The growth of microorganisms usually starts from the surface. (Foodborne Pathogenic Microorganisms and natural Toxins Handbook the «Bad Bug Book», 2009)¹

Meat, like all foods should be canned for as short a period of time, of course, limited, before use. However unlike fresh foods, fresh and very fresh meat is not very palatable because in fact it is slightly aromatic, dry and firm. Achieving optimal organoleptic characteristics such as color, softness, aroma are achieved about a week after slaughter. (James.M.Jay – Modern Food Microbiology)².

Among the bacteria that have been isolated from the surface we can mention: *Pseudomonas* spp., *Moraxella* spp., *Acinetobacter* spp., *Lactobacillus* spp., *Micrococcus* spp., *Enterobacteriaceae*: *Klebsiella* spp., *Yersinia* spp., *Serratia* spp., *Proteus* spp.; *Bacillus* spp., *Chromobacterium* spp., *Flavobacterium* spp., *Alcaligenes* spp., *Vibrio* spp., *Aeromonas* spp., *Arthobacter* spp., *Corynebacterium* spp., *Staphylococcus* spp., yeast and fungi were also found. (Hamzaraj.E-Mikrobiologjia e Përgjithshme, Tiranë, 2007)³. Certain cells can contaminate meat during slaughter (agonizing contamination) and also during the preparation of carcass (post-mortem contamination) from the environment, fecal materials, skin, instruments, manipulations, etc.(Troja. R – Kimia dhe teknologjia ushqimore, 2005)⁴. This paper aims to compare samples of beef processed with natural antimicrobial substances (sage) in two anatomical parts (neck and shoulders) at points of sale of meat in refrigerated conditions (refrigeration). This serves to provide data regarding the microbial safety of the products offered in the market. The study consists of general microbiological control of fresh beef before and after treatment with sage antimicrobial agent (genus *Salvia*). (Prifti., D- Mikrobiologjia ushqimore, 2007)⁵.

We will perform the methodology according to the microbiological control offered in the Practicum of Technical Microbiology (M. Frashëri; D. Prifti. 2000. Tirana)⁶. The experimental work that we will present is a part of the scientific research of the tests that can be performed, on the experimental results of which will depend the successful continuation of the research in the same field.

II. Materials and methods

Microbiological characteristics of fresh beef. Four beef samples were taken for the study: Neck part; Shoulder part. The neck part treated with sage; Shoul-

¹ Foodborne Pathogenic Microorganisms and natural Toxins Handbook the «Bad Bug Book», 2009.

² James M.Jay- Modern Food Microbiology. 2001.

³ Hamzaraj E -Mikrobiologjia e Përgjithshme, Tiranë, 2007.

⁴ Troja R. – Kimia dhe teknologjia ushqimore, 2005.

⁵ Prifti D. - Mikrobiologjia ushqimore, 2007.

⁶ Frashëri M., Prifti D. - Praktikum i Mikrobiologjisë Teknike, – Vol. I. 1997.

der part treated with sage. The determination of the microflora was done in two terrains, PCA and Capek (antibiotic) terrains with the method of limit dilutions described in the methodology. (Frashëri. M – Practicum of Technical Microbiology, volume I)¹ The results are presented in Tables 1 and 2.

III. Results and discussions

Table 1. – General microbiological control of fresh beef untreated with sage plant (antimicrobial agent) cfu/gr

Samples	Dilu- tions	Para- lels	Terrains				
			PCA		Capek (antibiotic)		
			Time of incubation		Time of incubation		
			24 hours cfu/gr	48 hours cfu/gr	24 hours cfu/gr	48 hours cfu/gr	7 days cfu/gr
Beef shoul- der	10 ⁻¹	I	12	15	–	–	–
		II	15	16	–	–	–
		Aver.	18.5	15.5	–	–	–
	10 ⁻²	I	6	6	–	–	–
		II	6	9	–	–	–
		Aver.	6	7.5	–	–	–
	10 ⁻³	I	5	5	–	–	–
		II	6	7	–	–	–
		Aver.	5.5	6	–	–	–
Beef neck	10 ⁻¹	I	15	32	–	–	–
		II	13	16	–	–	–
		Aver.	14	24	–	–	–
	10 ⁻²	I	5	7	–	–	–
		II	4	6	–	–	–
		Aver.	4.5	6.5	–	–	–
	10 ⁻³	I	3	5	–	–	–
		II	2	4	–	–	–
		Aver.	2.5	4.5	–	–	–

¹ Frashëri M. – Practicum of Technical Microbiology, – Vol. I.

