



# ***BODY SIZE OF ACEH CATTLE IN SMALLHOLDER FARM LEVEL AND IN BALAI PEMBIBITAN TERNAK UNGGUL DAN HIJAUAN PAKAN TERNAK INDRAPURI ACEH***

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## I. INTRODUCTION

North Aceh Regency is one of the districts in Aceh Province which has the second largest population of beef cattle in Aceh. According to the Agriculture and Livestock Agency of North Aceh Regency, the population in 2015 was 96,982. Farmers in North Aceh Regency prefers to raise Aceh cattle compared to another breed. Aceh cattle is one of Indonesia's local cattle breed, that has the potential to be developed for beef cattle [1] [2]. Aceh cattle have been designated as local Indonesian cattle breed by Minister of Agriculture Decree No. 2907/Kpts/OT.140/6/2011.

The raising system for Aceh Cattle carried out by the farmers is still traditional. The pen was built simply near the house or yard [3]. Cattle raising in North Aceh Regency is generally released to grassland or newly harvested rice fields. [4]. Most of the farmers who raise cattle are for the side of their main job [2]. The beef cattle breed maintained by the farmers of North Aceh Regency is Aceh cattle with a percentage of 84.93%, the number of beef cattle ownership is 3.03 head/farmer or 1.65 livestock unit (LU) which consists of 2.57 head/farmer or 1.78 LU for Aceh cattle and 0.46 head/farmer or 0.25 LU for non-Aceh cattle breed. The

**Abstract**—The study aimed to identify the body size differences of Aceh Cattle maintained in smallholder farm level and Balai Pembibitan Ternak Unggul dan Hijauan Pakan Ternak (BPTU HPT) Indrapuri Aceh. The research was conducted in North Aceh Regency for smallholder farm level and at BPTU HPT Indrapuri from December 2016 until January 2017. Data were collected by measurements of 70 head Aceh Cattle, 35 head from the smallholder farmers and 35 head from BPTU HPT Indrapuri respectively. Aceh cattle were categorized by age and sex as young male and female (aged 1.5 until 3 years) and adult male and female (aged above 3 years). The data of body size are body length, chest girth, and shoulder height, the data were analyzed using a T-test. The results showed that young male Aceh Cattle maintained in the BPTU HPT Indrapuri Aceh was significantly ( $P<0.05$ ) having higher shoulder height ( $101.95\pm 2.08$  vs  $92.76\pm 5.11$  cm) and higher chest girth ( $124.60\pm 5.48$  vs  $115.40\pm 6.93$  cm), whereas, in females, the shoulder height was also significantly higher ( $P<0.05$ ). On adult Aceh Cattle, female Aceh Cattle that were maintained on smallholder farms was significantly ( $P<0.05$ ) had a longer body size ( $107.41\pm 3.82$  vs  $100.50\pm 1.31$  cm), but lower shoulder height ( $95.28\pm 4.26$  vs  $101.33\pm 2.79$  cm) compared to Aceh Cattle in BPTU HPT Indrapuri Aceh. It was concluded that Aceh cattle maintained in BPTU HPT Indrapuri Aceh had better body size than those maintained on smallholder farms, especially in young males and females

number of a male is less than a female with a ratio of 1: 2.33 (Ibrahim et al., 2016). Aceh cattle kept by the farmers have a good reproductive performance with an average calving interval is 15.09 months [5]. Balai Pembibitan Ternak Unggul-Hijauan pakan Ternak (BPTU-HPT) Indrapuri is an agency for Aceh cattle breeding, which is determined by the government through Minister of Agriculture Decree No. 282/Kpts/T.210/4/2002. Aceh Cattle in BPTU-HPT Indrapuri maintained semi-intensively with shelter and grazing according to their age and gender group.

