Tingkat Infeksi Bakteri Patogen pada Daging Babi di Pasar Tradisional di Wilayah Kota Denpasar.

Infection Level of Pathogenic Bacteria in Pork at Traditional Market in Denpasar.

Ni Nyoman Puspawati[1]*, Komang Ayu Nocianitri[1] dan Nyoman Semadi Antara[2]

Department of Food Sci.and Tech[1]. and Department of Industry of Agricultural Technology[2], Faculty of Agricultural Technology, Udayana University,

ABSTRAK

Tujuan dari penelitian ini adalah untuk mengetahui informasi ilmiah tentang tingkat cemaran bakteri patogen pada daging babi dan untuk memperoleh informasi tentang tingkat sanitasi dari kios daging di pasar tradisional di seluruh Denpasar. Penelitian ini menggunakan metode survei untuk pengambilan sampel sebelum dianalisis di Laboratorium. Total umlah pasar tradisional yang terdapat di Denpasar sebanyak 1 buah. Berdasarkan survei minimum sampling yaitu 30 % , 4 pasar telah dipilih sebagai tempat untuk pengambilan sampel. Parameter yang diamati pada penelitian ini adalah total *Coliform*, total *Escherichia coli* dan *Salmonella sp*, serta tingkat sanitasi dan kebersihan dari pedagang daging dengan menggunakan teknik wawancara berdasarkan kuisioner. Hasil penelitian menunjukkan bahwa tingkat cemaran *Coliform* melebihi batas SNI yang ditetapkan, dimana pada pasar pagi Badung cemaran *Coliform* sebesar ($2,5 \pm 1,7$) x 10^5 cfu/cm^2, pasar Impres Sanglah sebesar ($7,3 \pm 1,2$) x 10^4 cfu /cm^2, pasar Ubung sebesar ($2,9 \pm 4,1$) x 10^4 cfu/cm^2 dan pasar Kreneng sebesar ($1,4 \pm 1,5$) x 10^4 cfu/cm^2. Tingkat cemaran *E. coli* melebihi batas SNI yang ditetapkan, dimana pada pasar pagi Badung cemaran *Coliform* sebesar (5.7 ± 8.2) x 10^4cfu/cm^2, pasar Impres Sanglah sebesar (2.3 ± 2.8) x 10^4cfu/cm^2, pasar Ubung sebesar is (1.4 ± 1.6) x 10^4 cfu/cm^2 dan pasar Kreneng sebesar ($8,3 \pm 1,1$) x 10^3cfu/cm^2. Tingkat cemaran *Salmonella sp* melebihi batas SNI yang ditetapkan, dimana pada pasar pagi Badung cemaran *Coliform* sebesar (5.6 ± 7.5) x 10^3 cfu/cm^2, pasar Impres Sanglah sebesar (6.6 ± 1.1) x 10^3 cfu/cm^2, pasar Ubung sebesar is (5.2 ± 6.8) x 10^3 cfu/cm^2 dan pasar Kreneng sebesar ((3.2 ± 3.9) x 10^2 cfu/cm^2. Sumber kontaminasi berasal dari lingkungan disekitar pasar dan tingkat sanitasi serta higiene pedagang yang masih rendah.

Kata kunci : *cemaran bakteri, daging babi, pasar tradisional*

*Korespondensi Penulis:
  Email: nnpuspa@yahoo.com

ABSTRACT

The aim of the research were to achieve scientific information about the infection level of bacteria found in pork meat and to acquire the information of the sanitation level of the meat stall in traditional market around Denpasar. This research used survey method in sampling before being analyzed in Laboratorium. There are 16 traditional market in Denpasar, based on the minimum survey of sampling which is 30%, 4 market has chosen for sample source. The parameter of this research is total of *Coliform*, total of *E.coli* and *Salmonella sp*, also the sanitation level and hygiene of the butcher using questionare. The result of the research showed that the infection level of *Coliform* in pork found in the market has been over the limit of SNI which is on the morning market of Badung is $(2.5 \pm 1.7) \times 10^5$ cfu/cm^2, Impres Sanglah market is $(7.3 \pm 1.2) \times 10^4$ cfu/cm^2, Ubung market is $(2.9 \pm 4.1) \times 10^4$ cfu/cm^2 and Kreneng market is $(1.4 \pm 1.5) \times 10^4$ cfu/cm^2. The infection level of *E. coli* found in pork is over the limit of SNI, which is on the morning market of Badung is $(5.7 \pm 8.2) \times 10^4$ cfu/cm^2, Impres Sanglah market is $(2.3 \pm 2.8) \times 10^4$ cfu/cm^2, Ubung market is $(1.4 \pm 1.6) \times 10^4$ cfu/cm^2 and Kreneng market is $(8,3 \pm 1,1) \times 10^3$ cfu/cm^2. The infection level of *Salmonella sp* found in pork is over the limit of SNI, which is Impres Sanglah market $(6.6 \pm 1.1) \times 10^3$ cfu/cm^2, on the morning market of Badung is $(5.6 \pm 7.5) \times 10^3$ cfu/cm2, Ubung market is $(5.2 \pm 6.8) \times 10^3$ cfu/cm^2 and Kreneng market is $(3.2 \pm 3.9) \times 10^2$ cfu/cm^2. The source of contamination come from the surroundings of the butcher stall in the market that is lack of hygiene and sanitation standard.

