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## Health of Balinese cows to be slaughtered at the denpasar abattoir

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### Abstract

Provision of food sources of animal origin, for example meat, must meet food health criteria. In this case both quality and quantity must be met. Hygienic and good quality meat can be obtained from healthy sources (animals). That's why healthy cows are needed before being slaughtered. This is important to prevent poor quality meat before consumption. Blood profiles such as images of erythrocytes and leukocytes can be used to determine the status of healthy or sick animals. Animals that travel or are transported using this mode of transportation often cause stress which in turn causes the animal before it is slaughtered to suffer from illness. This can cause poor quality and unhealthy meat when consumed by consumers and the public. This research was conducted to determine the health status of cattle to be slaughtered at the Denpasar RPH using the red blood cell and white blood cell index parameters. A total of 30 bulls that were to be slaughtered at the Pesanggaran Slaughterhouse, Denpasar, Bali were used in this research. Blood samples were taken from the jugular vein of the cows. The method used to determine the number, index of red blood cells and white blood cells uses a hematology analyzer (Animal Blood Counter). Next, the data is interpreted, so that health is known. To determine the significance of the differences, the data was tested using the t test to compare with the reference value.

**Keywords:** Health, erythrocytes, leukocytes, cows

### Introduction

Bali cattle are domesticated cattle from native Indonesian bulls which have advantages in reproductive power, adaptability and high carcass percentage. Bali cattle have unique characteristics that cattle from other nations do not have and are a genetic resource native to Indonesia whose sustainability needs to be protected and maintained so that it can provide benefits in improving the welfare and prosperity of the Indonesian people.

Beef is one of the livestock commodities which is a mainstay source of animal protein and is very supportive of meeting basic food needs in Indonesia. These demand side dynamics cause national food needs to increase rapidly, both in quantity, quality and diversity. Balinese beef is very popular with Indonesian people, this is because of its texture, tenderness and good taste. Agustina *et al.*, (2017) <sup>[1]</sup> stated that Bali beef has good nutritional and physical quality.

The superiority of Bali cattle can also be seen from how well it turns poor feed into good meat. So, if you look at the posture of a Balinese cow, it will show good and full performance. Its docile nature is also good, making it easy to maintain. Resistance to disease infection is also an advantage of Bali cattle.

Bali cattle are known to be quite resistant to disease attacks due to microorganism infections and physiological diseases. However, if there is environmental disturbance that can cause stress and fatigue, the animal will experience a decline in health condition which ultimately causes the animal to get sick. Animal transportation is one of the conditions that can cause animals to become stressed and tired. Animals to be slaughtered in slaughterhouses generally come from rural areas which are quite far from the city.

Most of the cattle rearing centers intended for consumption are in rural areas, while more meat consumers are in urban areas, therefore a mode of transportation of livestock from rural to urban rearing/fattening centers is needed. Transportation is a tool that must be used to transport livestock from the fattening area to the slaughterhouse. Transporting livestock can cause animals to become tired and stressed, thus having an effect on health which ultimately

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affects meat quality. Several researchers report that transportation activities such as preparation for transportation, loading, transportation and unloading of livestock carried out by livestock entrepreneurs using ships, trucks or other transportation can generally cause stress (Aradom, 2013) [2].

Transportation can cause stress, so that the animal's health will decline, which in the end can cause the animal to become unhealthy. (Adenkola and Ayo, 2010; Chai *et al.*, 2010; Zhong *et al.*, 2011; ELkhasmi *et al.* 2013) [3, 4, 5, 6]. Meanwhile, the hematocrit levels, hemoglobin concentration and body weight of the heifers decreased significantly ( $p > 0.05$ ) (Anton *et al.* 2016) [7]. Bovine red blood cells do not have nuclei, in circulation the erythrocytes generally have the shape of elliptical biconcave discs. Erythrocytes are a sponge-like stroma with hemoglobin deposits in between. Erythrocytes are also in the form of bubbles whose membrane surrounds a liquid mass, or erythrocytes are balloons containing elastic stroma and hemoglobin, and surrounded by condensation (thickening) of protein lipids which act as a membrane. The consistency of erythrocytes is soft so they are elastic, therefore erythrocytes can pass through blood capillaries whose diameter is smaller than the diameter of erythrocytes, but this often causes trauma to erythrocytes (Weiss and Wardrop, 2017) [8].

