

**Article 5. Standards and Specifications for  
Each Food Product**

## 11. Processed Meat and Egg Products

### 1) Definition

Processed meat and egg products refer to products that are manufactured and processed using meat or eggs as its main material (those not specified in the standards for processing of livestock products and specifications for their components).

### 2) Requirements of Raw Material

- (1) For non-domestic animals, raw materials should meet the methods of butchering and the examination criteria as specified in the Processing of Livestock Products Act.

### 3) Manufacturing and Processing Standards

#### 4) Food type

##### (1) Meat and Egg Product

Meat and egg product refers to egg, carcass, lean meat, the viscera and other parts of animals reared to eat.

##### (2) Processed Meat Product

Processed meat product refers to a product that is manufactured and processed by the addition of other foods or food additives using meat as its main material.

##### (3) Processed Egg Product

Processed egg product refers to a product that is manufactured and processed by the addition of other foods or food additives using egg as its main material.

### 5) Specifications

- (1) Nitrite ion (g/kg) : Not more than 0.07 (Limited to processed meat product)
- (2) Volatile basic nitrogen (mg %) : Less than 20 (Limited to meat product)
- (3) Tar color : Should not be detected (Limited to processed meat product)
- (4) Coliform group : Less than 10 per 1 g (Limited to pasteurized products: in case of processed meat product, it should be negative)
- (5) The number of bacteria : Negative (Limited to sterilization: but less than 10,000 per 1 g in case of pasteurization)
- (6) Salmonella : Negative (Limited to pasteurized products)
- (7) *E.Coli* O157:H7 : Negative (Limited to minced raw products).
- (8) Preservatives (g/kg) : Any preservative except the followings should not be detected

Sorbic acid Potassium sorbate Calcium sorbate	Not more than 2.0 (as sorbic acid, limited to meat and processed meat (except seasoned meat, minced meat, processed rib product))
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### 6) Test Method

#### (1) Nitrite ion

##### ① Azo Dye Formation Method(Diazoreaction)

##### A. Reagent

Ⓐ Ammonium acetate buffer solution

Melt 100 g of ammonium acetate with 900 mL water, the solution is adjusted to pH 9.1 by 10% ammonia water and water is added to it to be 1,000 mL.

Ⓑ Sulfanilamide solution

Heat and melt 0.5 g sulfonilic amid with 100 mL hydrochloric acid (1+1).

Ⓒ Naphthyl ethylene diamine solution

Melt 0.12 g N-(1-naphthyl) ethylene diamine solution to 100 mL Water and filter, if any, impurities.

Ⓓ Nitrite standard solution

The standard solution is made by dissolving 0.150 g sodium nitrate ( $\text{NaNO}_2$ ) in 1.000 mL of sterilized water, after drying  $\text{NaNO}_2$ (the highest purity) in a desiccator containing sulfuric acid for 24 hours. 10 mL standard solution is diluted with sterilized water to make the total volume of 100 mL. Take 2 mL of the diluted standard solution and add additional distilled water so that the final volume is 100 mL. The concentration of the final solution should be  $0.2 \mu\text{g NaNO}_2/\text{mL}$  (prepare the standard solution prior to use).

Nitrite standard solution 1 mL =  $0.2 \mu\text{g NO}_2^-$

B. Preparation of test solution

10 g of sample cut finely is weighed precisely and water of about  $80^\circ\text{C}$  is added appropriately. After the solution is well mixed, it is transferred into a 200 mL volumetric flask and the original container is rinsed out several times with warm water to be added to the flask. The total volume of the solution in the flask must be 150 mL.

★ Add 10 mL of 0.5 N NaOH into the flask and mix well by shaking the flask. Then, add 10 mL of 12% zinc sulfate ( $\text{ZnSO}_4$ ) into the solution and mix well through the same procedure. Heat the flask in a water bath with a temperature of  $80^\circ\text{C}$  for 20 minutes while occasionally shaking the flask. Place the flask in cool water until the temperature reaches room temperature. Then, add 20 mL ammonium acetate buffer solution and add water until the final volume is 200 mL. Thoroughly mix the final solution and rest it for 10 minutes. Filter the solution using dried filter paper. About 20 mL of the initial filtrate is discarded and clear filtrate is taken into an Erlenmeyer flask. This solution is used as the test solution. In addition, 10 mL of water (instead of sample) is treated according to the method described in ★. This solution is used as the blank solution.

C. Test method

1 mL of sulfanilamide solution is added to 20 mL of the test and blank solution respectively. Then, add 1 mL naphthyl ethylene diamine solution. Make the final volume 25 mL by adding more water and mix the solution by shaking. Rest the solution for 20 minutes. Prepare a control solution with 20 mL of water according to the same procedures. Then, test and compare the absorbance  $A_a$  and  $A_b$  at a wavelength of 540 nm. If the test solution is in colors, measure the absorbance  $A_c$  of a mixture made by adding 1 mL of HCl (1+1) and water to 20 mL of the test solution to make the final volume of 25 mL against the water (control). Then, obtain the absorbance difference ( $A_a - A_b$  or  $A_a - (A_b + A_c)$ ) and calculate the amount of nitrite ion ( $A$  ( $\mu\text{g}$ )) in 20 mL of test solution with use of the previously plotted standard curve. Then, calculate the concentration of nitrite ion in sample according to the following formula.