Key words : *bacteria infection, pork, traditional market*

INTRODUCTION

Meat is defined as all animal tissue and all products are the result of processing these networks are suitable to be eaten and not cause health problems for those who eat it (Soeparno, 1992). Animal protein needs are generally derived from beef, lamb, pork, and fish. One of the lots of choice is pork meat where meat is a nutritious pork for consumption.

Pork is a good place for microorganisms to grow because it contains pork, water and high protein and neutral pH conditions. Types of microorganisms that frequently contaminate and grow well on pork is a type of bacteria such as *Coliform*, *Salmonella sp*. and *Staphylococcus aureus* is an indicator of cross-contamination in meat which grow optimally at 30ºC (Jay, 1992). The meat most often contaminated with bacteria is part of the thigh. This is due to the thigh on the pork is very easy to experience cross-contamination. In addition, pork thigh adjacent to the place of expenditure to allow the occurrence of contamination is very large.

In previous studies about the level of bacterial contamination of traditional market is the result obtained on the beef obtained contaminant level for *Coliform* bacteria at $(4.4 \pm 9.9) \times 10^5$ (Arpandy, 2003), in chickens of $(1.9 \pm 2.7) \times 10^4$ (Irawaty, 2003) whereas in fish obtained 2.6×10^8 (Febrianto, 2003). This is the basis for conducting research on contaminant levels of *Coliform* bacteria, *Salmonella sp*. and *E. coli* in pork since pork consumption level is very high especially in Bali.

MATERIALS AND METHODS

Materials Research

Materials used in this study were fresh pork sold in traditional market in Denpasar. While the materials used for microbiological analysis is the medium of Violet Red Bile (VRB), Eosin Methylen Blue Agar (EMBA), Salmonella Shigella Agar (SS order), Baird Parker Agar (BPA), NaCl 0.85% (Pro Analysis), distilled water , 70% alcohol, methylated spirit.

Implementation Research
Research sample

The sample used in this research is pork thigh that was taken by swab (topical) of pork meat traders in traditional markets in the city of Denpasar.

Determination of Sample Research

The number of samples taken for analysis in a traditional market laboratrium of each depending on the number of traders of pork. In the city of Denpasar Denpasar district covering West, East Denpasar, South Denpasar Denpasar North and there are 16 pieces of traditional markets. Based on the minimum requirements of sampling survey data that is required at least 30% (Singarimbun and Effendi, 1989), so that the entire amount of the selected markets 4 fruit market that will be used as a sampling of pork. Merchants who elect to. pork meat samples taken at 30% of all pork sellers in each market that is as many as 18 traders.

Sampling

Samples were taken by swab method (topical) using sterile cotton bud on the same unit area (16 cm2), and then inserted into a bottle containing 10 ml of sterile 0.85% NaCl solution to avoid external contamination. The samples were put into bottles and then placed in a cool box that already contains the ice to inhibit bacterial growth during the time required until the sample reached the laboratory for analysis.

Analysis Method
1. Determination of *Coliform*

Determination of total *Coliform* count method was used for the cup using Violet Red Bile (VRB) (Fardiaz, 1989). The way it works is the results of swab samples, in put into 10 ml of 10-1 dilution aquades thus obtained. Then performed dilution series 10-2, 10-3, 10-4 and 10-5 by adding 1 ml of previous dilution to 9 ml of sterile diluent.

Planting methods used in surface spread method for. From the desired dilution, a total of 0.1 ml in the pipette solution into the petri dish that already contains 15 ml of VRBA. Each will be in a pipette into a petri dish, test tube containing a solution must be thoroughly shaken to spread the bacteria in it. To spread the bacterial cells evenly on a petri dish made of agitation on the surface for which has been given a solution by using a rod, by twirling a petri dish and stir bar simultaneously and in opposite directions. After the sample is

spread evenly, these plates can be incubated in an incubator in the inverted position at 37 °C for 24 hours. The total number of colonies on each plate can be calculated.

The characteristics of *Coliform* in for VRB is specific to form colonies in sub-surface, which is colored purple with a diameter of 0.5 mm or more, surrounded by areas that show precipitation indicator (neutral red).

2. Determination of *E. coli* and *Salmonella sp.*

Determination of total *E. coli* and *Salmonella* sp same as the method of determination of *Coliform* plate count method (Buckle et al,. 1985). What distinguishes only on the media used. In the determination of *E. coli* EMBA media used in the determination of *Salmonella* sp while using the media of Salmonella Shigella Agar (SS order) (Buckle *et al,*. 1987). The appearance of *E. coli* form a metallic green colonies while colonies of *Salmonella* sp forming cloudy white with colored center somewhat dark.

The total number of colonies by Fardiaz (1989) per gram of sample is calculated using the formula:

The number of colonies per ml = the number of colonies per plate x 1/dilution factor

RESULTS AND DISCUSSION

Total *Coliform* Contamination

Total *Coliform* contamination in pork sold in traditional markets in the city of Denpasar can be seen in Table 1.

