

## USE OF ROSEMARY AND RED ONION EXTRACT IN DEMI SMOKED SALAMY

Orădan Cristian Adrian\*, Timar Adrian\*\*

\*University of Oradea, Doctoral School of Biomedical Science, 1 University St., 410087, Oradea, Romania, e-mail: [cristi\\_1406@yahoo.com](mailto:cristi_1406@yahoo.com)

\*\*University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea, Romania, e-mail: [atimar@uoradea.ro](mailto:atimar@uoradea.ro)

### **Abstract**

*Meatstuff production was increasing continuously in Romania during last 30 years. In order to answer to the higher demands of the population regarding quality and new types of products due to latest trends that are reducing the additives use there were researches and concerns related with additive replacement by natural compounds.*

*In this way it was a challenge to find proper dosage, way of production and way of use of natural extracts but keeping the appearance of the product similar with classical production variant in order to lead to purchasing intention from consumers. Also it was important to assess the meatstuff quality obtained in comparison with products obtained in classical approach.*

*Finding the shelf life of the products that contained natural additives was also a real challenge and it was the final validation of the solution proposed.*

**Key words:** meatstuff, rosemary, red onion, shelf life, nitrites substitution.

### **INTRODUCTION**

**Meat** has long been considered a highly desirable and nutritious food.

Unfortunately it is also highly perishable because it provides the nutrients needed to support the growth of many types of micro-organisms and due to composition rich in proteins and having high water content.

The meatstuff are most appreciated products in the foodchain and also very valuable from nutritional point of view. Due to high level of processing the meatstuff are very exposed to changes at physical, biochemical, microbiological and rheological level.

One of the most important change is related with color that is turning from the meat color to dark. The responsible for meat color is myoglobin in specific forms. Myoglobin is a water-soluble protein that stores oxygen for aerobic metabolism in the muscle. It consists of a protein portion and a nonprotein porphyrin ring with a central iron atom. The iron atom is an important player in meat color.

Myoglobin forms are the following: Deoxymyoglobin, Carboxymyoglobin, Metmyoglobin, Oxymyoglobin

The defining factors of meat color are the oxidation (chemical) state of the iron and which compounds (oxygen, water or nitric oxide) are attached to the iron portion of the molecule.

Meat color is dependent on: Pigment content - Myoglobin mainly, Chemical State of Myoglobin, Ultimate pH and rate of pH decline postmortem, Nature of group attached to the iron and the state of the iron, Ingredients, processing, Vitamin E, Microflora, Slaughtering, Curing (Salting), Packing, etc.

Meat color is very important because it affects consumer purchase decisions.

Research continues to find ways to improve the length of time a product stays "bright red" in the meat case. The most common technique of keeping the color of meatstuff is nitrites and nitrates adding.

**Nitrite/Nitrate** may be added to meat in the form of *sodium* - E250 and E251 or *potassium* - E252 and E249 salts to provide desirable flavor, color and conservation to the cured meat products.

**Nitrate** is reduced to **Nitrite** by bacterial action and thermal treatment and in fact nitrite is the compound that is responsible for the flavor, color and shelf life in cured meats.

The additives are introduced in the meat by so called curing process. Curing of meat using salts as preservatives is used for many centuries. It is a process by which meat products are treated with salt, nitrite or nitrate salts or both and other curing agents to improve the color, texture and flavor of meat and also preservation of meat. Most cured meat products are cooked and/or smoked: hot dogs, semi - smoked, raw - dry, bacon, etc.

As we mentioned the most important effect of nitrites after meat stuff color improving is preservative one. In this way we investigate alternatives for obtaining same effects using natural extracts rich in bioactive compounds from Rosemary and Red Onion. In the same time this approach fortify the meatstuff with bioactive compounds.

Rosemary and Red Onion were chosen because their well known benefits in consumers health. Rosemary Prevents oxidative stress, Fight against inflammation, Bioavailability, Helping cardiovascular system

Red Onion have the following properties on humans health: Reduce the cholesterol content, Prevent atherosclerosis, Fight against inflammation, Help immune system, Detoxification effect, Reduce blood pressure and Prevent diabetes according to several studies.

## **MATERIAL AND METHOD**

Aims of the study were the following:

- Reducing the nitrite consumption and intake,
- Fortifying the meatstuff with bioactive compounds,

- Maintaining the meatstuff global quality at the required demands,
- Improving the sensorial properties of the meatstuff.

For fulfilling this there were established following objectives:

- Producing the natural extract,
- Finding the proper dosage in meatstuff,
- Assessing the shelf life of the meatstuff.

