THE IMPACT USE OF COCONUT WATER BASED ELECTROLYTE AND ROSELLE EXTRACT ON BODY COMPOSITION OF PADJADJARAN RAMS AFTER 8 HOUR TRANSPORTATION

Elin Nurlina[1*], Elvia Hernawan[2], An-An Yulianti[2]

[1]Faculty of Engineering of Jenderal Achmad Yani University, Cimahi, Indonesia
[2]Faculty of Animal Husbandry of Padjadjaran University, Bandung, Indonesia

Abstract

Determination of body composition through space urea method can be used to predict changes in the body components without slaughter the animals. Changes in body composition occur along with changes in the physiological values. The aim of this research is to evaluate the effects of coconut water based electrolyte and rosella extract supplementation on body composition of Padjadjaran ram. The study included 20 Padjadjaran rams aged 1-1.5 years old with the average body weight ranged from 17-26 kg. Coconut water based electrolyte (CWBE) and 25 mg extract of roselle (RE) are given as treatment with various volumes (T1 = 75 mL distilette water non RE, T2 = 75 mL CWBE and RE, T3 = 112.5 mL CWBE and RE and 150 mL CWBE). Treatments were given 1 hour prior transportation. The transportation process was done by using a pick-up truck for 8 hours. Body composition measurements were performed by Urea Space Method. The results of the measured body composition showed changes in the levels of fat, protein and body water in the amount of 15.57 -16.39%, 15.57% - 17.42% and 57.35 -61.16% respectively were not significantly different (P> 0.05). Conclusion: the supplementation of coconut water-based electrolyte solution and rosella extract can maintain body composition of Padjadjaran rams that have experienced transportation for 8 hours.

Key words: Padjadjaran rams, electrolyte, coconut water, roselle, body composition

INTRODUCTION

Transportationis absolutely necessary in the farm to ease the mobility of livestock. Transportation conducted in livestock marketing, transport to abattoir, seeds provision and livestock distribution among regions given the distance between the production centers and consumer centers are quite far [5] Livestock transportation management feed and water fulfillment during the journey thus its often cause problems including body weight shrinkage and dehydration [26] Body weight depreciation figures can reach 6.7 to 8% during the course of 14-15 hours [13] if not supported by adequate transportation facilities it is a potential losses economically.

Depreciation figures changes suspected as a manifestation of physiological and biochemical changes during transport, in particular for more than 6 hours travel time [25]. The mechanism of heat regulation likely to trigger changes in the heat balance, the activity of heat loss tends to increase so that the amount of water removed from the body through breathing, perspiration, urination and defecation [8] and should be anticipated a number of electrolytes come out along with the water from the body thus gave impact to change body electrolyte balance, which in turn interfere with cells performance and need to be immediately replaced [26].

During the trip, body activity increased thus some additional energy required but because it is performed on livestock, the energy source comes from the demolition of a number of body energy reserves through the process of glycogenolysis, lipolysis and

*Corresponding author: elinrumi01@gmail.com
The manuscript was received: 15.07.2016
Accepted for publication: 17.08.2016

gluconeogenesis [1]. The condition is likely to alter body composition in body fluid percentage, fat or protein. Increased metabolism likely to cause oxidative stress, triggered by an imbalance between the production of oxidants and antioxidants [23] to prevent oxidative stress it is necessary to add a number of exogenous antioxidants [9]. Electrolytes loss of can be replaced with the addition of electrolyte through isotonicliquid, which is easy to absorb [14] so that it can immediately restore fitness.

The study aims to evaluate the impact of using an isotonic fluid originated form coconut water-based electrolytes and exogenous antioxidants addition originated from herbal to body composition that is calculated through the water, protein and fat from body.

MATERIAL AND METHOD

The research object is 20 Padjadjaran male lambs aged 12-16 months with a range of 17-26 kg body weight. Research using experimental methods with a completely randomized design (CRD), consists of four treatment which are: P0 = Control (distilled water 75 mL) P1 = coconut water-based electrolyte 75 mL + roselle extract 25mg. P2 = coconut water-based electrolyte 112.5 ml + 25 mg extract of roselle. P3 = coconut water-based electrolyte 150 mL + 25 mg extract of roselle. Each treatment was repeated 5 times and the effect of the treatment was tested by analysis of variance (ANOVA) and to see the differences among treatments using Duncan's multiple range test [7].

