STUDY OF THE WATER AND RESIDUAL NITRITE CONTENT IN MEAT PRODUCTS IN THE SIBIU AREA ROMANIA
— short report —

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Abstract: In this paper, the content in residual nitrite and water of ten meat products — Summer salami, Smoked salami, Salami whith ham, Cabanos, traditional Parizer, Canadian salami, Demisec salami, Torpedo salami, Frankfurter, Hungarian salami — from three Romanian producers are investigated. The results show that for all the analysed samples, the nitrite concentration is below the admitted Romanian limits. Water content is high in all meat products and in some of them, namely Summer salami, Canadian salami and Torpedo salami, the water amount is higher as the maximal values admitted.

Keywords: meat product, residual nitrite, toxic, water content

INTRODUCTION

Sodium nitrite is used for the curing of meat because take care of colour of meat products, greatly delays development of botulinal toxin (botulism), retards development of rancidity and off-odours and off-flavours during storage. Nitrite is strongly inhibitory of anaerobic bacteria (Clostridium botulinum) and contributes to control of other microorganisms (Listeria monocytogenes), but is not generally considered to be effective for control of Gram-negative enteric pathogens such as Salmonella and Escherichia coli (Tompkin, 2005).

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Also, nitric oxide (NO) is an endogenous mediator of numerous physiological processes that range from regulation of cardiovascular function to participation in memory (Feldman, 1993). Nitric oxide can abate the effects of some radicals are formed as a result of both oxidative stress and normal metabolism on biological systems so can have protective effects (MacMicking, 2000). For example, NO can react with oxyradicals formed during lipid peroxidation, which is an important component of the inflammatory process and cell death (Rubbo et al., 1995). Also, NO can reduce of oxidized cholesterol levels is thought to impede initiation of atherosclerosis (Miranda, 2000).

The goal of the present paper is to monitor the presence of residual nitrite because over limit being toxic and verification of water content in meat products for possible embezzlements.

**MATERIALS AND METHODS**

Ten samples from three meat products factories were taken into analysis. The meat products are presented in Table 1 and the firms in Table 2.

Table 1. Meat products

<table>
<thead>
<tr>
<th>Name of product</th>
<th>Firm</th>
<th>Group of product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer salami</td>
<td>SC CIA ABOLIV SRL</td>
<td>Salami with structure from boiled and smoked meat group</td>
</tr>
<tr>
<td>Smoked salami</td>
<td>SC CIA ABOLIV SRL</td>
<td>Boiled and double smoked salami</td>
</tr>
<tr>
<td>Salami whit ham</td>
<td>SC CIA ABOLIV SRL</td>
<td>Salami with structure from boiled meat group</td>
</tr>
<tr>
<td>Cabanos</td>
<td>SC ELIT SRL</td>
<td>Sausages with structure boiled and double smoked</td>
</tr>
<tr>
<td>Parizer traditional</td>
<td>SC ELIT SRL</td>
<td>Salami without structure from smoked and boiled meat group</td>
</tr>
<tr>
<td>Canadian salami</td>
<td>SC ELIT S.R.L</td>
<td>Salami with structure from boiled and smoked meat group</td>
</tr>
<tr>
<td>Demisec salami</td>
<td>SC ELIT SRL</td>
<td>Boiled and double smoked salami</td>
</tr>
<tr>
<td>Torpedo salami</td>
<td>SC ELIT SRL</td>
<td>Boiled and double smoked salami</td>
</tr>
<tr>
<td>Frankfurter</td>
<td>SC LACTOFARM SRL</td>
<td>Sausages without structure from smoked and boiled meat group</td>
</tr>
<tr>
<td>Hungarian salami</td>
<td>SC LACTOFARM SRL</td>
<td>Boiled and double smoked, dry salami</td>
</tr>
</tbody>
</table>
Table 2. Presentation of firms from where the analysed products were sampled (for 2007)

<table>
<thead>
<tr>
<th>Company</th>
<th>Products sold</th>
<th>Clear income</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC ABOLIV SRL</td>
<td>The products sell under two brands: BRIOL and APETIT</td>
<td>61,910 RON</td>
<td>148</td>
</tr>
<tr>
<td>SC ELIT SRL</td>
<td>Clear income: 23,080,438 RON</td>
<td></td>
<td>1,276</td>
</tr>
<tr>
<td>SC LACTOFARM SRL</td>
<td>Clear income: 80,708 RON</td>
<td></td>
<td>53</td>
</tr>
</tbody>
</table>

Samples came from a single shop, so that the store condition in shop do not influencing the results.