$$\text{Nitrite Ion (g/Kg)} = \frac{A \times 1}{s} \times \frac{1}{100}$$

S = Quantity of sodium nitrate sample (g)

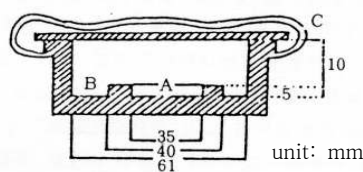
Plot of the calibration curve: Obtain the sodium nitrate standard solution in 25 mL volumetric flasks with a stopper varying the volume in each flask (2 mL, 5 mL, 10 mL, 15 mL, 20 mL). Add 1 mL sulfanilamide solution and 1 mL naphthyl ethylene diamine solution in each flask. Then, add water to make the final volume in all flasks equal to 25 mL. Then, mix all solutions by shaking. Prepare a control solution with 20 mL water through the identical method. Measure the absorbance of all solutions with the water-based control solution. Then, obtain the calibration curve.

## (2) Volatile basic nitrogen (VBN)

### ① Micro-diffusion (Conway) method

#### A. Devices

- Ⓐ Diffuser : As illustrated below, a diffuser has the cover with a multi-layered glass which assembles a Petri dish. The body is divided into two concentric quarters, an inner A(35 mm diameter) and outer B(61 mm diameter). The height of the inner quarter is approximately one half of that of the outer quarter. A diffuser is must be tight-sealed once the cover is properly located and the clip (C) is locked.



#### B. Reagents

- Ⓐ Tight-seal enhancer: Glycerin (white baseline as well as liquid paraffin is also applicable)
- Ⓑ  $K_2CO_3$  saturated solution: Dissolve about 60 g of  $K_2CO_3$  (the highest purity) in approximately 50 mL distilled water, while heating the mixture. Then, cool down the solution away from  $NH_3$  gas. Take the top layer only during the experiment.
- Ⓒ Brunswick reagent: Dissolve 0.2 g of methyl red and 0.1 g of methylene blue with 300 mL ethanol. Then, keep it in a non-transparent bottle.

#### C. Preparation of Test solution

In the case of meat, obtaining a universally representative sample is relatively difficult due to the inconsistency in the quality and composition depending on each portion. Hence, several test samples must be collected varying their origins with a bias towards the flesh. In accordance with the size and quantity of samples, a group of samples, collected from several parts of each group out of three to five, which weight approximately 20 g to 50 g, respectively. Cut the samples and blend them. Weigh precisely 10 g and place it into two beakers (two sets of test will be done in order to get the average). Add 50 mL distilled water in each beaker and stir, and then extract through precipitation for 30 minutes. Filter the solution. Prepare the test solution by neutralizing the filtrate to weak acid with 5% sulfuric acid and adding proper amount of distilled water.

#### D. Test

Since it is a micro analysis by neutralization method, acid or alkali gas should not be generated in a lab.

##### Ⓐ Diffusion

Incline a diffuser slightly and put 1.00 mL of test solution into the bottom of its outer shell by using a pipette accurately and then, put 1.00 mL of 0.01 N- $H_2SO_4$  into its inner shell A in the same way.

Apply a small quantity of airtight agent evenly around the cover, put 1.00 mL K<sub>2</sub>CO<sub>3</sub> saturated solution on the top of the outer shell B, and close it quickly. Then, fix it with clips, incline the diffuser left and right, rotate it silently to mix them (solutions in the outer/inner shell should not be mixed) at 25°C for 1 hour (120 minutes at 20°C, 140 minutes at 7°C and, 160 minutes and longer at 10°C) and leave them alone.

Ⓑ Quantitative test

Open the cover, put a drop of Brunswik reagent to H<sub>2</sub>SO<sub>4</sub> solution, which is in the inner shell and titrate it with 0.01 N-NaOH by using a micro burette, calculate the average of two attempts (a mL).

Apart from it, execute a blank test by using distilled water, instead of test solution, obtain the average of two tests (b mL) and calculate it according to the following formula.

$$\text{Volatile basic nitrogen (mg/\%)} = 0.14 \times (b-a) \times f/w \times 100 \times d$$

W : weight of a sample (g)

f : factor of 0.01N-NaOH

d : dilution factor

(3) Tar color

It is tested according to 2.4. Coloring Agents described in Article 10. General Testing Methods.

(4) Coliform group

In order to prepare the test solution, uniformly pulverize coliforms in a grinder. Take 10 g of the grinded coliforms in a sterilized test tube. Then, add sterilized phosphoric acid diluted buffer and sterilized saline solution until the total volume reaches 100 mL. Place the stopper and blend it well by shaking the tube. Dilute the test solution through 10 mL, 1 mL, and 10 time dilution methods. Then, apply 1 mL of each diluted solution on B.G.L.B agar. It is tested according to 3.7 Coliform group, 3. Microorganism described in Article 10. General Testing Methods.

(5) The number of bacteria

It is tested according to 3.5.1 The number of bacteria, 3. Microorganism described in Article 10. General Testing Methods.

(6) Salmonella

It is tested according to 3.11 Salmonella, 3. Microorganism described in Article 10. General Testing Methods.

(7) Coliform group O157:H7

It is tested according to 3.16 Coliform group O157:H7, 3. Microorganism described in Article 10. General Testing Methods.

(8) Preservatives

It is tested according to 2.1. Preservatives described in Article 10. General Testing Methods.