

ANALYSIS OF THE NITRITE CONTENTS IN DOMESTIC AND IMPORTED MEAT PRODUCTS OF REPUBLIC OF KOREA

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Abstract – This study was designed to investigate nitrite contents of imported and domestic meat products. A total of 280 imported and domestic meat products were examined within 10 imported and domestically-produced meat product categories (processed ribs, dry meat product, bacon, patty, sausage, cured meat, pressed ham, ham, mixed pressed ham, and mixed sausage). Nitrite contents were estimated in samples using the diazotization method from Animal, Plant and Fisheries Quarantine and Inspection Agency official method, which is equivalent to AOAC official method 973.31. Nitrite content of imported meat products was less than 5 mg/kg in 75.4% of samples and it was between 5 mg/kg and 15 mg/kg in 11.1% of the samples. Nitrite content of between 20 mg/kg and 30 mg/kg was found in 6.8% of the samples. Consequentially, nitrite content was found at less than 10 mg/kg in 86.5% of samples. Nitrite content of homegrown meat products was less than 5 mg/kg in 31% of samples and it was between 5 mg/kg and 15 mg/kg in 34% of samples. As a result, nitrite content was present at less than 20 mg/kg in 76% of samples.

Key Words – nitrite, meat products, sausage, ham, bacon

I. INTRODUCTION

Nitrite helps to form the characteristic color, flavor, and texture of cured meat products. It also functions as an antioxidant and antimicrobial and provides specific protection against *Clostridium botulinum* [1]. Monika Eichholzer *et al.* [2] published the results of their research work that showed that nitrite in food increased the risk of developing cancer; therefore substantial research has been conducted to develop a substitute for or reduce the level of nitrite used, but to date there has been no substance found that is capable of completely replacing nitrite [3]. Until recently, concerns regarding the healthfulness of nitrite caused a decrease in the consumption of meat in

Korea and a distrust of meat products. Because of its potential to harm, the addition of nitrite to meat products is controlled by standards set in Korea, and tolerance is set at less than 70 ppm, a level that is similar to international legal standards. There is the need to conduct an enquiry of the real status about nitrite contents in meat products to ensure compliance with Korean standards. The aim of this study was to investigate nitrite contents in imported meat products and domestic meat products in Korea.

II. MATERIALS AND METHODS

A total of 280 randomly selected meat products were used in the study from 10 imported and domestic meat product categories (processed ribs, dry meat product, bacon, patty, sausage, cured meat, pressed ham, ham, mixed pressed ham, mixed sausage). Nitrite contents of samples were estimated using the diazotization method from Animal, Plant and Fisheries Quarantine and Inspection Agency official method [4]. Twenty mL of each sample was added to 1 mL of sulfanilamide solution and 1 mL of N-(1-naphthyl)-ethylene diamine solution, and then distilled water was added to a total sample volume of 25 mL. Color was allowed to develop for 20 minutes and then sample absorbance was measured at 540nm (UV/VIS Spectrometer, Lambda 40, PerkinElmer, USA) against a distilled water blank test.

III. RESULTS AND DISCUSSION

Nitrite content of the imported meat products was less than 5 mg/kg in 75.4% of the imported samples and it was between 5 mg/kg and 15 mg/kg in 11.1% of the imported samples. Nitrite content between 20 mg/kg and 30 mg/kg was found in 6.8% of the samples. Consequentially, nitrite content was indicated to be less than 10 mg/kg in 86.5% of samples.

Nitrite content of domestic meat products was less than 5 mg/kg in 31% of the samples and it was between 5 mg/kg and 15 mg/kg in 34% of the samples. Nitrite content between 20 mg/kg and 30 mg/kg was found in 26% of the samples. Consequentially, nitrite content was indicated to be less than 20 mg/kg in 76% of the samples.

Fig. 1 shows the average nitrite content of the imported meat products as compared to the domestic ones by meat product category. Most categories of the imported meat products were shown to be less than 5 mg nitrite/kg of product but in bacon nitrite was detected at more than other meat products at 7.1 mg nitrite/kg product. In the case of domestic meat products, dry meat product was shown to have 1.3 mg nitrite/kg product and nitrite in sausage was detected at the highest concentration of 20.6 mg nitrite/kg product.

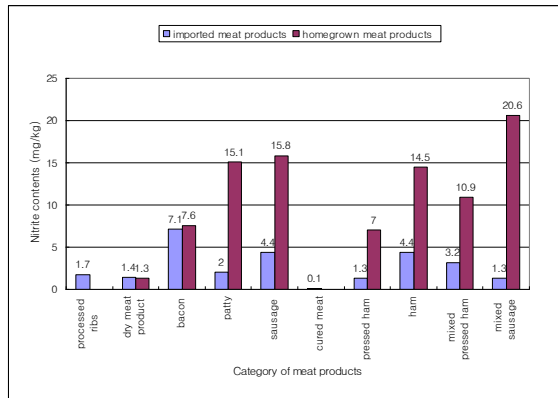


Figure 1. The average nitrite content of imported and domestic meat products by category

IV. CONCLUSION

In this study, imported and domestic meat products were analyzed for nitrite contents. Nitrite content was found to be present at concentrations less than 10 mg/kg for 86.5% of the imported meat products measured and was found to be present at less than 20 mg/kg in 76% of the domestic meat products studied. In conclusion, this study shows that the average nitrite content of domestic meat products may be higher than that of the imported meat products. However, all nitrite concentration values were under the Korean nitrite control level of 70 mg nitrite/kg product.

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