Producing the natural extract was done following the production flow from below.

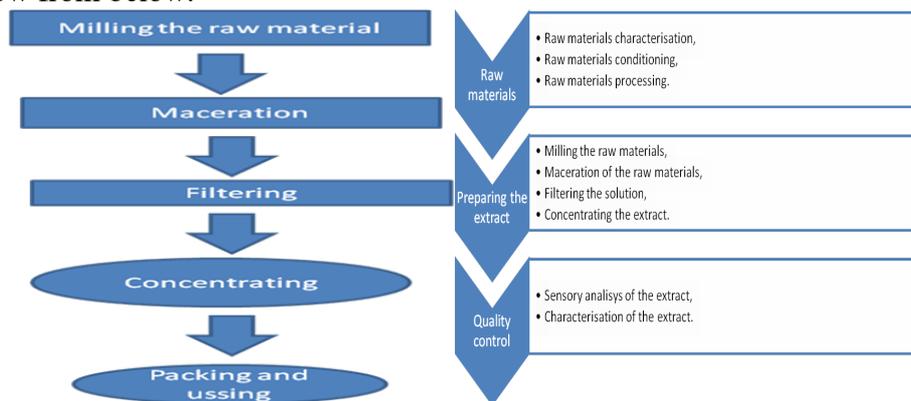


Figure 1. Producing the natural extract and quality control

The main issues was raw materials management. In this way raw materials were characterized, conditioned and mechanical procesed.

Preparation of the extract was the second issue because it was important to maintain properties of raw materials.

Preparation of extract from rosemary and red onion was done by maceration in alchoolic solution in 1:1 ratio for 24 hours and then under vacuum extraction the alchool was evaporated.

We pay attention for raw material food safety and in this way the raw materials were imersed for maceration in ethilic alchool and ultrafrezeed at -80 °C.

The assesment of the extract quality was done by FRAP method.

Before using the extract it was stored at 0 °C.

#### **Finding the proper dosage**

It was done by assesing the global quality of the semi – smoked sausage produced using following production flow by sensory analisys, microbiological and phisicho – chemical properties assesment.

There were conducted trials with following concentration of extract:

- 0 % (with sodium nitrite - blank sample),
- 2 %,
- 5 %,

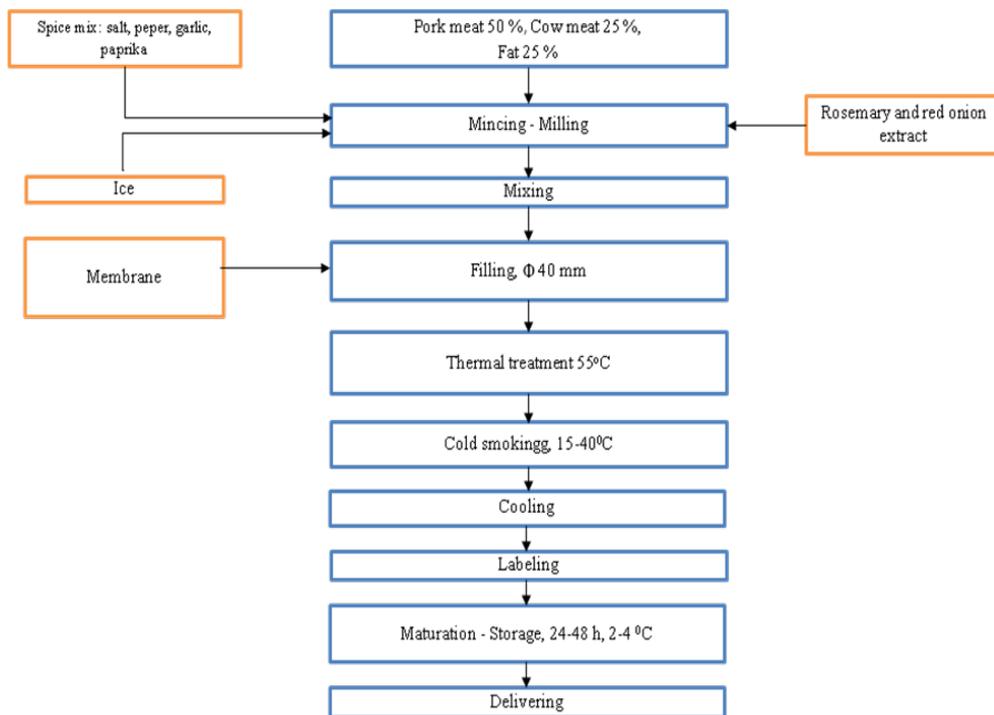


Figure 2. Production flow for demismoked sausages

The assesment of the demismoked salami was done by sensory nalisys for color, taste, texture, odor and shape using evaluation panels with grading up to 5.

