

# Buffy Coats of Kacang Goats Slaughtered at A Traditional Slaughterhouse in Western Denpasar

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**Abstract.** This study examines the buffy coat of local Kacang goats slaughtered in a traditional slaughterhouse in Western Denpasar. The blood of 20 male Kacang goats was collected using a survey method, with randomized sampling. Inclusion in the study was based on the health status of the goats, but there were no requirements concerning diet or management systems. Once collected, blood was stored in tubes containing ethylenediamine tetraacetic acid anticoagulant. Buffy coats were evaluated using the Westergren erythrocyte sedimentation method. Four of the 20 blood samples had buffy coats with 0 mm/24 h thickness, two of the blood samples had 1 mm/24 h thickness, eight samples had a buffy coat thickness of 2 mm/24 h, and three of the samples had a buffy coat sickness of 4 mm/24 h. Thirteen samples had a gray-white colored buffy coat, three samples had a pink buffy coat, and the remaining three samples had a clear buffy coat.

**Keywords:** Buffy coat, erythrocyte sedimentation rate (ESR), kacang goat

## I. INTRODUCTION

The buffy coat is a reddish-white to gray-colored blood fraction that is visible after centrifugation, with components including leukocytes and platelets [1] [2]. Studies of the buffy coat of Kacang goats in Bali and Indonesia have not been widely published, nor have they been reported for other species. The buffy coat can be used for the study of genetics and DNA analysis [3] [4]; observation of blood parasites [5]; and the study of the nature of lymphocytes in Jembrana disease, a condition that attacks Bali cattle [6].

Buffy coat analysis is useful for monitoring a number changes or disorders, including nonregenerative anemia, distemper, leptospirosis, pyometra, and blood parasites such *Plasmodium spp.* [7] and *Toxoplasma gondii* [8]. The buffy coat thickness can increase in cases of blood parasites [9], and has also been observed to increase in West Highland white terrier dogs affected by nonregenerative anemia [10]. When the buffy coat is measured using a packed cell volume method, the buffy coat consists of young erythrocytes, platelets and leukocytes [11]. When using Westergren's erythrocyte sedimentation rate (over a period of 24 hours), the buffy coat is often, but not always, visible [12]

## II. RESEARCH METHODS

Five milliliter blood samples were taken from 20 clinically-healthy slaughtered male goats (average age 1.5 years) at a local slaughterhouse at

Western Denpasar Bali. Blood was immediately inserted into an ethylenediamine tetraacetic acid (EDTA) venotube and each tube was inverted to mix the sample. All blood samples were placed into a flask containing ice cubes to avoid deterioration. Blood samples were re-homogenized before insertion into the Westergren tube (time recorded) and the tube was maintained upright at room temperature for 24 hours. Research was performed at the Physiology and Biochemistry Laboratory of Veterinary Faculty, Udayana University.

Assessment of the buffy coat in a Westergren tube is done by observing the buffy coat color and thickness. All data were recorded and then analyzed quantitatively and qualitatively [13]

## III. RESULTS AND ANALYSIS

TABLE 1  
DEPICTS THE BUFFY COAT THICKNESS OF  
20 KACANG GOATS.

Table 1. Buffy coat thickness of Kacang g	
Thickness of buffy coat (mm/24 h)	Number of goats
0	4
1	2
2	8
3	3
4	3
Total	20

Table 1 illustrates varying buffy coat thicknesses, which can be categorized into no buffy coat (Figure 1), medium-thickness buffy coat (Figure 2), and thick buffy coat (Figure 3). The thickness of the buffy coat depends upon the interaction of opposing forces between erythrocytes and blood plasma [14], as well as the presence of leukocytes. Table 2 shows the color of the buffy coat in Kacang goats. These colors can be categorized as white to gray and white to pink.

TABLE 2.  
BUFFY COAT COLOR OF KACANG GOATS

No	Color of buffy coat
1	Buffy coat normal (white to grayish)
2	Presence of reticulocytes (white to pink)

In many species, the presence of a thick buffy coat may indicate an infectious or non-infectious abnormality [15]. This appears to be true for goats, even though it has not been confirmed microscopically or by other methods.

Buffy coat revealed several abnormalities, including color variation. There were three buffy coat color categories noted in this research. A white-grayish, homogeneous buffy coat indicates that the buffy coat is normal (Figure 4). A pink color, dispersed homogeneously in the buffy coat (if the buffy coat is centrifuged, the pink is at the bottom), may indicate the presence of reticulocytes (Figure 5). Color variation in the buffy coat was observed in this study because of the use of the sedimentation method, in contrast to the use of centrifugation methods which do not result in similar color variation.



Figure 1. Thin buffy coat (1 mm/24 h)



Figure 2. Moderate buffy coat (2 mm/24 h)



Figure 3. Thick buffy coat (3-4 mm/24 h)



Figure 4. Normal buffy coat color

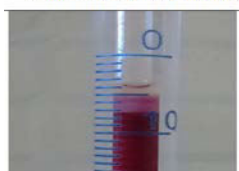


Figure 5. Reticulocyte-containing buffy coat



Figure 6. No buffy coat seen

The thickness of the buffy coat indirectly reflects quantities of leukocytes, platelets, and reticulocytes (the latter is indicated by the presence of pink) in the blood. During the sedimentation of blood, blood cell types (for example metarubricytes, reticulocytes, and mature red blood cells) produce variation in buffy coat colors in the Westergren tube.

The results obtained from this study demonstrate that, in cases of leukocyte depletion, the buffy coat obtained using a sedimentation technique is less turbid than the buffy coat obtained using a hematocrit or centrifugation technique. Additionally, a pink color to the buffy coat indicates the presence of young erythrocytes. The thickness of the buffy coat varies, reflecting the number of leukocytes present in the Westergren tubes (16).

#### IV. CONCLUSION

The results demonstrate that there are differences in the thickness of buffy coat obtained from the blood sedimentation rate test. Buffy coat thicknesses observed include no buffy coat, thin buffy coat (1 mm/24 h), medium buffy coat (2 mm/24 h), and buffy thick coat (3-4 mm/24 h). A diversity of buffy coat colors was observed, including: white - gray (normal), pink (reticulocytes), and no buffy coat.

Further research on the microscopic character of the ruminant buffy coat is required, using both sedimentation and centrifugation techniques. This is especially the case for the Balinese cow, as Bali icon. Future research should be continued by completing further research on substance contained in buffy coat.

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