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# Effectiveness of Urea Molasses Multi-Nutrient Block Based on Fermented Coffee Fruit Peel on the Blood Profile of Sheep Experiencing Stress during Transportation

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**ABSTRACT**

Transportation stress is influenced by trip duration, mileage, vehicle type, road conditions, loading and unloading, vehicle speed and environmental conditions. The provision of Urea Molasses Multi-Nutrient Block (UMMB) based on fermented coffee peel aims to overcome nutritional deficiencies and stress in livestock. This study was conducted experimentally with a non-factorial complete randomized design (RAL) with 4 treatments of A0 (without UMMB) as a control, A1 (UMMB based on fermented coffee peel 10%), A2 (UMMB based on fermented coffee peel 20%), A3 (UMMB based on fermented coffee peel 30%) and 4 replications. The parameters of the study were glucose levels, total protein and creatinine. The results showed that giving UMMB peel-based fermented coffee has a significant effect ($P<0.05$) on increasing glucose levels (16.03%), decreasing total protein levels (31.49%), and decreasing creatinine levels (2.71%). It can be concluded that giving UMMB based on fermented coffee peel up to 30% can overcome stress in sheep that experience transportation for 8 hours.

**Keyword:** Coffee Peel, Creatinine, Glucose Levels, Total Protein, Transport


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## 1. Introduction

Livestock transportation is one part of management animal husbandry consisting of the delivery of livestock for the purpose of breeding, fattening as well as for slaughtering and meat production. This process involves a series of treatments that can cause livestock experience stress, causing weight loss in sheep [1]. If the livestock feels stressed or there is a major change in condition environment, livestock will become restless and overly active. Likewise with transportation, so the longer the journey or transportation, the longer the livestock This will make it even more stressful. As a result of experiencing shocks and levels of fatigue will increase. Hematological changes, such as red blood cell count, values hematocrit, hemoglobin concentration, and blood reticulocyte RNA concentration (acid ribonucleate) [2].

Antioxidants can be given to cattle to help reduce stress. Coffee peel is one antioxidant that can be applied. Antioxidant chemicals found in coffee fruit peel may find application as natural antioxidants. Apart from that, phenolic acids such as caffeine, chlorogenic acid, Coumarin, sinapic acid, and ferulic acid are sources of antioxidant polyphenols high in coffee peel [3]. Anti - nutritional substances contained in coffee peel must be minimized or eliminated so as not to interfere with the digestion of sheep. One method that can be implemented to eliminate or reduce the antinutrient content in coffee peel is by fermentation. Fermentation

is a process in which enzyme activity produced by microbes makes complex compounds simpler. Fermentation can occur spontaneously or non-spontaneously. Spontaneous fermentation occurs naturally without the addition of microbial inoculum. In contrast, non-spontaneous fermentation occurs with the addition of microbial inoculum [4].

Urea Molasses Multinutrient Block (UMMB) is a feed supplement that contains various kinds of nutrients that have been compressed. UMMB in solid form is usually given to ruminants with various ingredients, such as fillers and molasses absorbents such as bran, urea for NPN providers, molasses as an energy source, mineral, table salt, lime, concentrate, and agricultural waste. Based on the description above, researchers are interested in conducting a study on the effects of UMMB utilization on livestock in transportation.

## 2. Materials and Methods

### *2.1. Material*

16 sheep weighing ± 15 kg obtained from Dompet Dhuafa Farm. fermented coffee peel flour, local microorganisms based on coffee peels, molasses, fine bran, soybean meal, cement, salt, lime, ultraminerals, water and urea as well as multivitamins. Other ingredients used are alcohol, HCl, distilled water. Meanwhile, the tools used were squid, sterile tubes, cool boxes and 1.5 ml Efendorf tubes used for taking blood samples, analytical scales, press tools, containers, rubber bands, polyethylene plastic and paralon pipe measuring 8.5 cm with a height of 5 cm then camera and stationery for documentation and recording research results.

### *2.2. Research methods*

#### *2.2.1. Making Coffee Mole Peel Solution*

1. Prepare a fermenter container with a capacity of 2000 ml and 400 grams of coffee peel.
2. Next, add 60 grams of rice bran, 30 grams of brown sugar and 30 grams of molasses.
3. Then add 740 grams of water from rice washing and 740 grams of water from coconuts.
4. Then homogenized and covered using polyethylene plastic and tied with a rubber band.
5. Then fermented for 7 days. After these steps, the coffee peel-based local microorganism solution is ready for use.

#### *2.2.2. Making Coffee Peel Fermentation Using MOL*

1. Prepare 5 kg plastic is provided as a fermentation medium, chopped coffee peel, MOL and urea solution.
2. Next, 3 kg of coffee peel were weighed for each treatment, then filled with 6% MOL solution, 180 grams of fine bran, 180 grams of molasses and 90 grams of urea and stirred evenly.
3. Then put it in plastic, tie it tightly with a rubber band, and ferment it for 14 days.

