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Quality and safety assessment of meat products obtained by traditional romanian recipes

Adriana Morar, Kálmán Imre, Claudia Sala

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- ▶ **Traditional meat products**
 - healthy foods with superior sensory characteristics,
 - highly appreciated by consumers.
- ▶ **There is a great variety of meat products,**
 - different size, shape, colour and taste characteristics.

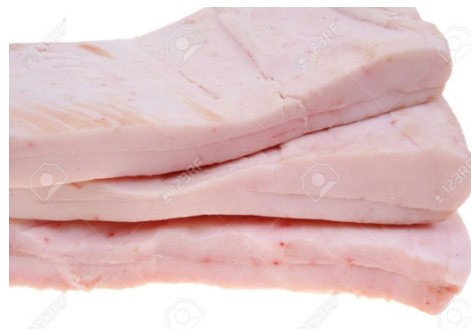


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▶ **Meat and fat – the principal raw materials**



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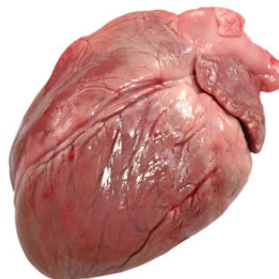


▶ **Other edible parts of the slaughtered animal**

- **internal organs:** tongue, heart, liver, kidneys

▶ **Slaughter byproducts:**

- blood, meat from head etc.



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- ▶ Is a **great variability** in the quality of meat products
 - fluctuations in the quality of raw materials:
 - the recipes used and
 - the processes for obtaining them.



- ▶ They are controlled by the **responsible authorities** with the **same exigencies, criteria and legislation**, as for the **industrial products**.

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- ▶ **The objectives** of this study were to evaluate the **quality and safety** of some categories **of meat products, obtained using traditional recipes.**

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Materials and methods

- ▶ The samples were collected from three areas of Timișoara
 - *agri-food markets*
 - *temporary food stands*



Materials and methods

◦ MEAT PRODUCTS – 2 categories:

1. Products prepared from **meat and fat** (n=10),

- raw/smoked **pork sausages** (n=3), **loin** (n=1), **bacon** (n=2), **kaizer** (n=1), **ham** (n=1), **spareribs** (n=1), **pork pastrami** (n=1),

2. Sausages prepared from **edible meat offal of pork** (n=8)

- **Caltaboş** = an emulsified sausage based on **liver** with consistency from fine (*pâté*) to coarse;
- **Sângerete** (black pudding) = blood sausages - an emulsified sausage obtained from a mixture of pig's blood with fat and meat, breadcrumbs or other grains, and spices;
- **Leber** = liver sausages;
- **Tobă** (head cheese) – based on pig's feet, ears, and meat from the head suspended in aspic and stuffed in pig's stomach

Microbiological analysis

- ▶ **Food safety criteria: *Salmonella*, *Listeria monocytogenes***
- ▶ **Process hygiene criteria: *E. coli***

1. *Salmonella*

SR EN ISO 6579-2003 *Microbiology of food and animal feeding, Horizontal method for detection of *Salmonella* spp.*

- **Non-selective enrichment:** 25 g of sample – in buffered peptone water (225 mL) – incubation at 37°C, 24 h
- **Selective enrichment:** transfer of the BPW suspension to RVS and MKTTn broth - incubated at 41.5°C/ 37°C, 24 h
- **Isolation and identification** - plating on XLD and Rambach agar - incubated at 37° C, 24 h
- **Biochemical and serological tests** - typical colonies.



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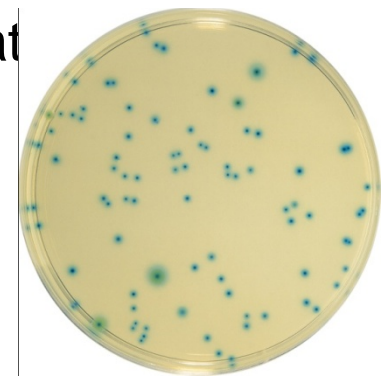
Microbiological analysis

2. *Listeria monocytogenes*

- **SR EN ISO 11290-1** - Microbiology of food and animal feeding stuffs. Horizontal method for the detection and enumeration of *Listeria monocytogenes*, Part 1: Detection method
- **Primary enrichment** - semiFraser, incubation at 30°C, 24 h
- **Secondary enrichment** - Fraser, incubation at 37°C, 48 h;
- **Isolation** - plating on ALOA and PALCAM agar.
- **Morphological, biochemical or molecular identification**

3. *Escherichia coli*

- **SR ISO 16649-1** – Microbiology of food and animal feeding stuffs. Horizontal method for the enumeration of β – glucuronidase – positive *Escherichia coli*, colony count technique at 44° C
- The samples - **serially diluted** in peptone water,
- Each dilution - inoculated on **TBX agar** - incubated at 48 h, and the colonies counted.