For the results comparison, data register in 560 Disposal since 16 August 2006 advancing by MAPDR and published in Monitorul Oficial number 10 since 8 January 2007 were used.

The residual nitrite was analysed according to the Griess test, readings have been made using a spectrophotometer T80 UV-VIS from PG Instruments Ltd.

The analysis of water content were made based on the principle of thermogravimetric analysis and the thermobalance ML-50 from A&D COMPANY, LIMITED was used for drying.

RESULTS AND DISCUSSIONS

The results obtained by spectrophotometer analysis concerning the residual nitrite content in samples are presented in Table 3. The results show that, normally, the values of the residual nitrite content for all samples are smaller than the maximum accepted by Romanian legislation (7mg/100g product).

It can be noticed that only in case of „summer salami“ the residual nitrite content come near to the maximum accepted value, and in the case of samples „frankfurter“ this value is small (over 50% from the maximal accepted dose). For the rest of samples, the values are very low, most probably thanks to the addition of ascorbic acids or ascorbic salts.
Table 3 Residual nitrate content from samples

<table>
<thead>
<tr>
<th>Products</th>
<th>Residual nitrite, mg/100g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer salami</td>
<td>6.72</td>
</tr>
<tr>
<td>Smoked salami</td>
<td>1.51</td>
</tr>
<tr>
<td>Salami with ham</td>
<td>3.44</td>
</tr>
<tr>
<td>Cabanos</td>
<td>2.41</td>
</tr>
<tr>
<td>Parizer traditional</td>
<td>2.62</td>
</tr>
<tr>
<td>Canadian salami</td>
<td>2.17</td>
</tr>
<tr>
<td>Demisec salami</td>
<td>0.23</td>
</tr>
<tr>
<td>Torpedo salami</td>
<td>2.99</td>
</tr>
<tr>
<td>Frankfurter</td>
<td>4.63</td>
</tr>
<tr>
<td>Hungarian salami</td>
<td>0.28</td>
</tr>
</tbody>
</table>

Analysis of water content in percentage has getting to results presented in Figure 1.

![Figure 1. Percentage of water content from the analysed samples](image)

It can be observed that most products have smaller water content than the accepted limit, but very near by this limit. There are also exceptions, as the case of „summer salami” and „canadian salami”, where the values are lightly higher, the overtaking being 3.1% respective 3.9%. At „torpedo salami” the
overtaking of water content is just 0.6%. In the case of sausages without structure from boiled and smoked meat group (Parizer traditional) the obtained values are very small (14.8% respective 18.2%). Taking into account the economical aspect, the possible explication could be that time of dispatch until analyse moment water samples were lost in abnormal.

Figure 2 was obtained by centralising the results of the two analysed series. In the case of „summer salami” it can been notice that percentage values are greater both in case of water (when maximum accepted limit is overtaking ) and residual nitrate content, but the value is lightly under accepted limit. Better results were obtained for the other products manufactured by the same firm „smoked salami” and „salami with ham”. The products from SC ELIT SRL firm have a residual nitrate content very small at all produces, but the water content is near 100, the maximum overtaking being made for two products on the five. Seemingly the better results had been obtained in case of the third firm, which is smaller than first two.

Figure 2. Results of the two analysis, water content and residual nitrate.
CONCLUSIONS

- Out of wish of big profits the firms are trying to exceed the maximum water content of some products.
- Follow the study we found that the residual nitrite content are not over limits (7mg / g product), but the content may be influenced by the addition of ascorbic acid.
- The number of samples was too small to say if firms are really respecting the residual nitrate content.

REFERENCES