Table 2. – General microbiological control of fresh beef treated with sage (antimicrobial agent) cfu/gr

Samples+	Dilutions	Para- lels	Terrains				
			PCA		Capek (antibiotic)		
			Time of incubation		Time of incubation		
			24 hours cfu/gr	48 hours cfu/gr	24 hours cfu/gr	48 orë cfu/gr	7ditë cfu/gr
Beef shoul- der	10 ⁻¹	I	3	3	–	–	–
		II	4	5	–	–	–
		Aver.	3.5	4	–	–	–
	10 ⁻²	I	2	4	–	–	–
		II	3	3	–	–	–
		Aver.					
10 ⁻³	I	3	4	–	–	–	
	II	4	4	–	–	–	
	Aver.						
Beef neck	10 ⁻¹	I	10	14	–	–	–
		II	3	12	–	–	–
		Aver.					
	10 ⁻²	I	2	3	–	–	–
		II	2	4	–	–	–
		Aver.					
10 ⁻³	I	–	3	–	–	–	
	II	–	3	–	–	–	
	Aver.						

IV. Conclusions

At the end of this study on the general microbial load and fungal load of beef (neck and shoulders), untreated and treated with Sage (genus *Salvia*), in natural antimicrobial agent, in meat shops in the area in Korça we reached the following conclusions:

Tests for beef microflora (neck) untreated with sage (essential oils), natural antimicrobial agent, number of cfu/gr colonies (average number) in this untreated part varies: PCA terrain according to all three dilutions, after 24 hours incubation in thermostat at 37 °C; from 3 colonies to 14;

PCA terrain according to all three dilutions, after 48 hours of incubation in thermostat at 37 °C; from 5 colonies to 24;

In the Capek terrain according to the three dilutions, after 48 hours of incubation in the thermostat at 28 °C; from 4 colonies to 12; Tests for beef

microflora (shoulder) untreated with sage (essential oils), natural antimicrobial agent, number of cfu / gr colonies (average number) in this untreated part varies: PCA terrain according to all three dilutions, after 24 hours incubation in thermostat at 37 °C; from 6 colonies to 14 (cfu/gr); PCA terrain according to all three dilutions, after 48 hours of incubation in thermostat at 37 °C; from 6 colonies to 16; In the Capek field according to the three dilutions, after 48 hours of incubation in the thermostat at 37 °C; from 1 colony to 7.5; Analyzes for the microflora of beef (neck) treated with sage (essential oils), natural antimicrobial agent, the number of cfu/gr colonies (average number) in this treated part varies: PCA terrain according to all three dilutions, after 24 hours incubation in thermostat at 37 °C; from 2 colonies to 7; PCA terrain according to all three dilutions, after 48 hours of incubation in thermostat at 37 °C; from 3 colonies to 13; In Capek terrain (with antibiotics) according to the three dilutions, after 48 hours of incubation in a thermostat at 28 °C, 0 colonies; No molds were counted after 7 days of incubation; This is a high indicator of meat quality. Analyzes for the microflora of beef (shoulder) treated with sage (essential oils), natural antimicrobial agent, the number of cfu /gr colonies (average number) in this treated part varies:

PCA terrain according to all three dilutions, after 24 hours incubation in thermostat at 37 °C; from 3 to 4; PCA field according to all three dilutions, after 48 hours of incubation in thermostat at 37 °C; from 4 to 5; In Capek field (with antibiotic) according to all three dilutions, after 48 hours of incubation in thermostat at 28 °C; 0 colonies; No molds were counted after 7 days of incubation; This is a high indicator of meat quality

Experimental measurements clearly show a reduction in the microbial load of beef after treatment with the natural sage antimicrobial agent (Salvia).