#### *2.2.3. Making UMMB Based on Fermented Coffee Peel*

1. The ingredients that make up UMMB include fermented coffee peel with MOL, molasses, fine bran, soybean meal, urea, salt, lime, ultraminerals, white cement and multivitamins.
2. First, flour the fermented coffee peel using a grinder, then weigh all the ingredients, namely fermented coffee peel flour, molasses, fine bran, soybean meal, cement, salt, lime, ultraminerals and urea as well as multivitamins according to your needs using an analytical balance.
3. When all the ingredients have been weighed, then mix all the ingredients according to the treatment and after the ingredients are homogeneous, they can be weighed with a mixture weight of 240 grams/block.
4. Then print the block with a mold made from paralon pipe and press it with a block press tool coated with plastic so that it is easy to take the UMMB from the printer.
5. Then the printed dough is placed on a tray and oven at a temperature of 45°-50°C.

#### *2.2.4. Providing UMMB to Transported Sheep*

UMMB was given 4 days before transportation in the Dompet Dhuafa farm pen which had been marked for each repetition and treatment. On the first and third days each sheep was given 1 piece of UMMB, on the second and fourth days the remaining UMMB was checked. The fifth day of giving UMMB during transportation. Giving UMMB 240 grams/block.

*2.2.5. Blood Sampling*

1. Blood samples are taken through the jugular vein. Before taking blood samples, the area around the blood vessels is cleaned using cotton wool soaked in alcohol to determine the blood vessels more clearly.
2. Then, insert the syringe into the jugular vein and withdraw the syringe slowly. Next, take a blood sample of 3 ml from each sheep.
3. Then put the blood into an ethyl diamine tetra acetic acid (EDTA) tube that has been marked with treatment and repeat.
4. The blood samples that have been taken are then taken to the laboratory to be checked for glucose levels, total protein and creatinine. Blood sampling was carried out before and after transportation.

*2.3. Research design*

The research was carried out experimentally using a completely randomized design (CRD) with 4 treatments and 4 replications, resulting in 16 research units as follows:

A0 = Not given UMMB
A1 = UMMB based on fermented coffee peels 10%
A2 = UMMB based on fermented coffee peels 20%
A3 = UMMB based on fermented coffee peels 30%

## 3. Results and Discussion

3.1 Glucose Levels

Table 1. Blood glucose levels of sheep given UMMB during transportation

| Treatment | Glucose (mg/dl) | | Precentage increase/decrease (%) |
|---|---|---|---|
| | Before transportation | After transportation | |
| A0 | 37,96±5,04 | 63,73±10,82$^{C}$ | 67,89 ↑ |
| A1 | 31,41±3,87 | 51,57±3,35$^{B}$ | 64,21 ↑ |
| A2 | 36,60 ±7,76 | 43,84±8,2$^{AB}$ | 19,66 ↑ |
| A3 | 34,54±1,95 | 40,08±1,74$^{A}$ | 16,03 ↑ |
| Avarage | 35,13 | 49,80 | |

Note: Different superscripts in the same column indicate significant differences (P<0.05)

Table 1 shows that the blood glucose levels of sheep given UMMB based on fermented coffee peel before transportation ranged from 31.41 - 37.96 mg/dl, and after transportation the glucose levels ranged from 40.08 - 63.73 mg/dl. There was an increase in glucose levels by 16.03 – 67.89%. Providing up to 30% UMMB of coffee peel can reduce the increase in glucose levels by up to 16.03%.

Transportation of sheep for 18 hours with treatment with vitamin C and molasses before transportation resulted in blood glucose levels of 47.83 mg/dl before transportation and 65.76 mg/dl after transportation [5]. Furthermore, the treatment of the livestock deck position during 16 hours of transportation was that the sheep's blood glucose concentration was 44.44 mg/dl before transportation and 80.72 mg/dl after transportation (an increase of 81.64%) [6]. when livestock experience stress due to transportation or lack of food, their central nervous system works harder and activates hormones to release glucose, which causes lysis. There is an increase in glucose levels in the blood due to glycogenolysis which is associated with an increase in the hormones catecholamines and cortisol which are under the control of sympathetic nerves which are released due to stress [7].

Based on the results of analysis of variance, it was found that the use of fermented coffee peel UMMB at various doses had a significant effect after transportation (P<0.05) on sheep blood glucose levels. Duncan's further test showed that treatment A3 (UMMB containing 30% fermented coffee peel) was significantly lower than A0 (without UMMB). This happens because the administration of Urea Molasses Multi-Nutrient Block (UMMB) based on fermented coffee peel contains antioxidant compounds such as flavonoids and polyphenols which together with vitamin C and carotenoids can protect body tissue due to oxidative stress so that the higher the dose of fermented coffee peel contained in UMMB the higher the antioxidant content. Coffee peel fermented using local microorganisms based on coffee peel themselves contain phenol compounds of 5.22 mg GAE/g.