The number of erythrocytes is determined in millions per mm<sup>3</sup> of blood and can be determined using a hemacytometer or a device that uses a calorimeter system. The number of erythrocytes is influenced by sex, exercise, food and climate and disease. Male animals have a higher number of erythrocytes than female animals, due to the hormone testosterone. Animals that often receive a lot of exercise, for example working cattle, have a higher number of erythrocytes than passive animals. Likewise with food, animals that are given rations that contain good nutrition, especially adequate levels of amino acids, vitamins and Fe, will result in increasing the number of erythrocytes. Animals in hot areas have a significantly higher number of erythrocytes and hemoglobin content than animals in cold areas. Topography also influences the number of erythrocytes, animals that live in the highlands have more erythrocytes than animals in the lowlands. This can happen because in the highlands the oxygen concentration is low, so as compensation for the animal so that it does not lack oxygen, the body will form more erythrocytes. Thus the animal does not lack oxygen. Erythrocytes on average contain 60 - 70 grams of water per 100 ml of cells, the solid part of erythrocytes includes hemoglobin pigment (95%) and stroma (membrane) where the stroma consists of protein, lipids (lecithin, cholesterol and cephalin) and inorganic substances. Cows suffering from disease show low erythrocytes (Borel, 2001; Reece, 2015) [9, 10].

The number of normal erythrocytes in Bali cattle is 5.2 million/mm<sup>3</sup> (Siswanto, 2011) [11] meanwhile the number of normal erythrocytes indicates good animal health, conversely an increase or decrease in the number erythrocytes represent unhealthy animals. In animals that are stressed, for example due to fatigue, discomfort in transportation can cause the number of erythrocytes to decrease (Pascual-Alonso *et al.* 2016; Lendrawati *et al.* 2020) [12, 13].

Leucocytes are a dense part of the blood that functions to ward off sources of infection such as microorganisms from the body. Leukocytes are much fewer in number than erythrocytes (only thousands) while erythrocytes are millions and are divided into lymphocytes, monocytes, neutrophils, eosinophils and basophils. Lymphocytes are formed in

lymphoid tissue (nodus lymphaticus, spleen) and produce anticorpora and bind toxins, but do not have the ability to carry out phagocytosis even though they have amoeboid movements. Monocytes are transitional cells and have one large nucleus (large mononuclear leucocyte). They are limited in number, have good movement, and actively carry out phagocytosis, originating from cells of the Reticulo Endothelial System (SRE). Neutrophils are classified as granular leucocytes, neutrophils are found most abundantly in the blood of cattle. Has granules in the cytoplasm that can be stained with a neutral dye. The core has lobes or segments (3-4 and polymorph if old) while those with simple cores (1-2) are considered young (called Stab). There is a relationship between certain pathological conditions and the degree of activity of neutrophil granulocyte formation. Neutrophils are capable of amoeboid movement, are active in phagocytosis and show a rapid increase in numbers in bacterial infections. These cells are also called the first line of defense and are formed in the bone marrow. Eosinophils have characteristics like neutrophils, only the core has two polymorphs, with Giemsa granules in the cytoplasm red (acidic). The amounts are relatively small in most animals and increase in cases of acute allergies, parasitic, bacterial, yeast and antigen-antibody infections. These cells made in the bone marrow contain histaminase and can release serotonin, but do not have phagocytosis properties. Basophils have cytoplasmic granules which are alkaline so they are purplish blue on Giemsa staining. It is present in small quantities, and has no or little phagocytosis properties. These cells function in hypersensitivity reactions (allergies), fat metabolism. Basophils have IgE and IgG receptors, contain heparin, histamine, hyaluronic acid, chondroitin and serotonin and are made in the bone marrow. The leukocyte picture shows a significant increase in cases of infection and moderately in cases of stress. In cases of stress caused by transportation, it involves the function of hormones which can influence the number of leukocytes in the blood (Weiss and Wardrop, 2017) [8].