At the end of this study on the general microbial load and fungal load of beef (neck and shoulders), untreated and treated with Sage (genus Salvia), in natural antimicrobial agent, in meat shops in the area of In Korça we reached the following conclusions:

Tests for beef microflora (neck) untreated with sage (essential oils), natural antimicrobial agent, number of cfu / gr colonies (average number) in this untreated part varies:

PCA terrain according to all three dilutions, after 24 hours incubation in thermostat at 37 °C; from 3 colonies to 14; PCA terrain according to all three dilutions, after 48 hours of incubation in thermostat at 37 °C; from 5 colonies to 24;

In the Capek terrain according to the three dilutions, after 48 hours of incubation in the thermostat at 28 °C; from 4 colonies to 12;

Tests for beef microflora (shoulder) untreated with sage (essential oils), natural antimicrobial agent, number of cfu / gr colonies (average number) in this untreated part varies: PCA terrain according to all three dilutions, after 24 hours incubation in thermostat at 37 °C; from 6 colonies to 14; PCA terrain

according to all three dilutions, after 48 hours of incubation in thermostat at 37 °C; from 6 colonies to 16;

In the Capek terrain according to the three dilutions, after 48 hours of incubation in the thermostat at 28 °C; 0 colonies;

Analyzes for the microflora of beef (neck) treated with sage (essential oils), natural antimicrobial agent, the number of cfu/gr colonies (average number) in this treated part varies:

PCA terrain according to all three dilutions, after 24 hours incubation in thermostat at 37 °C; from 2 colonies to 7;

PCA terrain according to all three dilutions, after 48 hours of incubation in thermostat at 37 °C; from 3 colonies to 13;

In Capek terrain (with antibiotics) according to the three dilutions, after 48 hours of incubation in a thermostat at 28 °C, 0 colonies; No molds were counted after 7 days of incubation; This is a high indicator of meat quality

Analyzes for the microflora of beef (shoulder) treated with sage (essential oils), natural antimicrobial agent, the number of cfu/gr colonies (average number) in this treated part varies:

PCA terrain according to all three dilutions, after 24 hours incubation in thermostat at 37 °C; from 3 to 4

PCA terrain according to all three dilutions, after 48 hours of incubation in thermostat at 37 °C; from 3 to 4;

In Capek terrain (with antibiotic) according to all three dilutions, after 48 hours of incubation in thermostat at 28 °C; 0 colonies. No molds were counted after 7 days of incubation; This is a high indicator of meat quality

Experimental measurements clearly show a reduction in the microbial load of beef after treatment with the natural sage antimicrobial agent (Salvia).

References:

1. Arnau Arboix J Cooked ham. In; Jensen WK, Devine M –Encyclopedia of meat sciences, 2004.
2. Foodborne Pathogenic Microorganisms and natural Toxins Handbook the «Bad Bug Book», 2009.
3. Frashëri M., Prifti D. - Praktikumi i Mikrobiologjisë Teknike, Vol. I. 1997
4. James M. Jay- Modern Food Microbiology. 2001.
5. Papa S. – Disertacioni “Vlerësimi i shumëllojshmërisë së gjeneve koduese të monoterpen sintetazave dhe produkteve enzimmatike të tyre tek popullata të sherebelës të Shqipërisë së veriut”.
6. Hamzaraj E. – Mikrobiologjia e Përgjithshme, Tiranë, 2007.
7. Prifti D.- Mikrobiologjia ushqimore, 2007.
8. Shabani L. – Mikrobiologjia e ushqimeve të fermentuara, 2003.
9. Troja R. – Kimia dhe teknologjia ushqimore, 2005.
10. URL: [http://www. Researchgate.net](http://www.Researchgate.net), PDF, Teknologjia e Përpunimit të Mishit, 2017.