



Quality of Bali Beef From East Nusa Tenggara During Distribution from Slaughterhouse to Consumers

**Anggia Martiana, Irma Isnafia Arief, Henny Nuraini, Epi Taupik
IPB University**

ANIMAL LOGISTICS SEMINAR



Introduction

Materials and Methods

Result and Discussion

Summary

Conclusions

Introduction

The consumption of beef in Indonesia is increasing



Government policy in distribusi cattle.



Need to improve quality of meat from slaughterhouses.



Meat quality is observed from the beginning of production to consumer



The objectives of this research was to analyze the physico-chemical and microbiological quality of Balinese beef From East Nusa Tenggara transported by the Camara Nusantara ship during the process of distributing fresh meat from Slaughterhouses to consumer acceptance

Materials and Method



Introduction
Materials and Methods
Result and Discussion
Summary
Conclusions

Sampling Method :

Sampling uses Bali cattle from East Nusa Tenggara (Kupang) which are slaughter at Jatimulya slaughterhouse. The cattle were ferried by Camara Nusantara ship from East Nusa Tenggara (Kupang) to Tanjung Periok and then transported by truck to Jatimulya slaughterhouse. Cattle are cut at different times. The carcasses distributed into 3 distribution points:

- 1). slaughterhouse (meat after cutting in slaughterhouse)
- 2). Market (meat in the traditional market)
- 3) consumer (meat after 3 days the consumer at the freezer)

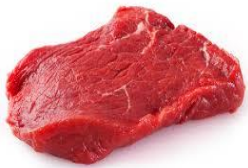


Materials and Method



Introduction
Materials and Methods
Result and Discussion
Summary
Conclusions

Materials:



Meat



BPW



PCA, BPA, EMBA, XLDA

Beef Characteristic Analysis :

- pH values
Analysed based on Weglarz 2010.
- water holding capacity
Analysed based on method (Hermanianto *et al.* 1999).
- Beef tenderness
Analysed based on method Warner-Bratzler shear force method (Wheeler *et al.* 1997)
- Beef cooking loss
Analysed by calculating the difference meat between fresh meat weight and cooked meat weight (Soeparno, 2005).



Microbiological analysis :

Analysed based on Pelczar and Chan (2008) method

- Analyzes the total plate count using *plate count agar*
- Analysis of *eschericia coli* using eosyn methyllen blue agar (EMBA)
- Analysis *salmonella sp* using xylose lysine desoxycholate agar (XLDA)
- Analysis of *staphylococcus aureus* using baird parker agar (BPA)

This experiment used a randomized block design with three process of distribution treatment : after packed, after market and 3 days after delivered by consumers. Data observed were analysed using varian analysis (ANOVA)

Result and Discussion



Table 1. Microbe population (log cfu g⁻¹) on beef at different slaughtering time and different chain distribution

Tests	Slaughtering time	Distribution Chain		
		Slaughtering	Market	Consumers
Total Plate Count (log cfu g ⁻¹)	Cutting 1	5.90±0.13	6.49±0.62	5.77±0.13
	Cutting 2	5.56±0.07	5.96±0.09	6.01±0.04
	Cutting 3	6.44±0.04	6.67±0.16	6.20±0.49
	Average	5.97±0.45	6.37±0.37	5.99±0.21
Escherichia coli (log cfu g ⁻¹)	Cutting 1	2.32±0.07	2.43±0.07	1.92±0.15
	Cutting 2	1.80±0.14	1.81±0.30	1.00±0.00
	Cutting 3	0.65±0.92	1.35±0.07	1.15±0.21
	Average	1.59±0.85	1.86±0.54	1.36±0.49

Number in the same line or row followed by different letters shows significant difference (p<0.05)

The maximum limit of carcass and beef TPC on SNI (Indonesia National Standard) 2008 is 6 log cfu g⁻¹

According to SNI 2008 E. Coli on carcass and beef is 1 log cfu g⁻¹.