The assesment of the quality parameters was done in 31.05,2020, 15.06.2020 and 07.06.2020.

There were analisys three kind of samples as following: 0% natural additive, 2% natural additive, 5% natural additive.

The parameters studied were: water content %, fat content % and salt content %. The methods used for analisys were drying in owen for water content, Soxhlet for fat content and Mohr for salt content.

For assesing the shelf life there were conducted following analisys:

- pH by instrumental method, use of Innolab pHmeter,
- Amonia by Nessler reaction.

- Microbiologic assesment at 7 days by cultural method using BioMaxima ready to use Petri dishes.

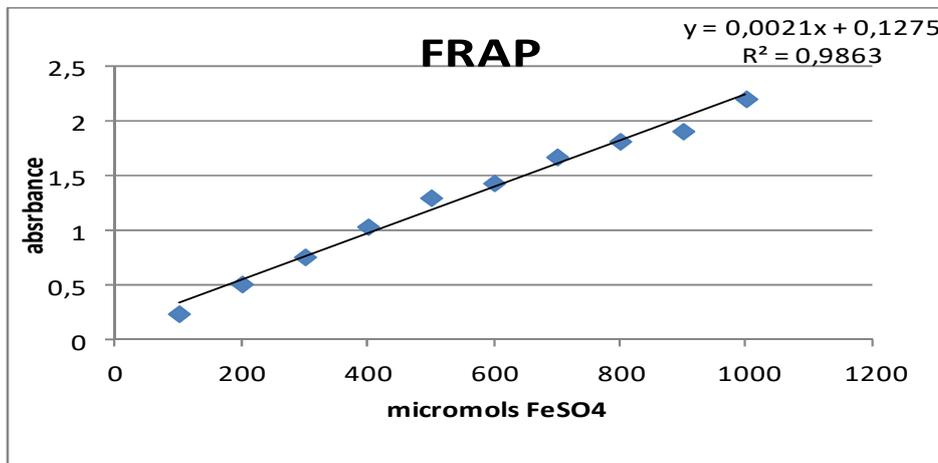
For microbiological assesment there were use the bellow cultural mediums.



Figure 3. Cultural media used for microbiological assesment

**RESULTS AND DISSIONS**

The first set of results was related with Natural extract properties. In this way Rosemary and Red Onion extract was assesed from antioxidant activity as mentioned above. The results are presented in figure 2.



Calibration curve for FeSO<sub>4</sub>

Where: x - μm FeSO<sub>4</sub>, y – absorbance of the sample

Figure 4. Determination of antioxidant activity of the extract of rosemary and red onion by the FRAP method - 593 nm

The concentration of extract was **1113,57** μm FeSO<sub>4</sub>.

The results from color point of view were assesed by sensory analisys. In the pictures below are the aspects of the meat pasta and demismoked salami in all exerimental variants.



Figure 5. Meat pasta color

From the demismoked salami color point of view the result are resented in the following picture.

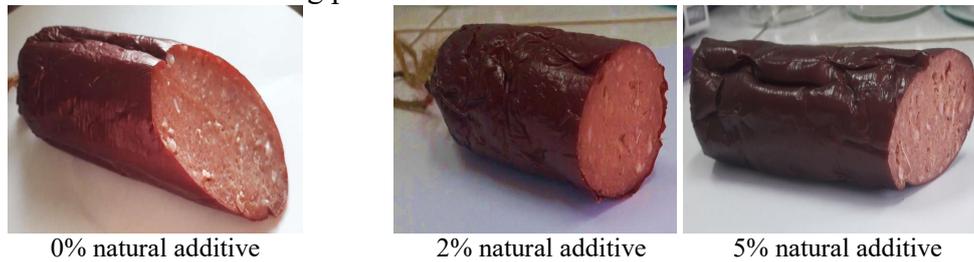


Figure 6. Demismoked salami color

Analyzing these images we can observe that sausage with the addition of extract in composition has a lighter red colour.

Also, all three types of sausages have a compact composition, with a specific mosaic aspect and a uniform consistency.

There are elasticity issues in the variant with 5% extract addition. This must be assessed in the following research.