### 3.2. Total Protein

Table 2. Total blood protein of sheep given UMMB during transportation

| Treatment | Total Protein (g/dl) | | Precentage incrase/decrease (%) |
|---|---|---|---|
| | Before transportation | After transportation | |
| A0 | 7,82±0,68 | 8,17±0,48$^{C}$ | 4,47 ↑ |
| A1 | 7,73±0,55 | 6,93±0,54$^{B}$ | 10,32 ↓ |
| A2 | 7,50±0,94 | 6,37±1,06$^{B}$ | 15,04 ↓ |
| A3 | 7,35±0,44 | 5,04±0,38$^{A}$ | 31,49 ↓ |
| Avarage | 7,60 | 6,63 | |

Note: Different superscripts in the same column indicate significant differences (P<0.05)

Table 2 shows that the total blood protein of sheep given UMMB based on fermented coffee peel before transportation ranged from 7.35 - 7.82 g/dL. After 8 hours of transportation the total protein in the sheep's blood ranged from 5.04 - 8.17 g/dL. Giving coffee peel UMMB up to 30% can reduce total blood protein levels by up to 31.49%.

Transportation of local sheep for 12 hours resulted in total sheep blood protein of 5.36 g/dL before transportation and 5.16 g/dL after 8 hours of transportation (a decrease of 3.87%) [8]. Furthermore, administration of vitamin C and molasses before transportation for 18 hours resulted in an increase in total blood protein of 4.83%, before transportation the total protein in sheep blood was 6.20 g/dL and after transportation it was 6.50 g/dL [9]. that there is a close correlation between the total phenol content and the antioxidant activity of coffee. Flavonoid compounds are known for their function in protecting cell structure, increasing the effectiveness of vitamin C, anti-inflammatory and antibiotic. This occurs because there is a close correlation between the total phenol content and the antioxidant activity of coffee. Flavonoid compounds are known for their function in protecting cell structure, increasing the effectiveness of vitamin C, anti-inflammatory and antibiotic [10]. The results of analysis of variance showed that the use of fermented coffee peel UMMB at various doses had a significant effect after transportation (P<0.05) on total sheep blood protein. Duncan's further test showed that treatment A3 (UMMB containing 30% fermented coffee peels) was significantly lower than A0 (without UMMB).

### 3.3. Creatine

Table 3. Blood creatinine levels of sheep given UMMB during transportation

| Treatment | Creatine (mg/dl) | | Precentage incrase/decrease (%) |
|---|---|---|---|
| | Before transportation | After transportation | |
| A0 | 0,99 ± 0,07 | 2,34 ± 0,35$^{C}$ | 137,06 ↑ |
| A1 | 0,85 ± 0,17 | 1,39 ± 0,15$^{B}$ | 63,05 ↑ |
| A2 | 0,81 ± 0,38 | 0,81 ± 0,10$^{A}$ | 0,31 ↓ |
| A3 | 0,81 ± 0,11 | 0,79 ± 0,09$^{A}$ | 2,17 ↓ |
| Avarage | 0,86 | 1,33 | |

Note: Different superscripts in the same column indicate significant differences (P<0.05)

Table 3 shows that the blood creatinine levels of sheep given UMMB based on fermented coffee peel before transportation ranged from 0.81 -0.99 mg/dl. After 8 hours of transportation it ranged from 0.79 - 2.34 mg/dl. It was seen that there was an increase in creatinine levels by 63.05 - 137.06%, as well as a decrease in creatinine levels by 0.31 - 2.17%. Giving coffee peel UMMB up to 30% can reduce creatinine levels by up to 2.17%.

The average creatinine levels of research sheep both before and after transportation were higher than the average creatinine levels of sheep treated with the position of the livestock deck during 16 hours of transportation, namely a decrease ranging from 0.008 - 0.022% [11]. This happens because the administration of UMMB based on fermented coffee peels contains anti-oxidant compounds derived from coffee peels, so the higher the dose contained in UMMB, the higher the antioxidant content which can overcome the stress of

livestock undergoing transportation. The increase in blood creatinine levels in the A0 treatment is due to the absence of nutritional reserves that can be used by the animal's body to become an energy source, resulting in an increase in the breakdown of creatinine phosphate.The results of analysis of variance showed that the use of UMMB based on fermented coffee peels at various doses had a significant effect after transportation ($P<0.05$) on sheep blood creatinine. Duncan's further test showed that treatment A3 (UMMB containing 30% fermented coffee peels) was significantly lower than A0 (without UMMB).

**4. Conclusions**

Providing Urea Molasses Multinutrient Block (UMMB) based on 30% fermented coffee peel was able to increase the lowest percentage of glucose levels by 16.03%, decrease total protein levels by 31.49% and decrease creatinine levels by 2.71%. Based on this, giving UMMB is able to overcome stress in sheep that experience transportation for 8 hours.

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