

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 whit 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 reduction 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 METODS

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

Name of product	Firm	Group of product
Summer salami	SC CIA ABOLIV SRL	Salami with structure from boiled and smoked meat group
Smoked salami	SC CIA ABOLIV SRL	Boiled and double smoked salami
Salami whit ham	SC CIA ABOLIV SRL	Salami with structure from boiled meat group
Cabanos	SC ELIT SRL	Sausages with structure boiled and double smoked
Parizer traditional	SC ELIT SRL	Salami without structure from smoked and boiled meat group
Canadian salami	SC ELIT S.R.L	Salami with structure from boiled and smoked meat group
Demisec salami	SC ELIT SRL	Boiled and double smoked salami
Torpedo salami	SC ELIT SRL	Boiled and double smoked salami
Frankfurter	SC LACTOFARM SRL	Sausages without structure from smoked and boiled meat group
Hungarian salami	SC LACTOFARM SRL	Boiled and double smoked, dry salami

Table 2. Presentation of firms from where the analysed products were sampled (for 2007)

SC ABOLIV SRL	The products sells under two brands: BRIO and APETIT Clear income : 61.910 RON Employees: 148
SC ELIT SRL	Clear income : 23.080.438 RON Employees : 1.276
SC LACTOFARM SRL	Clear income : 80.708 RON Employees : 53

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

Products	Residual nitrite, mg/100g
Summer salami	6.72
Smoked salami	1.51
Salami with ham	3.44
Cabanos	2.41
Parizer traditional	2.62
Canadian salami	2,17
Demisec salami	0.23
Torpedo salami	2.99
Frankfurter	4.63
Hungarian salami	0.28

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

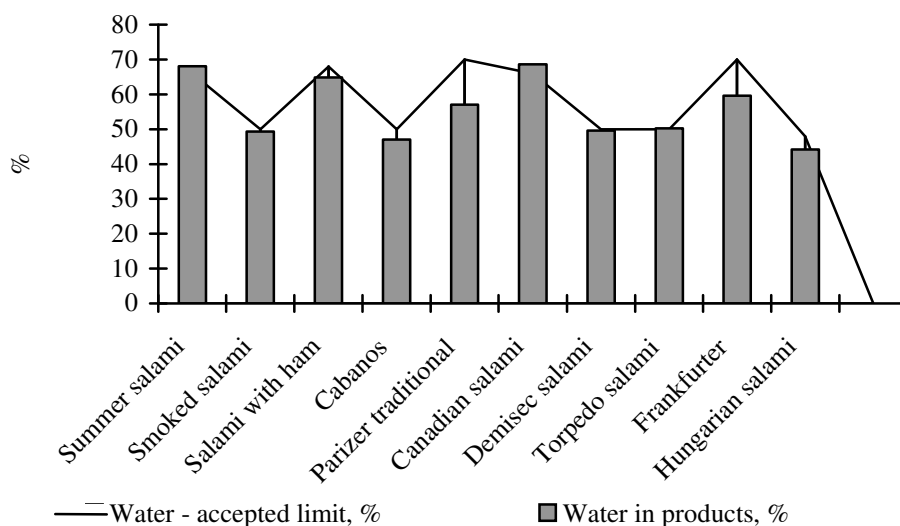


Figure 1. Percentage of water content from the analysed samples

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 be noticed 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 S.R.L 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.

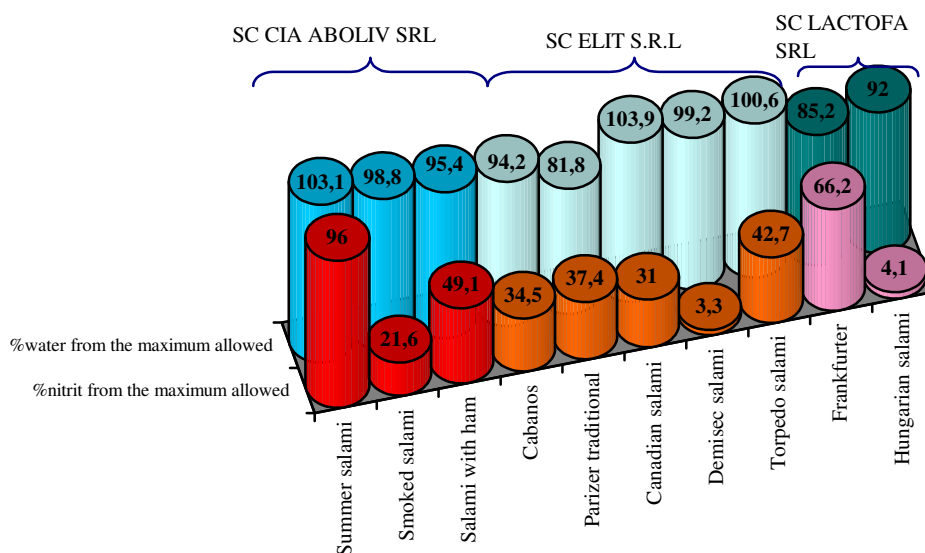


Figure 2. Results of the two analysis, water content and residual nitrate.

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

- 1 Feldman, R L., Griffith, O. W., and Stuehr, D. J., The surprising life of nitric oxide. *Chem. Eng. News*, 1993, Dec. 20, 26-38.
- 2 MacMicking, J., Xie, Q., Nathan, C., Nitric oxide and macrophage function. *Annu. Rev. Immun.*, 1997, 15, p. 323-350.
- 3 Miranda K. M., Espey M. G., Jourdeuil D., Grisham M. B., Fukuto, J. M., Feelisch M., Wink D. A., *Nitric Oxide - Biology and Pathobiology*, edited by Louis J. Ignarro, Academic Press, 2000, p.41-55
- 4 Rubbo, H., Radi, R., Trujillo, M., Telleri, R., Kalyanaraman, B., Barnes, S., Kirk, M., Freeman, B. A., Nitric oxide regulation of superoxide and peroxynitrite-dependent lipid peroxidation: Formation of novel nitrogen-containing oxidized lipid derivatives. *J. Biol. Chem.*, 1994, 269, p. 26066-26075.
- 5 Tompkin, R.B., Nitrite., in *Antimicrobials in Food* (3rd ed.). P.M. Davidson, J.N. Sofos and A.L. Branen, edited by CRC Press, Taylor & Francis Group. Boca Raton, FL, 2005