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Chemical analysis

- ▶ **The moisture content** – drying method ($103 \pm 2^{\circ}$ C)
- ▶ **The fat content** – *Soxhlet* extraction method.
- ▶ **Total protein (nitrogen content)** – *Kjeldahl* method.
- ▶ **The salt content** – *Mohr* method.
- ▶ **The content of nitrites** – *Griess* method.

Results

- ▶ *Salmonella* and *L. monocytogenes* were not isolated from any of the tested samples.
- ▶ *E. coli** was recovered in two samples (11.1%)
 - 30 cfu/g (1.5 log) ⇒ 1,760 cfu/g (3.25 log).
 - a smoked sausages
 - a sausage prepared from edible offal of pork

*According to Commission Regulation (EC) No. 1441/2007 which specifies microbiological criteria for meat products *E. coli* is used as process hygiene criteria.

RESULTS

Chemical parameters

Table 1. The proportion of the **main components** of meat products

Category/ Type	Water (%)	Protein (%)	Fat (%)
Raw / Smoked meat products			
<i>Raw pork sausages C</i>	50.65	18.93	30.27
<i>Loin B.C.</i>	56.38	21.25	21.15
<i>Smoked sausages B.C.</i>	42.95	18.02	36.67
<i>Smoked sausages P.V.</i>	46.53	20.26	30.61
<i>Bacon C</i>	62.08	23.18	10.58
<i>Bacon B.C.</i>	29.28	16.80	47.28
Smoked and pasteurized products			
<i>Ham B.C.</i>	43.25	18.14	31.78
<i>Kaiser B.C.</i>	43.50	21.32	31.75
Salted and dried products			
<i>Spareribs C</i>	29.09	19.05	49.31
<i>Pork pastrami C</i>	17.21	16.60	62.18

Results and discussion

Table 2

The proportion of the **main components** of sausages prepared from meat and edible offal of pork

Types	Water (%)	Protein (%)	Fat (%)
<i>Caltaboş¹P.V.</i>	53.81	15.46	28.83
<i>Caltaboş¹B.C.</i>	60.22	14.13	23.03
<i>Caltaboş¹C</i>	67.48	8.13	22.31
<i>Sângerete² B.C.</i>	60.41	12.93	23.61
<i>Sângerete²C</i>	55.34	19.24	22.81
<i>Leber³</i>	64.84	9.22	23.15
<i>Tobă⁴ B.C.</i>	67.32	13.53	17.37
<i>Tobă⁴ C</i>	66.42	13.28	17.55

Table 3

The proportion of the **added components** in meat products

Category/ Type	Nitrites (ppm)	NaCl (%)
<i>Raw / Smoked meat products</i>		
<i>Raw pork sausages C</i>	< 10	2.29
<i>Loin B.C.</i>	< 10	0.66
<i>Smoked sausages B.C.</i>	< 10	1.86
<i>Smoked sausages P.V.</i>	< 10	2.53
<i>Bacon C</i>	<u>35</u>	4.16
<i>Bacon B.C.</i>	<10	<u>6.27</u>
<i>Smoked and pasteurized products</i>		
<i>Ham B.C.</i>	<u>22</u>	<u>6.39</u>
<i>Kaiser B.C.</i>	<u>25</u>	3.13
<i>Salted and dried products</i>		
<i>Spareribs C</i>	< 10	2.53
<i>Pork pastrami C</i>	<u>19</u>	3.85

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Table 4

The proportion the **added components** in sausages prepared from meat and edible offal of pork

Types	Nitrites (ppm)	NaCl (%)
<i>Caltaboş¹ P.V.</i>	<10	1.62
<i>Caltaboş¹ B.C.</i>	<u>21</u>	2.71
<i>Caltaboş¹ C</i>	<u>21</u>	1.92
<i>Sângerete² B.C.</i>	<u>20</u>	2.47
<i>Sângerete² C</i>	<u>30</u>	1.50
<i>Leber³</i>	<10	2.35
<i>Tobă⁴ B.C.</i>	<u>24</u>	1.68
<i>Tobă⁴ C</i>	<u>28</u>	2.47

4. Conclusions

- ▶ **Meat products** obtained using traditional recipes and commercialized as direct sales in agri-food markets in Timișoara **have no microbiological risks for consumers.**
- ▶ Both meat products and sausages prepared from meat and edible offal of pork are **nutritive** and are **in compliance with specific recipes.**
- ▶ The **variability of the main components of meat products** in the same type **reflects the variability of quality of raw materials used.**
- ▶ In some types of smoked meat products, **the salt concentration exceeded the maximum limits allowed by law.** These products should be avoided by persons with dietary salt restriction.

Thank you for your attention!!!