Aceh cattle has phenotypic characteristics between Java cattle, Brahman, Bali cattle, and Pesisir cattle. Aceh cattle has a concave and long face profile [6], small body shape, and compact with the hump in the shoulder for male, while the female does not hump, but the shoulders are not flat and slightly prominent than female Bali cattle [7]. When compared to Aceh cattle with Bali cattle, Madura cattle and Ongole has a smaller size, but the size is relatively larger when compared with Pesisir cattle [6]. The male Aceh cattle maintained by farmers in the smallholders' farm level have weight, chest girth, and body height greater than females. The weight of the cattle of Aceh was maintained at the smallholder farm between 130-148 kg for young cattle and 169-191 kg for adult cattle [8], while the weight of the Aceh cattle was maintained at BPTU-HPT Indrapuri is 131,23 kg for males and 127.65 kg for females [9].

The phenotypic characteristics of an livestock can be measured by body size [10]. These characteristics can be used for visual identification and determining the body weight of the livestock [8]. Some body sizes such as body length, chest girth, and body height have a positive correlation and can be used to predict body weight and describe the performance of cattle (Hardjosubroto, 1994). This study aims to compare the body size of Aceh cattle was maintained in smallholder farm level and in the BPTU-HPT Indrapuri, Aceh. The results can be used for the evaluation of Aceh cattle raising in terms of body size as a recommendation for a good and sustainable maintain regulation on Aceh cattle.

## II. METHODOLOGY

The research used Aceh cattle that are maintained in smallholder farms in North Aceh Regency and BPTU-HPT Indrapuri, Aceh Besar Regency. The Aceh cattle used were male and female in a total of 70 head, with details of 35 head from smallholder farms and 35 head from BPTU-HPT Indrapuri. The Aceh cattle was consist of totally 40 head young with aged 1,5 - 3 years, and 40 head adult with aged 3 years. To determine the age of Aceh cattle by using cattle incisors replacement (1-2 pairs for young cattle and 3 pairs for adult cattle) in the smallholder farms, and by using the recording for BPTU-HPT Indrapuri. Determination of age estimates based on incisors refers to SNI No. 7651.3: 2013. The data taken is the body size, which includes body length, chest girth, and body height. Maintenance management data is obtained by means of interviews and direct observation in both research locations. Body size data were analyzed using the T-Test.

## III. RESULTS AND DISCUSSION

### A. Maintenance of Aceh cattle

Interviews and direct observations were carried out to find out the maintenance management of Aceh cattle conducted by smallholder farmers in North Aceh Regency and in the BPTU-HPT Indrapuri. Aceh cattle that are kept by the farmers are generally still done traditionally. Almost all cattle are released to grass fields or newly harvested rice fields which are carried out in the morning until the evening. Cattle were housed done at night and during the planting season. Feed are met from grazing and a few forages feeding at night in the house. Mating system is carried out naturally with males that are owned by farmers or by artificial insemination. Farmers have a tendency to choose Bali bull straw. Health care is still traditional if it is needed new to bring in veterinary. [7] reported that Aceh cattle breeding was still profitable even though it was enough to provide land and houses. Cattle are maintained in accordance with the economic ability of farmers. Aceh cattle can still graze well despite the poor conditions of grasslands.

The maintenance management of Aceh cattle carried out at BPTU-HPT Indrapuri was done better than by smallholder farmers. Aspects such as housing, feed, reproduction, and health have been carried out by good management practice according to the standard procedures. Cattle are grouped in pen-based on age, sex, and body weight. Grazing is done in grasslands with forage management according to standard procedures and good quality. In addition to being fed from grazing, cattle are also given additional feed concentrate/supplements. Mating system is done naturally with selected bulls. The bull and parent selection process is carried out to get superior Aceh cattle. Livestock health is handled by veterinary and professionals. [3] reported that the pattern of raising Aceh cattle in BPTU-HPT Indrapuri was conducted semi-intensively, where cattle were housed and released at the wet season from morning to afternoon and in the afternoon were included in the group house. Mating patterns are carried out at the pen mating with the selected bull. Males that are not used as a bull are kept in pen.