Table 1. *Coliform* contamination levels in pork sold in traditional market in Denpasar.

No	Name of market	Average *Coliform* contamination levels (cfu/cm^2)
1.	Ubung Market	$(2,9 \pm 4,1) \times 10^4$
2.	Impres Sanglah Market	$(7,3 \pm 1,2) \times 10^4$
3.	Kreneng Market	$(1,4 \pm 1,5) \times 10^4$
4.	Badung Pagi Market	$(2,5 \pm 1,7) \times 10^5$

The high level of *Coliform* contamination, the pork sold in traditional markets can be caused by the influence of environmental conditions in a less clean. Observe the market environment in less net covering the floor around where the sale of meat and muddy, the place is still adjacent to the sale of vegetables, the number of flies that were flying.

Total *E. coli* Contamination

Total *E.coli* contamination in pork sold in traditional markets in the city of Denpasar can be seen in Table 2.

Height levels of *E. coli* contamination of meat sold in traditional market can be caused by the influence of the pork itself and the environment in which pork is sold. Pork meat sample is used as part of the thigh where in this part of the most frequently contaminated with bacteria. This is due to the thigh on the pork is very easy to experience cross-contamination. In addition, pork thigh adjacent to the place of expenditure to allow the occurrence of contamination is very large.

Table 2. *E.coli* contamination levels in pork sold in traditional market in Denpasar.

No	Name of market	Average *E.coli* contamination levels (cfu/cm^2)
1.	Ubung Market	$(1,4 \pm 1,6) \times 10^4$
2.	Impres Sanglah Market	$(2,3 \pm 2,8) \times 10^4$
3.	Kreneng Market	$(8,3 \pm 1,1) \times 10^3$
4.	Badung Pagi Market	$(5,7 \pm 8,2) \times 10^4$

Total Contamination *Salmonella sp.*

Total *Salmonella* sp contamination in pork sold in traditional markets in the city of Denpasar can be seen in Table 3.

The high level of contamination with *Salmonella sp* may come from contamination of dirt (feces) and water that has been contaminated by feces of humans and animals. Primary habitat of these bacteria are the digestive tract of humans and animals to allow the occurrence of bacterial contamination in pork *Salmonella* sp. In addition to these factors in ways that are less precise handling of meat can also cause high levels of contamination in pork. How to inappropriate handling of meat that traders put meat on the open space on the table without a pad at room temperature, subsequently holding a meat-free buyer is selected and will be purchased and traders put the meat-this part is not separate either the thigh, or meat offal . Tools used like a knife cutting flesh and viscera together to cut the same scales

Table 3. Contamination levels of *Salmonella sp* in pork sold in traditional market in Denpasar.

No	Name of market	Average *Salmonella sp* contamination levels (cfu/cm^2)
1.	Ubung Market	$(5,2 \pm 6,8) \times 10^3$
2.	Impres Sanglah Market	$(6,6 \pm 1,1) \times 10^3$
3.	Kreneng Market	$(3,2 \pm 3,9) \times 10^2$
4.	Badung Pagi Market	$(5,6 \pm 7,5) \times 10^3$

used to weigh meat and jeroannya. The traders do not use gloves while the apron is clean because it consumes less concurrently used as a hand towel.

CONCLUSION

Based on the results of research on the level of contamination of *Coliform*, *E. coli* and *Salmonella sp* on pig meat sold in traditional markets in the city of Denpasar, it can be concluded that:

1. *Coliform* contamination level on pork has exceeded the limits set by Indonesia National Standart that is on the morning of Badung Market $(2.5 \pm 1.7) \times 10^5$ cfu/cm2, then in succession at Sanglah IMPRES Market at $(7.3 \pm 1, 2) \times 10^4$ cfu/cm2, Ubung Market at $(2.9 \pm 4.1) \times 10^4$ cfu/cm2 and Markets Kreneng of $(1.4 \pm 1.5) \times 10^4$ cfu/cm2.

2. Contaminant level of *E. coli* in pork has exceeded the limits set by Indonesia National Standart that is on the morning of Badung Market $(5.7 \pm 8.2) \times 10^4$cfu/cm2, then in succession at

Sanglah IMPRES Market at $(2.3 \pm 2, 8)$ x 104cfu/cm2, Ubung Market at (1.4 ± 1.6) x 10^4cfu/cm2 and Markets Kreneng of (8.3 ± 1.1) x 10^3cfu/cm2.

3. Contamination levels of *Salmonella sp* in pork sold in traditional markets have been known to exceed the limits set by the Indonesia National Standart which is on Market IMPRES Sanglah (6.6 ± 1.1) x 103 cfu/cm2, Badung Market Morning $(5.6 \pm 7,5)$ x 10^3 cfu/cm2, Ubung Market (5.2 ± 6.8) x 10^3 cfu/cm2 and Markets Kreneng (3.2 ± 3.9) x 10^2 cfu/cm2.

4. One source of contamination could come from environments where the pork seller who does not meet sanitary standards.

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