Research work procedures:

1. Introduction Phase:

Transportation is done by using 20 lambs without treatment with transportation distance 210 km. It was observed that depreciation happened on 9.1% of body weight. The figure is used to manufacture an electrolyte solution. Na and K needs to replace fluids lost during depreciation calculated based [20].

2. Preparation Phase:

Material coconut water and roselle (Table 1). Preparation of coconut water based electrolyte (CWBE) formula (Table 2), while the manufacture of roselle extract is according to procedure [17]. Urea solution production based [3]. The composition of electrolyte Coconut Water Based and Rosella extract formulation formulation formulation presented in Table 3.

3. Research Phase

Installation neck tag according to treatment, prior to sheep transport is weighed to determine the weight and determining the level of the electrolyte solution is administered. One hour prior to the transport, sheep treated and transported for approximately 8 hours, during transport food and drink was not administered. Another weighing performed after transport.

Blood collection performed twice, first to determine the content of the initial blood urea. Blood stored on vaccum tube EDTA in ice bucket. Then urea solution injected 0.65 mg per metabolic body weight (BW $kg^{0,75}$) through the left jugular vein. Twelve minutes later a blood sample taken from the right jugular vein then blood stored in vaccum tube EDTA. Blood samples then stored in ice bucket and then taken to the laboratory for analysis.

Table 1 *Material Content of* Coconut Water (*Cocosnucifera*) and Roselle Extract (*Hibiscus sabdarifa*)

Material	Content
Coconut Water[a]	
Potassium (mg/L)	312
Chlorine (mg/L)	183
Sodium (mg/L)	105
Rosella Extract	
Vitamin C (mg/kg)[b]	250.75
Total Phenol (mg/L)[c]	292.01
Flavonoid (mg/L)[c]	29.74

Source :[a)] [30] [b)][15] [c)][22]

Table 2 Treatments for Electrolyte Formula, Material and Rosella Extract

Electrolytes Treatment Formulation	Treatments			
	T1	T2	T3	T4
Coconut water (mL)	0	50	75	100
Sucrose (g)	0	4.5	6.75	9
Sodium Chloride (dg)	0	0.5	0.75	1
Sodium Benzoate (g)	0	0.1	0.15	0.2
Potassium Carbonate (g)	0	3.1	4.65	6.2
Citric acid (g)	0	0.1	0.15	0.2
Roselle extract (mg)	0	25	25	25
Distilled water (mL)	75	25	37.5	50
Solution volume (mL)	75	75	112.5	150

Note: T1 (non-treatment) = 75 mL Aquadest; T2 = 75 mL CWBE+RE; T3 = 112.5 Ml+RE; T4 = 150 mL CWBE+RE

Table 3 Results of Body Composition Analysis of Test Sheep's Blood That Has Been Transported for 8 hours

No	Parameter	Perlakuan			
		P0	P1	P2	P3
1.	Body Water (%)	61.16 ± 3.94	59.54 ± 3.12	58.12 ± 5.67	57.35 ± 5.65
2.	Bpdy Fat (%)	16.47 ± 5.55	21.03 ± 4.39	24.76 ± 7.98	21.82 ± 7.97
3.	Body Protein (%)	17.42 ± 1.26	16.39 ± 0.99	15.57 ± 1.81	16.22 ± 1.83

Urea Space (US) (%) = $\frac{v(ml)\ x\ C\ (mg/dl)}{\Delta\ BUN(\ mg/dl)\ x\ 10x\ lw}$

Body Water (%)[a] = 59,1+(0,22xUS(%))-0,04LW

Body fat (%)[a] = 98,0 -1.32 x BW (%)

Body protein (%)[b] = 16,5 +0,07 RU+0,0001W

Information:

US : Urea space

v : The volume of urea injected

C : The concentration of urea

ΔBUN : Changes in the concentration of urea in the blood (between 0 and 12 minute)

LW (W) : Live Weight (Weight of life)

BW : Water Body

RESULT AND DISCUSSION

Observations of various levels CWBE provision on body composition are presented in Table 3. The body composition components include water, fat and body protein. Body composition after adult individuals have a relatively constant percentage [28] several factors that affect body composition including livestock species, weight, age, sex and nutritional status [2].