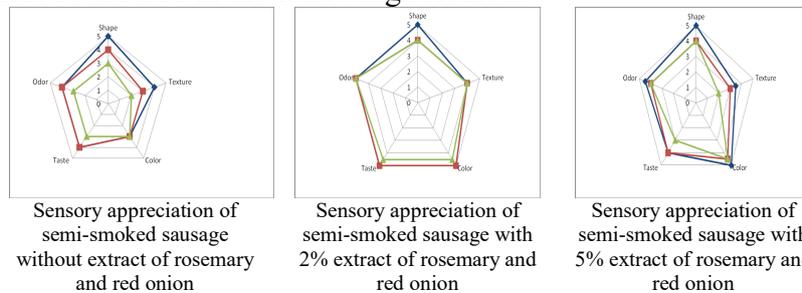


Figure 7. Demismoked salami sensory analysis

Examining the figures, we can concluded that the sausages keeps theirs sensory characteristics over the first two weeks. Most of the respondents gave a low score in the third week of analysis.

This demonstrates that sensory properties of the sausages underwent changes perceptible to human senses.

The most appreciated was the sausage with 2% addition of extract.

The assesment was done in 31.05.2020 blue line, 15.06.2020 red line and 07.06.2020 green line.

For assessing the minimal parameters that are leading to acceptability by institutions responsible for food safety were done also the following surveys in 31.05.2020 and 07.06.2020.

Table 1. Comparative study of the moisture content

Sample	Humidity, %
Sample 1	59,11
Sample 2	57,29
Sample 3	59,06

Table 2. Comparative study of the fat

Sample	Fat, %
Sample 1	13,80
Sample 2	13,75
Sample 3	13,74

Table 3. Comparative salt content study

Sample	Sodium Chloride, %
Sample 1	1,755
Sample 2	1,789
Sample 3	1,696

The results of the above tables shown no deviation from the range of maximal allowed limits.

Table 4. pH study of our three samples and of the extract

Sample	Date	pH	
		31.05.2020	07.06.2020
Sample 1		5,95	6,15
Sample 2		5,79	6,01
Sample 3		5,80	5,74
Extract		4,44	4,46

The results are in the range of maximal allowed limits.

Table 5. Freshness study by qualitative determination of ammonia

Sample	Date	Nessler reaction	
		31.05.2020	07.06.2020
Sample 1		negative	weakly positive
Sample 2		negative	weakly positive
Sample 3		negative	weakly positive

The results are in the range of maximal allowed limits.



Figura 1. Yeasts



Figura 2. Fungus



Figura 3. *Escherichia coli*



Figura 4. *Salmonella*

Figure 3. Microbiological assesment after 7 days was reveal no signs of microflora

## CONCLUSIONS

Natural compounds enjoy positive consumer image and have application in development of novel functional healthy meat products.

Natural antioxidants are nature's defense against the damaging effects of free radicals for health but extend shelf life of meatstuff as well replacing nitrates use.

In this way the meat industry tends to reduce the amounts of nitrates that are responsible for the formation of nitrosamines with carcinogenic action by alternatives. One of this combinations that can replace additives in meat products is extract of rosemary and red onion as we shown and our opinion is that proposed variant is promising.

This extract improve also the sensorial properties of demi-smoked sausages as color, smell, odor and has the same antimicrobial effect as nitrite addition variant.

Moreover it does not adversely affect the physico-chemical characteristics.

Use of natural extract brings also a high intake of essential minerals such as potassium, phosphorus, calcium, sodium, iron, zinc; the large number of antioxidant compounds present in rosemary and red onion extract according references making a significant contribution to increasing the quality of this salami by transforming it in functional meatstuff.

The properties of the raw materials according with references especially high content of red onion and rosemary polyphenols provides

salami, an important detoxifying, anti-inflammatory, anti-oxidant, antiviral, anticancer, cardioprotective, neuroprotective, antidiabetic, anti-aging properties.

The coloring effect of rosemary and red onion extract significantly improves the color of the sausages and rosemary act synergic.

There is unfortunately an increase of specific taste due to rosemary effect in high dosage – 5% and lack of rheological properties at this level of additive.

#### **RECOMANDATIONS**

The nutritional impact studies are required in order to asses the increasing nutritional effect.

There is necessary also studies regarding possible allergenic effects.

The increasing of the natural aditiv dosage over 2 % must be evaluated by rheologic methods competing the sensory analisys.

The microbiological assesment must be extended for longer time.

#### **Acknowledgments**

The researches were carried out in the project: **NEXT FOOD H2020-RUR-2016-2017/H2020-RUR-2017- 2**

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