THE INCIDENCE OF NITRITES IN THE WATER USED IN THE MEAT PROCESSING UNITS IN THE PERIOD 2007-2011, IN BIHOR COUNTY

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Abstract

In this paper there has been analyzed the incidence of nitrates and nitrites within the water from meat processing units, used in preparation of minced meat paste for expanding the scope of knowledge for a fixed period with data concerning nitrites and nitrates in some animal products in Bihor county given the fact that they enter the food chain. Analyses were conducted during 2007 - 2011 on 50 water samples from meat processing plants, during which it was analyzed the nitrogen pollution of the water used in the food industry. The study of the evolution of the incidence of nitrites in water highlights the fact that there are variations from year to year but not exceeding the maximum allowed. Average nitrogen content ranged from 0.77 mg / l (2009) and 1.41 mg / l (2010).

Key words: nitrates, nitrites, drinking water, minced meat paste

INTRODUCTION

Water is an indispensable element of life, an important factor in most industrial production processes. The water in the food industry must comply with certain features that do not alter food quality and ensure smooth operation of equipment and production facilities. In general, water must be drinking water and must meet the organoleptic criteria.

In subsidiary, nitrates in water can be converted into nitrites with negative effects of food vitamins (A, B1, B6, beta-carotene) that degrade or interfere with their absorption. Nitrates and nitrites are natural components of the soil from the organic matter mineralization of nitrogen from plant and animal origin. Nitrogen mineralization is mainly due to existing soil microorganisms in countries with temperate climates, this process takes place with maximum intensity in the hot season.

Some of the nitrates and nitrites is absorbed by plant roots and serves as a raw material for the synthesis of proteins and other nitrogen compounds, and the other part is driven by surface water or by crossing the soil, being found in rivers, lakes or groundwater, particularly groundwater.

Synthetic nitrogen fertilizers used in agriculture due to water solubility of rain reach the groundwater and even in the depth where it can reach the drinking water used in the food industry.

MATERIAL AND METHODS

Unconscious use of contaminated water for drinking resulting in harming human health is the motivation of our investigations carried out over a period of five years (2007-2011) on 50 water samples from meat processing units, used in the preparation of minced meat paste.

For nitrate determinations of chilled water used to form minced meat paste there has been used the spectrocolorimeter method. The method consists in obtaining a dry residue by evaporation to dryness 10 ml of water, plus more than phenyl disulfide acid (0.5 ml), that forms phenyl disulfide forming the yellow colored product, to get a color enhanced by repeatedly adding 1 ml of aqueous ammonia. Capsule content after drying is completed with doubly distilled water to 10 ml in a graduated cylinder and then it will be put into the tank where it photometers. Cells with thickness of 1 cm at 410 nm is photo metered nitrogen content of 10 mg / l and 480 nm for the content between 10-100 mg / l. Prepared standard solutions containing 0-10 mg or 10-100 mg of nitrates and trace the calibration curve standard samples noting the ordinate and the abscissa extensions, nitrate concentration in mg / l, compared with the reference solution:

Calculation of nitrates is determined by the relation:

$$mgNO^-_3/l \qquad \frac{C}{V} \cdot 1000$$

where: C = concentration of NO^-_3;
V = working water volume in ml.

In 50 ml water neutralized at pH 7 brought in a Erlenmeyer flask there was added 1 ml of sulfanilic acid and was stirred for homogenization. After 5 minutes there were added 1 ml of HCl alfanaphtylamine and 1 ml of sodium acetate. The content of the flask was shaken and left to stand for 30 minutes in the dark for color development. From this colorful content there can be determined the extinction at 520 nm and the amount of nitrite in milligrams per ordered.

The determination required a preparation of standard solutions containing 0.01 mg NO-2/ml and 2 standard solutions containing 0.001 mg NO-2/ml. There are formed by depositing standard stairs in four 50 ml flasks and numbered 0, 1, 2, 3 and 4 ml of standard solution, containing 0, 0.01, 0.02, 0.03 and 0.04 respectively mg NO-2. To each flask there are added the same quantities of reagents used to test water and it is completed to the sign with doubly distilled water.