The water content of the body obtained in this study ranged between 57.35- 61.16%. The analysis showed no different between treatments (P> 0.05), which means the provision of CWBE to 150 mL and 25 mg extract of roselle did not result in changes in body water content. During the trip an isotonic fluids based electrolyte contribute in replacing electrolytes [26], that missing along with body excretion water. The mean levels of body water obtained is lower than the results of [3] 68.64% live weight. The difference in value between previous studies results are estimated in animals, age differences [28]. Generally [1] suggested that local sheep composition have a range of body water content between 50-60%. The high water content in the body of non-treatment allegedly obtained from metabolism increase.

During transport potentially cause of body water imbalances of because more

water is excreted from the body through sweat, evaporation, urination and defecation [4] [12] Livestock provision during transport is likely alter body water balance, because largest water source comes from drinking water, water contained in feedstuffs and metabolic water. Lack of water or water imbalance will lead to water release from tissues [19] as occurs in dehydration.

In this study, giving CWBE treatment which given 1 hour before the transport proved positive impact, water and electrolytes absorbed and then used to replace the amount lost electrolytes along with water during the trip [26],[12]. Besides, the sheep have high adaptability to the use of water [27], so that the use of water during the trip managed efficiently. Therefore, in the end indicated that the sheep body water content remained in the normal range so that the overall CWBE provision can maintain the body water content.

Body fat (Table 3) ranged 16.47-24.76%.The analysis results showed body fat levels did not differ between treatments (P> 0.05). Body fat levels in this study almost equal to observations [21], [11] respectively 21.9% and 21.3%.

Observations result can be interpreted that CWBE provision to transported sheep for eight hours is able to cope with energy needs without exposing the body fat reserves. This can be illustrated by the levels of body fat sheep treated as non-treatment sheep had relatively smaller levels of body fat are although among treatment are not physiologically significant as disclosed [10].

Fat content has unstable or volatile properties [18].This is due fat is stored energy in the body, but during the shortage of energy supply (feed) it is soon be overhauled.

In this study, body fat levels are still within the normal range [28] so it is interpreted that during the trip demolition fat did not happen. CWBE provision before transportation suspected will be able to supply the energy needs. During the transportation, livestock requires some extra energy to cope with stressors that come from the environment. CWBE solution containing sucrose (Table 2), which is a disaccharide composed of glucose and fructose. Disaccharide hydrolysis takes longer than monosaccharides so when CWBE gets into the rumen it is not all used by microbes, especially sugar users bacteria, but there are still some of sucrose that can be absorbed in the small intestine and subsequently used as a precursor of energy.

The of average protein content in sheep body that feeds on various CWBE volume ranges from 15.57 to 17.42 %, In Non treatment body protein levels appear higher than other treatments, but the results of statistical analysis showed no differences (P> 0.05). Body protein content of the sheep obtained still within the normal range between 16-22% [6] and [29]. Sheep were used in the study is adult sheep based on the body thus the body protein content is relatively constant [3].

Body protein content of adult animals relatively stable, most proteins (amino acids) absorbed utilized by the body for proteins synthesis such as enzymes, hormones, hemoglobin. Replacing damaged cells and growth. Protein is only used as an energy source in certain circumstances, namely when glycogen, the body fat is no longer available, This is in line with the opinion of [1],[29]the respective use of body's energy reserves is glycogen, fat, and protein.

The sheep's body protein content is still within normal range, indicating that during transport no body's energy reserves overhaul are derived from protein. Energy needs during 8 hours transport can still be met without the need of remodeling body's proteins. This condition is supported by the result of [10] observation which showed sheep Blood Urea Nitrogen levels after 8 hours transport has decreased, which is means proteins revamp occurs in such transport. During transportation tends to be a lot of energy use to banish the stressors that come.

CONCLUSION

The supplementation of coconut water-based electrolyte solution and rosella extract can maintain body composition of Padjadjaran rams that have experienced transportation for 8 hours.

ACKNOWLEDGEMENTS

Thank you to Padjadjaran University Rector who has funded this research through Insentif Riset SINas with the tittle Pengembangan Domba Padjadjaran di Jawa Barat. Another gratitude would also given to Prof. Dr. Ir. Sri Bandiati Komar Prayogo who has supported this research.

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