Result and Discussion



Table 2. Microbe population (log cfu g⁻¹) on beef at different slaughtering time and different chain distribution

Tests	Slaughtering time	Distribution Chain		
		Slaughtering	Market	Consumers
Staphylococcus aureus (log cfu g ⁻¹)	Cutting 1	2.92±0.07	3.06±0.03	2.67±0.03
	Cutting 2	2.00±0.09	2.43±0.05	2.18±0.07
	Cutting 3	2.35±0.09	2.70±0.08	2.13±0.10
	Average	2.42±0.47a	2.73±0.32b	2.33±0.30a
Salmonella sp.	Cutting 1	(+) 2/2	(+) 2/2	(+) 2/2
	Cutting 2	(+) 1/2	(+) 1/2	(+) 1/2
	Cutting 3	(-) 2/2	(-) 1/2	(-) 1/2

Number in the same line or row followed by different letters shows significant difference (p<0.05)

SNI 2008 contains Salmonella sp in negative beef per 25 g.

SNI 2008 maximum limit of Staphylococcus aureus in beef products is 2 log cfu g⁻¹.

Result and Discussion



Table 2. Beef physical and chemical values in different chain distribution

Tests	Slaughtering time	Distribution Chain		
		Slaughtering	Market	Consumers
Ph	Cutting 1	5.49±0.11	5.47±0.16	5.35±0.07
	Cutting 2	5.63±0.04	5.61±0.02	5.36±0.04
	Cutting 3	5.61±0.03	5.47±0.05	5.59±0.11
	Average	5.57±0.07	5.51±0.08	5.43±0.13
Water Holding Capacity (%)	Cutting 1	38.8±0.19	38.41±2.27	37.0±1.6
	Cutting 2	37.8±2.41	36.28±1.7	35.6±0.8
	Cutting 3	40.1±0.23	40.71±0.75	38.7±1.4
	Average	38.90±1.17	38.46±2.22	37.1±1.57

Number in the same line or row followed by different letters shows significant difference ($p < 0.05$)

According to Soeparno (2015), after animals are cut there will be a decrease in pH. The activity of microorganisms breaks carbohydrates into lactic acid, so pH is lower (Lawrie 2003)

Decrease in mg H₂O is caused by a decrease in pH in beef and a long period of withering (Florek et al 2009). According to Soeparno (2015) too long storage will also reduce mg H₂O and changes in the structure of meat protein

Result and Discussion



Table 2. Beef physical and chemical values in different chain distribution

Tests	Slaughtering time	Distribution Chain		
		Slaughtering	Market	Consumers
Tenderness (kg cm ⁻²)	Cutting 1	8.2±1.13	8.6±2.55	5.65±0
	Cutting 2	6.45±1.77	7.85±2.62	6.15±0
	Cutting 3	10.4±0.28	7.9±3.11	6.52±0.1
	Average	8.35±1.98	8.12±0.42	6.02±0.32
Cooking Loss (%)	Cutting 1	54.4±1.98	47.6±4.12	36.7±7.3
	Cutting 2	46.4±4.71	49.3±3.61	44.6±0.8
	Cutting 3	47.9±4.14	52.2±5.2	39.4±3.2
	Average	49.57±4.25b	49.72±2.32b	40.26±4.02a

Number in the same line or row followed by different letters shows significant difference ($p < 0.05$)

Decreasing the pH of meat causes katepsin enzymes to become active and can break down meat protein, consequently meat becomes more tender (Aberle et al. 2001)

Lawrie (2003) states that cooking loss is influenced by pH, temperature and length of cooking and type of muscle. In addition, it also affects species, age and feed.



Comparison Of The Quality Of Microbes Beef Brahman Cross In The Cold Distribution Chain From Modern Slaughterhouses (Raifah 2018)

Tabel 3. Microbe population (log cfu g⁻¹) on beef at different slaughtering and distribution chain.

Tests	Slaughtering week	Distribution Chain		
		Beef after packed	45 days aged beef	3 days beef in the consumers
Total Plate Count (log cfu g ⁻¹)	Week 1	2.72±0.07	2.78±0.04	2.96±0.06
	Week 2	2.59±0.05	2.65±0.08	2.85±0.07
	Week 3	2.77±0.04	2.89±0.06	3.03±0.06
	Average	2.95±0.09a	2.77±0.12a	2.67±0.10b
Escherichia coli (log cfu g ⁻¹)	Week 1	0	0	1.30±0.21
	Week 2	0	0	1.26±0.24
	Week 3	0	0	1.32±0.15
	Average	0a	0a	1.29±0.17b