### B. Body size of Aceh cattle

Some body size such as body length, chest girth, and body height have a positive correlation and can be used to predict body weight and describe the performance of cattle [11]. Determination of cattle age estimation based on incisors replacement refers to SNI No. 7651.3: 2013, where Aceh cattle with 1 pair permanent incisors have an estimated age of 1.5 to 2 years and permanent incisors are 2 pairs of 2 to 3 years old. Based on the measurements, it was found that the male and female Aceh cattle body size on the smallholder farms level and BPTU-HPT Indrapuri were in the group of cattle with 1-2 pairs (aged 1.5-3 years) and cattle with 3 pairs (aged > 3 years) successively presented in Tables 1 and 2.

TABLE I. BODY ZISE OF MALE AND FEMALE ACEH CATTLE (AGED 1,5 – 3 YEARS OLD) IN THE SMALLHOLDER FARM LEVEL AND BPTU-HPT INDRAPURI

Body size	Location	
	Smallholder farmer (cm)	BPTU-HPT Indrapuri (cm)
Body length		
Male	96,72±4,85	98,30±3,30
Female	97,58±5,72	95,75±3,96
Body height		
Male	92,76 <sup>a</sup> ±5,11	101,95 <sup>b</sup> ±2,08
Female	95,00 <sup>b</sup> ±3,14	97,95 <sup>b</sup> ±2,79
Chest girth		
Male	115,40 <sup>b</sup> ±6,93	124,60 <sup>b</sup> ±5,48
Female	119,80 <sup>b</sup> ±7,14	123,10±6,02

<sup>a,b</sup>Superskrip shown the differences (P<0,05)

TABLE II. BODY ZISE OF MALE AND FEMALE ACEH CATTLE (AGED ABOVE 3 YEARS OLD) IN THE SMALLHOLDER FARM LEVEL AND BPTU-HPT INDRAPURI

Body size	Location	
	Smallholder farmer (cm)	BPTU-HPT Indrapuri (cm)
Body length		
Male	119,30±14,72	102,33±2,08
Female	107,41 <sup>b</sup> ±3,82	100,50 <sup>b</sup> ±1,31
Body height		
Male	107,80±8,82	105,00±4,35
Female	95,28 <sup>a</sup> ±4,26	101,33 <sup>b</sup> ±2,79
Chest girth		
Male	140,66±17,55	129,66±1,52
Female	129,33±6,82	130,16±8,31

<sup>a,b</sup>Superskrip shown the differences (P<0,05)

Based on Tables 1 and 2, it is seen that overall, a young Aceh cattle (1-2 pairs) maintained in BPTU-HPT Indrapuri have a body size that tends to be larger than those maintained on the smallholder farms level except for the body length of female Aceh cattle. In adult Aceh cattle ( 3 pairs), it appears that overall there is a tendency for a larger body size in Aceh cattle maintained on smallholder farms level except for the body height and chest girth of female Aceh cattle. However, statistically, not all body sizes were significantly different (P <0.05).

Body length describes the development of the spine (vertebrae) which consists of the backbone (thoracic vertebrae), waist bone (lumbar vertebrae) and the bone of the spine (sacral vertebrae) [12]. The results of this study indicate that the significant difference (P <0.05) in body length is only found in female Aceh cattle aged more than 3 years, where Aceh cattle maintained on smallholder farms level are higher (P <0.05) than those maintained at the BPTU-HPT Indrapuri. Aceh cattle that are maintained on the smallholder farms level still have a good body length because their size exceeds the standard size by SNI No. 7651.3:2013, which is 107 to 116 cm in Aceh cattle aged 2 to 3 years and 82 to 87 cm in female Aceh cattle aged 15 to 18 months [13].

Body height describes the bones that make up the front legs (anterior extremities) and the bones that make up the back. The bones of the forefoot compiler experience faster and early growth in accordance with its function to

support the body [12]. This study shows that Aceh cattle maintained in BPTU-HPT Indrapuri have higher body height (P <0.05) than those maintained by smallholder farms, both male and female in young age groups (1 – 2 pairs), whereas in the adult age group ( 3 pairs) only in female Aceh cattle. This result is almost the same as that reported by [8] in cows kept by smallholder farms, which amounted to 99.37 cm in young males and 95.91 cm in young females and 105.90 cm in adult males and 100.28 cm in adult females. Based on SNI No. 7651.3: 2013, the size of male Aceh cattle aged 24-36 months which is 105-112 cm and females aged 15-18 months is 86-90 cm [13].