## Research Methods

**Research design:** The research design used a cross-sectional study design and the results are presented in descriptive.

## Sample

The research was carried out in Denpasar and blood samples were taken from Bali cattle at the Slaughterhouse, Pesanggaran, Denpasar, Bali. Approximately 3 ml of blood was taken from 30 male Bali cattle in the jugular vein from the cattle that would be slaughtered the next day (having already undergone quarantine). Pick-up is done at 15.00 WITA.

The variants determined are the number of erythrocytes, hemoglobin levels, PCV, MCH, MCHC and MCV as well as the number of white blood cells. Determining this variant uses the Animal Blood Counter.

## Data analysis

Analyzed descriptively qualitatively and quantitatively, presented in tables, average/range, standard deviation. The significance test uses a comparison test with a reference.

## Results and Discussion

**Results:** The data results from 30 samples of cattle that were to be slaughtered after undergoing rest at the Sanggaran Slaughterhouse, Denpasar, Bali were all healthy. The average

profile of erythrocytes, hemoglobin, hematocrit and leukocytes obtained is as follows: number of erythrocytes 5.9 million/mm<sup>3</sup>, hemoglobin level 9.7 g %, and Hct 29.4%, MCV 2 fl, MCH 16.8 pg, and MCHC 33.1%/dl and leukocyte count 6.6 thousand/mm<sup>3</sup>. Complete results are presented in Table 1 below.

**Table 1:** Blood profile test results

Variants	Results
Jumlah Eritrosit (10 <sup>6</sup> /μL)	5.97±1.15
Kadar Hb (gram/dL)	9.65±1.41
Hct (%)	29.38±2.14
MCV (fL)	50.95±10.38
MCH (pG)	16.77±4.07
MCHC (%)	33.13±6.12
Jumlah Leukosit (10 <sup>3</sup> /μL)	6.58±1.96

**Note:** The data in the table corresponds to the description of normal erythrocyte, hemoglobin, hematocrit and leukocyte profiles

### Discussion

The results show that they are not significantly different from the results of research by several previous researchers such as Siswanto (2011)<sup>[11]</sup>, Perayadhista *et al.* (2022)<sup>[14]</sup>, Septiarini *et al.* (2020)<sup>[15]</sup>. This shows that the health condition of the cow to be slaughtered is good.

As is known, the health of cattle to be slaughtered is susceptible to decline in health due to the transportation process, location conditions and feed provision. Transportation involves several potential factors that can cause stress in livestock, including rough handling, mixing with unknown/unfamiliar animals, age differences, lack of food and drink, comfort of transportation equipment, number of animals, transportation, weather and fatigue. Grandin *et al.*, (2014)<sup>[16]</sup> further explained that animals that are not handled properly during transportation will become stressed. Stress can be observed by observing visible clinical symptoms. Stressed animals will experience a lack of certain metabolites such as blood glucose, electrolytes and water, so that the animal will experience dehydration. Severe glycogen deficiency often occurs in conditions of fatigue, hunger, fear and stress due to heat or aggressive behavior due to mixing with new, unfamiliar animals. Stressed animals can also cause their appetite to decrease so they can suffer from anemia. Animals that are anemic are not good for slaughter because they will reduce the quality of the carcass and beef.

Stressed animals need recovery time, such as adequate rest, good food/drink management. During the recovery period the cow returns its body condition to normal and eliminates the stress response (Borell, 2006)<sup>[9]</sup>. The slaughterhouse in Denpasar Bali has a place to quarantine cattle before slaughter. Here the cow is rested (quarantined) for two weeks with the aim of returning the cow to its normal condition.

### Conclusion

From the results of research that has been carried out, it has a normal blood profile, it is concluded that the cows slaughtered at the Pesanggaran slaughterhouse, Denpasar, Bali, Indonesia are good and in good health and fit for slaughter. This illustrates that health care before the cow is slaughtered is good.