Number in the same line or row followed by different letters shows significant difference (p<0.05)

Result and Discussion



Table 3. Microbe population (log cfu g⁻¹) on beef at different slaughtering time and different chain distribution

Tests	Slaughtering week	Distribution Chain		
		Beef after packed	45 days aged beef	3 days beef in the consumers
Staphylococcus aureus (log cfu g ⁻¹)	Week 1	0	0	1.36±0.22
	Week 2	0	0	1.42±0.22
	Week 3	0	0	1.44±0.13
	Average	0a	0a	1.41±0.17b
Salmonella sp.	Week 1	0	0	0
	Week 2	0	0	0
	Week 3	0	0	0

Number in the same line or row followed by different letters shows significant difference (p<0.05)



Comparison Of Physical And Chemical Values Of Beef Brahman Cross In The Cold Distribution Chain From Modern Slaughterhouses (Raifah 2018)

Table 4. Beef physical and chemical values in different slaughtering week and distribution chain

Tests	Slaughtering week	Distribution Chain		
		Beef after packed	45 days aged beef	3 days beef in the consumers
pH	Week 1	5.57±0.11	5.47±0.10	5.33±0.13
	Week 2	5.62±0.08	5.42±0.07	5.31±0.06
	Week 3	5.53±0.08	5.42±0.09	5.40±0.06
	Average	5.57±0.09a	5.44±0.08b	5.35±0.09b
Color	Week 1	1.33±0.47	3.00±0.00	3.67±0.47
	Week 2	1.33±0.48	3.00±0.00	3.67±0.48
	Week 3	1.00±0.00	3.00±0.00	3.67±0.49
	Average	1.22±0.41a	3.00±0.00b	3.67±0.47c

Number in the same line or row followed by different letters shows significant difference ($p < 0.05$)

Result and Discussion



Table 4. Beef physical and chemical values in different chain distribution

Test	Slaughtering week	Distribution Chain		
		After packed beef	45 days aged beef	3 days aged beef in consumers
Water Holding Capacity (%)	Week 1	32.19±0.31	30.45±0.21	31.69±0.33
	Week 2	29.80±0.34	28.97±0.17	29.05±0.35
	Week 3	31.54±0.05	29.65±0.13	27.95±0.13
	Average	30.97±1.18	29.77±1.29	29.56±1.94
Tenderness	Week 1	8.09±1.11a	3.70±1.43bc	2.96±1.01c
	Week 2	5.96±0.88ab	4.17±0.80bc	3.18±0.96c
	Week 3	4.57±1.42bc	4.30±0.85bc	2.52±0.81c
Cooking Loss (%)	Week 1	51.95±1.04	50.51±0.52	46.33±0.91
	Week 2	51.95±1.87	49.63±1.22	46.56±2.50
	Week 3	54.39±2.36	47.36±5.98	46.40±0.54
	Average	52.77±2.46a	49.17±2.69b	46.43±4.89b

Number in the same line or row followed by different letters shows significant difference ($p < 0.05$)



Summary

Summary : Comparison

Indicator	Bali cattle from NTT – traditional slaughterhouses	Brahman Cross –modern slaughterhouses
Total Plate Count (log cfu g ⁻¹)	According to SNI 2008	According to SNI 2008
Escherichia coli (log cfu g ⁻¹)	Not yet according to SNI 2008	According to SNI 2008
Staphylococcus aureus (log cfu g ⁻¹)	Not yet according to SNI 2008	According to SNI 2008
Salmonella sp	Not yet according to SNI 2008	According to SNI 2008



Summary

Summary : Comparison

Indicator	Bali cattle from NTT – traditional slaughterhouses	Brahman Cross –modern slaughterhouses
pH	Normal Range	Normal Range
Water Holding Capacity(%)	Normal Range	Normal Range
Tenderness (kg cm ⁻²)	Normal Range	Normal Range
Cooking Loss (%)	Normal Range	Normal Range



Conclusions

The beef characteristics of Bali Cattle from NTT (using Cemara Nusantara ship transportation) during the distribution process of slaughterhouse, markets and consumers were in the range normal pH, water holding capacity, high level of tenderness, and low cooking loss level. The microbiology quality of beef did not fulfill Indonesia National Standard.



THANKYOU