

Preservative residue in beef and chicken sausages and bolognas marketed in Iran

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Abstract

Nitrite in heated meat products such as sausages and bologna use as a preservative, in addition of this role nitrite has good effects on the color and taste of these products, and gradually the amount of nitrite decrease in sausages and bologna because it changes to another compounds.

In this study 350 samples of heated meat products (sausages and bologna) which produced by Iranian meat product factories were selected via random sampling in supermarkets.

Residue of nitrite in all samples was determined in the lab by spectrophotometric method.

For statistical analysis, means and standard errors of nitrite residues were determined and analyzed by one-way analysis of variance method.

The results of the experiments on the different types and brands of meat products showed that level of nitrite residues were between 1-108 PPM and according to one-way analysis of variance differences between the means of nitrite residues in beef sausages were highest than other meat products ($p < 0.05$), and these residues were lowest in beef bologna ($p < 0.05$). There weren't significant differences between the value of chicken sausages and chicken bologna ($p > 0.05$).

According to national standard of Iran for sausage and bologna producers are allowed to use 120 PPM in heated meat products and the residue of nitrite four days after production must not be more than 60 PPM, with consideration of this limit for preservative residue only 3.4 percent of samples had nitrite residue higher than standard.

Key words: sausages, bologna, nitrite, Iran

Introduction

Preservatives are materials which use for increasing the shelf life of food. In meat products in order to expanding of shelf life and development of color and organoleptic characteristics nitrite and nitrate salts are used. Nitrite and nitrate salts are able to produce nitro amines which are carcinogenic compounds; so the amount of nitrite and nitrate residue in meat product is very important.

Method and material

In this study 350 sample of sausages which are produce in meat product industries of Iran was analyzed for residue of nitrite compounds. The samples were selected according to random sampling. The samples transferred to lab in (+2) container and analyze for nitrite residue maximum 2 days after sampling. For analysis after homogenizing of samples; (10±0.01)g of sample weighted and transferred to 250cc beaker then 100 cc distilled water 70 °C and 5cc borax solution (50 gr/lit) added to the beaker and put in a boiling water bath for 15 minutes; after cooling 2cc of potassium Ferro cyanide solution (106 gr/lit) and 2cc zinc acetate 220 gr/lit, added to the beaker and after stirring content of beaker, transfer to the 200cc volumetric balloon and D.W added until 200cc. After 30 minutes content of volumetric balloon filtered by what man number 4. 20cc of extracted solution transferred to

100 cc volumetric balloon and 50 cc D.W and 10cc sulphanylamid solution and 6cc HCL(5N) added and put in dark for 5 minute and then 2cc alpha naphthyl ethylenediamin HCL added and put again in dark for 10 minute and received to 100cc by D.W, finally absorbance of color solution determined in a cell in 538 nm and assigned the nitrite residue of sample by compression of standard curve, and data was analyzed by SPSS.11 soft ware.

Results

According to the result of the test (table 1), only 3.4% of samples had nitrite residue more than 60 ppm and 96.6% had nitrite residue less than 60 ppm.

Table 1- Nitrite residue in different products

Product	Mean \pm SE(PPM)	Number of samples	Acceptable limit
Beef sausages	29.5 \pm 3.01	122	60
Chicken sausages	52.3 \pm 2.96	65	60
Chicken bologna	29.6 \pm 2.21	68	60
Beef bologna	38 \pm 3.50	95	60

the level of nitrite residues were between 1-108 PPM and according to one-way analysis of variance differences between the means of nitrite residues in beef sausages were highest than other meat products ($p < 0.05$), and these residues were lowest in beef bologna ($p < 0.05$). There weren't significant differences between the value of chicken sausages and chicken bologna ($p > 0.05$).

Discussion

According to FAO reports acceptable daily intake (ADI) of nitrite and nitrate is 5, 0/4 mg/bw daily we intake 84.5 mg nitrate and nitrite from food and water supplies.

The minimum concentration of nitrite which suppress clostridium botulinum vegetation in meat products is 40-80 ppm.

Zhukova and et-al(1999) had shown in 186 samples which analyzed for nitrite residue, only in 4 samples the amount of nitrite residue was more than acceptable limit.

According to the studies adding of 500 ppm sodium ascorbate decrease the nitrite residue and production of nitrosamines in meat products.

In this study in order to monitoring the nitrite residue of Iranian sausages, 350 sample was analyzed for determination of nitrite residue, the amount of nitrite residue in samples was between 1-108 ppm and 3.4% of samples had nitrite residue more than 60 ppm.

On bases of national standard of Iran maximum limits of nitrite residue in sausages is 60 ppm so nitrite residue of samples compared with this limits.

According to one-way analysis of variance differences between the means of nitrite residues in beef sausages were highest than other meat products ($p < 0.05$), and these residues were lowest in beef bologna ($p < 0.05$). There weren't significant differences between the value of chicken sausages and chicken bologna ($p > 0.05$).

Base on the above results the Iranian sausages and bologna are safe in point of nitrite residue for consumers.

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