The standard solution II shall be submitted in flasks and numbered 0, 1, 2, 3, 4, 5, 6, 8, 9 ml of standard solution stir II serial number

corresponding to the flask. In each flask there are added add 1 ml of sulfanilic acid, 1 ml alfanaphtylamine hydrochloride, 1 ml sodium acetate solution. There is added up to 50 ml doubly distilled water and shake for mixing and color development. These flasks contain 0.001…. 0.009 ml solutions containing NO^-_2. Drawing the standard curve was made in vats photometering solutions with various concentrations of nitrites and scoring the ordinate and the abscissa extinction mg NO^-_2.

The calculation was done by the relation:

$$mgNO^-_2/l \qquad \frac{C}{\quad} \cdot 1000$$

RESULTS AND DISCUSSIONS

Analytical results show variations of nitrate and nitrite content from one year to another, without exceeding the maximum allowed.

Investigations aimed at determining the content of nitrates and nitrites source of water used in processing units that minced meat paste additive. It shows a variation of nitrogen content from 2.3 to 24.5 mg / kg, the average being 9.76 mg / kg. Average annual values are 8.25 mg / kg in 2007, 7.95 mg / kg in 2008, 14.10 mg / kg in 2009, 7.70 mg / kg in 2010 and 10.8 mg / kg, in 2011. There were no exceedances of the MRL met, which is of 45 mg / kg. The nitrite content ranges from 0.83 to 2.45 mg / kg, and the average value is 0.97 mg / kg. The average nitrite content ranges from 0.79 to 1.41 mg year / kg. No exceedance of L.M.A. have been noticed.

The results obtained on the nitrite content in water samples examined are presented in table 1 and figure 1.

Table 1

The average content of nitrites in water used to obtain bradt

Anul	Nr.probe	$mgNO_3/l$		$mgNO_2/l$		Depăşiri ale L.M.A.
		Limite	Media	Limite	Media	
2007	10	2,30-14,20	8,25	0,23-1,42	0,82	0
2008	10	3,50-12,40	7,95	0,35-1,24	0,79	0
2009	10	3,80-24,50	14,10	0,38-2,45	1,41	0
2010	10	2,60-12,80	7,70	0,26-1,28	0,77	0
2011	10	3,00-18,60	10,80	0,30-1,86	1,08	0
Total	50	2,30-24,50	9,76	0,23-2,45	0,97	0

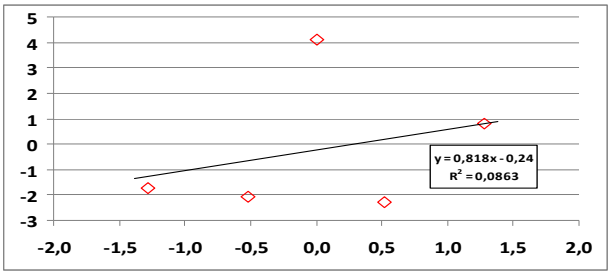

Fig. 1. *Normal probability graph of incidence dynamics in bradt water preparation nitrates*

CONCLUSIONS

1. The analysis of nitrate content in water used to obtain values of the minced meat paste points from 2.3 to 24.5 mg%. Average annual nitrate concentration varies from 7.70 to 14.10 mg % per year and the average for the entire period is 9.76 mg%. Primary data analysis revealed that 90% of samples had nitrate content below 10 mg%. The allowed limit is of 50 mg nitrate / l of water.

2. Average values of nitrites in the study area generally fall in the values allowed by the rules. Only in 2% of the samples were found maximum values 1.3 - 1.7 times higher than those allowed by the norms of varieties of sausage, Parizian, Frankfurters, pastrami, which indicates that producers do not always work based on a procedure to eliminate this risk. There were shown nitrites in meat products for fresh products (drums), where it is forbidden to use nitrites.

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