Chest girth describes the growth of ribs and the growth of meat tissue attached to the bone [12]. The results of the statistical analysis showed that the young Aceh cattle (1 – 2 pairs) were maintained at the BPTU-HPT Indrapuri (P <0.05) than those maintained on the smallholder farms, while the other groups were not statistically significant. The results obtained in this study are lower when compared with the research of [8] which is 125.54 cm in young males, 122.88 cm in young females and 141.00 cm in adult males and 132.63 cm in adult females. Based on SNI No. 7651.3: 2013, the size of male Aceh cattle chest girth aged 24-36 months was 135-143 cm and 94-99 cm in female cattle aged 15-18 months [13].

#### IV. CONCLUSIONS

The Aceh Cattle were maintained in BPTU-HPT Indrapuri have a better body size than in smallholder farms level, especially for male and a young female (aged 1 - 3 years old).

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# Applications of Phenolic Extracts from Tamarind Seed Husk to Inhibit the Formation of Antioxidants in Animal Feeds

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**Abstract.** The study aimed to investigate the effects of tamarind seed husk extracts on the inhibition of oxidation (IP) in soybean oil. The substances from the tamarind seed husk were extracted by soaking and heating technology (Soxhlet) using methanol, acetone, and hexane. The tamarind seed husk extracts obtained are crimson glossy solid powder with the average weight about 26.88%. The total phenol examined by Folin-Ciocalteu method revealed the quantity at about 120.63 mg/g dry matter of tamarind seed husk, accounted for 12.06%. The oxidation inhibition of tamarind seed husk extracts in soybean oil was determined by Oxitest, VELP Scientifica model 148. The oxidation formations during the induction period (IP) were used as the indicators. In other words, the higher IP, the higher potentials of the antioxidants. The 5x7 factorial in completely randomized design was used in this study. The first Factor was five types of antioxidants comprised of soybean oil (control), soybean oil supplemented with BHA+ethoxyquin 0.2%, soybean oil supplemented with 0.5% ascorbic acid, soybean oil supplemented with 0.5% tamarind seed husk extract, and soybean oil supplemented with 1.0% of tamarind seed husk extract. The second Factor was 6 various storage durations including 0, 10, 20, 30, 40, 50, and 60 days. The results showed no synergic effects between the two factors ( $P>0.05$ ). However, the significant differences ( $P<0.05$ ) were obviously noticed. The best oxidation inhibitions were found in both 0.5% and 1.0% tamarind seed husk extracts with the average IP readings at 5.42 and 5.33 hours, respectively. The IP readings from soybean oil supplemented with BHA + ethoxyquin, and with ascorbic acid were 5.06 and 5.05 hours, respectively. The lowest IP was found in the control (4.21 hours). The longer the storage durations, the lower the oxidation inhibition potentials ( $P<0.05$ ). At the storage times at 0 and 10 days, the highest IP were obtained (5.97 and 6.06 hours, respectively), while the storage times at 20, 30, 40, 50, and 60 days showed the IP values at 5.29, 5.01, 4.71, 4.24, and 4.14 hours, respectively.

**Keywords:** phenolic, tamarind seed husk, antioxidants, free radicals, animal feeds

## 1. Introduction

Fat is the main constituent in the raw ingredients of various animal feeds. When stored at room temperatures, fat undergoes reactions with oxygen leading to oxidation, and eventually free radicals. This causes the deterioration of feed quality regarding odors, colors, and tastes. The palatability is decreased, and the essential fats and fat-soluble vitamins are destroyed. Moreover, in severe cases, this can be toxic to animals. In animal feed industry, the synthesized antioxidants such as BHA, BHT and ethoxyquin are commonly used to inhibit oxidation in animal feeds. However, these antioxidants have safety concerns of consumptions (Pokorny *et al.*, 2001). The European Union reported the prohibitions of using ethoxyquin in all kinds of animal feeds to WTO (WTO, 2017). As a result, based