### References

- Agustina KK, IMade Ricky Dwi Cahya IMRD, Widyantara GM, Swacita IBN, Dharmayudha AAGO, Ruddyanto MD, *et al.* Nutrition level and physical quality of bali beef according to the sex and age of cattle. Buletin

- Veteriner Udayana. 2017 Aug;9(2):156-163. P-ISSN: 2085-2495; eISSN: 2477-2712.
- Aradom S. Animal transport and welfare with special emphasis on transport time and vibration. Doctoral Thesis: Faculty of Natural Resources and Agricultural Sciences, Department of Energy and Technology Uppsala. Swedish University of Agricultural Sciences; c2013.
- Adenkola AY, Ayo JO. Physiological and behavioural responses of livestock to road transportation stress: A review. African J Biotech. 2010;9:4845-4856.
- Chai J, Xiong Q, Zhang CX, Miao W, Li FE, Zheng R, *et al.* Effect of pre-slaughter transport plant on blood constituents and meat quality in halothane genotype of nn large white × landrace pigs. Livestock Science. 2010 Feb;127(2-3):211-217.
- Zhong RZ, Liu HW, Zhou DW, Sun HX, Zhao CX. The effects of road transportation on physiological responses and meat quality in sheep differing in age. J Anim Sci. 2011;89:3742-3751.
- ELkhasmi M, Chakir Y, Riad F, Safwate A, Tahri EH, Farh M, *et al.* Effect of transportation stress during the hot-season on some haematological and physiological parameters in Moroccan camels (*Camelus dromedarius*). Journal of Life Sciences (Libertyville, USA). 2013;7(1):13-25. ISSN 1934-7391.
- Anton A, Kasip LM, Lalu Wirapribadi L, Depamede SN, Asih ARS. Physiological status and body weight changes of Bali cattle heifers transported from Lombok Island to West Kalimantan. Jurnal Ilmu dan Teknologi Peternakan Indonesia. 2016 Jun;2(1):86-95. ISSN: 2460-6669.
- Weiss DJ, Wardrop KJ. Veterinary Hematology. 6<sup>th</sup> ed. A John Wiley and Sons, Inc., Publication. Iowa USA; c2017.
- Borell EHV. The biology of stress and its application to livestock housing and transportation assessment. Journal of Animal Science; c2001.
- Reece WO. Duke's Physiology of Domestic Animals. 13th Ed. Wiley-Blackwell. A John Wiley and Sons, Inc., Publication. Iowa USA; c2015.
- Siswanto. The erythrocyte profile of the female Bali cattle (slougher house study). Buletin Veteriner Udayana. 2011 Aug;3(2):99-105. ISSN: 2085-2495.
- Pascual-Alonso M, Miranda-de la Lama GC, Aguayo-Ulloa L, Villarroel M, Mitchell M, Maria GA. Hemophysiological, haematological, biochemical and behavioural stress responses of sheep transported on road. J Anim Physiol Anim Nutr. 2016;101:541-551.
- Lendrawati L, Priyanto R, Jayanegara A, Manalu W, Desrial D. Effect of different transportation period on body weight loss, hematological and biochemical stress responses of sheep. J Indonesian Trop Anim Agric. 2020;45:115-123.
- Perayadhista KTM, Utama IHU, Dharmawan NS. Erythrocyte, hemoglobin and hematocrit profile of bali cattle post transportation to Pesanggaran slaughter house Denpasar. Indonesia Medicus Veterinus. 2022 Mar;11(2):246-254. P-ISSN: 2301-7848; eISSN: 2477-6637. DOI: 10.19087/imv.2022.11.2.246.
- Septiarini AAIA, Suwiti NK, Suartini IGAA. Hematological value of total erythrocytes and hemoglobin level of bali cattle with organic forage feed. Buletin Veteriner Udayana. 2020;12(2):144-149. P-ISSN: 2085-2495; e-ISSN: 2477-2712. Online pada: <http://ojs.unud.ac.id/index.php/buletinvet>. DOI: 10.24843/bulvet.2020.v12.i02.p07.
- Grandin T. Livestock Handling and Transport. 4th ed. CABI Publ., Wallingford, UK; c2014.