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DETERMINATION OF NITRITE IN PROCESSED MEAT PRODUCTS, PRODUCED IN THE ALBANIA, BY SPECTROPHOTOMETRIC METHOD AND RAPID TESTS

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I –INTRODUCTION

In Albania, there is an increase in the daily amount of meat consumption and in particular salami and sausages, that are even cheaper compared to meat, especially those produced in the country. Sodium nitrate and sodium nitrite are approved additives found in many processed meat products (salami, sausages, ham etc.), considered the most important curing ingredients for preserving meat products. The main reasons for the addition of nitrite to meat products are anti-microbial action, color fixation, preservation effect and a significant indirect beneficial effect on flavor

Nitrite is far more reactive than nitrate and is more reactive in an acidic environment such as that of the stomach.

Unfortunately, recent research has demonstrated some negative effects because sodium nitrite reacts with stomach acid and produces nitrosamines, that are associated with some types of cancer prevalence. For this reason, the European Union has determined the maximum levels at which nitrates, and nitrites can be used in meat products.

II - MATERIALS AND METHOD

The study was based only on salami and sausages obtained from Albanian companies, 20 samples (10 salami and 10 sausages) were collected at some of the biggest markets in Tirana. Samples were analyzed to determine the nitrite content by two methods: spectrophotometric method and rapid tests.

Nitrite by the spectrophotometric method is determined by diazotizing with sulphanilamide and coupling with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a highly colored azo dye that is measured at 540 nm. The calibration curve for nitrite was initially prepared. The linearity of the calibration curve was good for nitrite content (R^2=0.99) in the concentration range 0.2-1.2 mg/l.

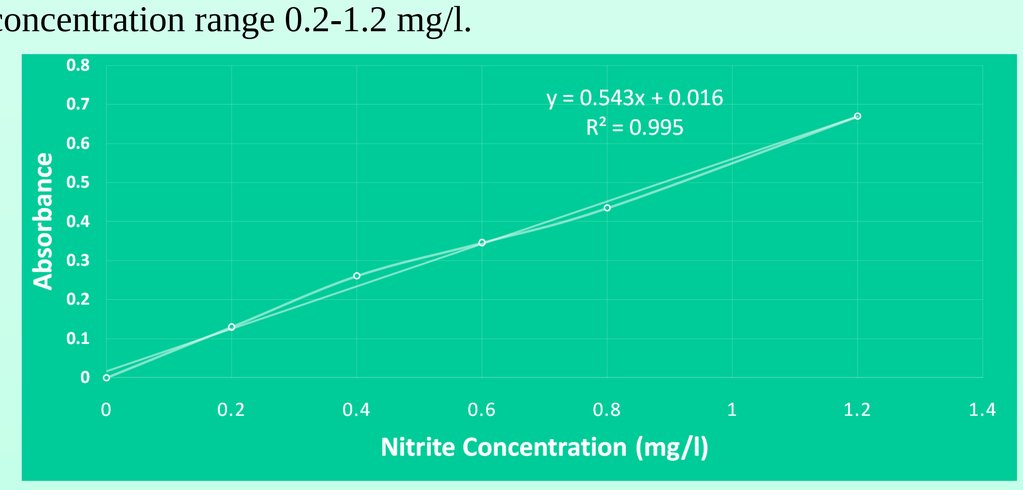

Fig. 1. Calibration Curve of Nitrite

Quantofix nitrite rapid tests were used for determination of nitrite in these samples. Dip the test strip into the filtrate obtained after extraction with sodium acetate. Remove the test strip and wait for 30 seconds. Compare the test field with the color scale on the tube. A red-violet coloration indicates the presence of nitrite ions.

III -RESULTS AND DISCUSSION

Results from salamis and sausages samples by both methods are presented in Figure 2 and 3 respectively. The nitrite concentration range for the spectrophotometric method was 0.188-60.590 mg/kg and rapid tests was 0-64.540 mg/kg, in salami samples.

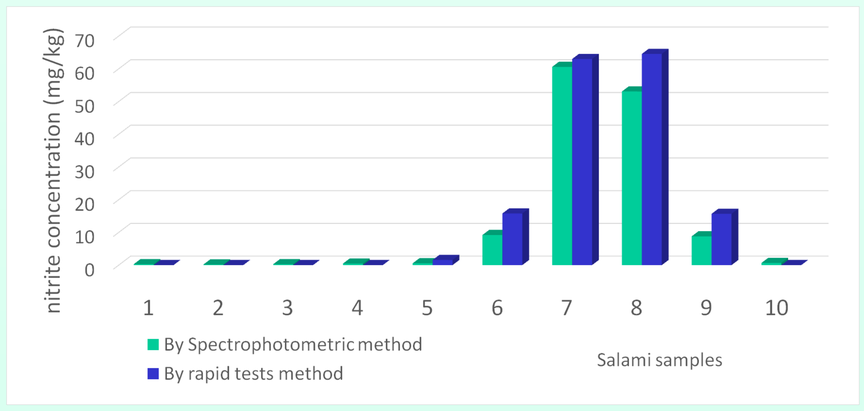

Fig 2. Nitrite concentrations in salami samples by both methods

The nitrite concentration range for the spectrophotometric method was 1.201-16.950 mg/kg and rapid tests was 0-15.630 mg/kg, in sausages samples.

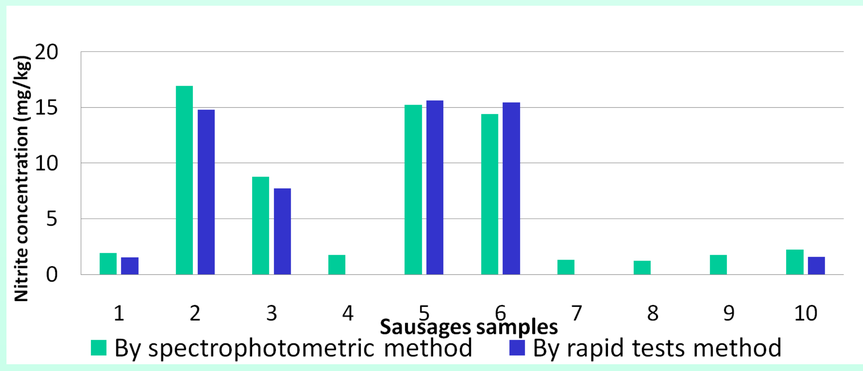

Fig 3. Nitrite concentrations in sausages samples by both methods

The results obtained showed that none of the analyzed samples exceeds the limits allowed by Regulation (EC) No. 1333/2008, the maximum amount of nitrite that can be added to meat products it is 150 mg/kg.

CONCLUSION

Some of the samples have the presence of nitrites in levels very close to limit. That indicates that it is important to evaluate meat products before considering them safe. Also, from the results obtained from both applied methods (the rapid tests and the spectrophotometric method) it can be concluded that very similar values for nitrite content were obtained.

Rapid tests used for nitrite analysis are an effective solution but present a limitation in the determination of samples with low concentrations.