Ration with Different Dietary Cation Anion to Mineral Status of Blood and Urine Garut Ewes

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ABSTRACT

The objectives of the present experiment were to evaluate the effect of dietary cation-anion difference (DCAD) on mineral status in blood and urine. Rations with DCAD value of -28, -18, 0, +14, and +32 mEq were offered to 15 ewes in a randomized complete block design. On day 21, blood samples were taken anaerobically using heparinized syringes from the coccygeal jugular venipuncture. Each syringe was capped and placed on ice immediately following collection to determine on plasma Na, K, Cl, Ca, and P concentrations. The DCAD values had no effect on plasma Na, K, Cl, Ca, and P concentrations indicating that there was homeostasis to maintain the physiological status of the body. The DCAD value of -18, 0, +14 and +32 mEq resulted in the normal blood with Na:K ratio closed to 20:1. Plasma Cl concentration was associated with plasma Na, but the concentration of Cl was lower than that of Na. The DCAD values significantly influenced P urine, but had no effect on urinary Na, K, Cl, S, and Ca. The DCAD value of -28 and -18 mEq resulted in the low acidity of urine at level of 5.73 ± 0.20 and 5.84 ± 0.27, respectively. The DCAD value of 0, +14, dan +32 mEq resulted in normal urinary pH. Rations with DCAD values of -18, 0, +14, and +32 mEq in garut ewes had normal ratio of plasma's Na^+:K^+ and were able to perform regulation of minerals control inside their blood to be homeostatis, and some excessive minerals would be secreted through urine. Rations with DCAD values of -28 and -18 mEq in garut ewes had the highest ratio of plasma's Ca^{2+}:P^{2-} which was 2.2:1.0, so it could be used as an action to prevent milk fever.

Key words: dietary cation-anion difference, blood, urin, ewe

INTRODUCTION

Consumed ration will affect physiological condition of the livestock. According to Stewart (1983), addition of anions (Cl and S) into the ration would lower the pH of body fluid. Blood condition is the result of acid base balance in body fluid and regulation of nutrition metabolism inside it. Blood is consisted of cells and plasma. Plasma contains water as much as 90% and anorganic minerals in form of soluted ion as electrolytes, proteins, metabolic waste products, respiration gases and hormones. Concentration of this combined ion is important for maintenance of blood osmotic balance. Acid base balance is highly affected by the function of lungs and kidneys.

Kidneys have vital role as controller of volume and composition of blood chemicals by secreting solution and water selectively. Vital functions of kidneys are done by the filtration of plasma through *glomerulus* followed with reabsorption some amount of solution and water with correct volume along the kidneys tubulus. The excess of solution and water will be secreted out as urine through collector system. Epitelic cells help maintaining constant pH of body fluid by controlling secretion of hydrogen ion. Secretion of acid in urine as the result of potential acid and H^+ formation rate from blood buffer. Acidic urine is also secreting Ca^{2+}.

In this research, the rations experimented with DCAD values of -28, -18, 0, +14, and +32 mEq. The objectives of this research was, to identify the effect of different DCAD to mineral in blood and urine of Garut ewes (*Ovis aries*).

MATERIALS AND METHODS

This experiment was conducted at the Pen Field Laboratorium A of Animal Husbandry Faculty and Integrated Laboratorium of Veterinary Faculty Bogor Agricultural University on January 11th - July 14th 2007.