

# The Performance of Cihateup Ducks Liver Given Natural Isotonic in Dry Maintenance Systems

Nurul Frasiska\*, Putri Dian Wulansari, Novia Rahayu

Departement of Animal Science, Faculty of Agriculture, Universitas Perjuangan Tasikmalaya

## Abstract

This study aims to observe the condition of serum glutamate pyruvate transaminase and serum oxaloacetate transaminase as an illustration of the liver performance of Cihateup Ducks that were given natural isotonic through drinking water in a dry maintenance system. The animals used were Cihateup ducks, kept for 8 weeks with 48 animals and divided into four treatments, namely T0 (Control with drinking water without isotonic), T1 (7% sugar + 2% lime juice + 25 mg celery extract + 0.8 salt g), T2 (7% sugar + 3% lime juice + 50 mg celery extract + 0.9 g salt), T3 (7% sugar + 4% lime juice + 75 mg celery extract + 1 g salt). Each treatment was repeated 4 times, 3 ducks for one treatment plot. This study used a Completely Randomized Design (CRD). Data were tested using analysis of variance and continued with Duncan's further test at 5% level. The results showed that the treatment of T2 (7% Sugar + 3% Lime juice + celery extract 50 mg + 0.9 g salt) significantly produced the lowest SGPT levels and seen a tendency for SGOT to decrease but not significantly. The use of natural isotonic solutions can be given to Cihateup ducks on dry system maintenance.

**Keywords:** Cihateup's duck, Dry system, Natural isotonic, SGOT, SGPT

## Introduction

Cihateup ducks are known as the type of dual-purpose ducks that have the potential to produce good meat and eggs (Matitaputty, 2014). Generally, the maintenance of ducks is done with a wet system. The cage is next to the pool for bathing, drinking, reproducing, and doing activities. For efficiency and increased productivity, duck maintenance can be done intensively using a dry system. This can facilitate the handling of ducks by breeders, improve duck feed conversion, and enhancement in productivity through the efficient use of duck feed will help farmers to gain profit (Suswoyo et al., 2017). The maintenance of dry systems will prevent ducks from releasing body heat that is normally done by swimming. As a result, ducks will experience oxidative stress in the form of heat stress. Heat stress will cause physiological changes in livestock such as

panting (Sunarti et al., 2015), increased heart rate, and also disrupt the function of corticosterone and cortisol which play a role in glycolysis and gluconeogenesis of the body (Tamzil, 2014). Dehydration or lack of water affects the balance of acid-base in the body due to the process of transferring body fluids to obtain the condition of homeostasis. Research on feed containing electrolytes tested on broilers shown a result that it can inhibit heat stress (Olanrewaju et al., 2007).

The use of isotonic containing natural electrolyte sources through drinking water is expected to be able to meet the needs of duck fluids during dry system maintenance. The National Standardization Agency sets specific requirements for isotonic drinks that contain a minimum of 5% sugar and mineral content of Sodium and Potassium each a maximum of 800 mg/kg and 125-175 mg/kg (BSN, 1998).

\*) Corresponding author:

E-mail:nurulfrasiska@unper.ac.id

Celery and lime have a natural mineral content that is good for the body so that it can be studied as a natural isotonic material.

USDA data (United States Department of Agriculture) states celery has natural mineral content that acts as an electrolyte (USDA, 2016b). Giving celery extract has the potential to be used as an anti-stress (Yusni et al., 2015). While lime juice also contains minerals, vitamin C, and citric acid as natural isotonic components (USDA, 2016a). The use of natural isotonic made from celery extract and lime juice containing antioxidant flavonoids can reduce oxidative stress.

Oxidative stress occurs as a result of increased Reactive Oxygen Species (ROS) in the body due to increased free radicals. Flavonoid antioxidants work to suppress ROS by increasing the body's immune cell performance by sending intracellular signals to cell receptors so that it works more optimally (Astuti et al., 2017; Werdhasari, 2014). But it is also necessary to observe the condition of duck organs given the phytochemicals of plant origin. Because the liver is also used to neutralize toxins where its performance can affect the performance of the liver. Indicators of liver function damage can be seen from the levels of serum glutamate pyruvate transaminase (SGPT) and serum oxaloacetate transaminase (SGOT). High levels of SGPT and SGOT show high liver performance activity in neutralizing toxins (Puspitasari et al., 2019). For this reason, it

is necessary to know whether natural isotonic made from herbs have an impact on the performance of the liver.

### **Materials and Methods**

The research material used was 48 DOD Cihateup ducks with an average weight of 36 g, divided into four treatments, namely T0 (Control with drinking water without isotonic), T1 (7% sugar + 2% lime juice + 25 mg celery extract) + 0.8 g salt), T2 (7% sugar + 3% lime juice + celery extract 50 mg + 0.9 g salt), T3 (7% sugar + 4% lime juice + 75 mg celery extract + 1 g salt). All ingredients were mixed until homogeneous and then added to 1 liter of drinking water. The treatment was repeated 4 times. The cage used was a postal husk with a cage with a plot size of 75 x 75 x 75 cm. The cage did not have a pool for bathing. Each treatment plot contained 3 ducks, kept for 8 weeks. The feed was given twice a day, morning and evening with 16% of Crude Protein and 2900 kcal/kg of Metabolic Energy. An isotonic solution was given through drinking water in the morning. 100ml isotonic was dissolved into one liter of water, which then was given by ad libitum.

SGOT and SGPT measurements were made through blood samples, taken through the brachial vein on the inside of the duck wing. Then, the blood sample was inserted into the EDTA tube to prevent clotting. Blood samples were prepared in the form of serum. SGPT and SGOT levels were determined by using the photometric

method. A total of 250µL mono reagent SGPT/SGOT was added with 25µL of sample serum, then stirred until homogeneous and left for 50 seconds, then the solution was measured using a 300LX Microlab portable photometer. The absorbance was read with a wavelength of 340 nm at 37 °C. SGOT and SGPT levels data were tested using Analysis of Variance (ANOVA) and further tested by the Duncan test at 5% level.

## Results and Discussion

The levels of SGOT and SGPT Cihateup ducks given natural isotonic are shown in Table 1. SGOT level in T1 treatment (7% sugar + 2% lime juice + 25 mg celery extract + 0.8 g salt) showed the lowest tendency, but not significantly different to other treatments ( $P>0.05$ ). Whereas the lowest SGPT level is significantly shown by T1 ( $P<0.05$ ).

Table 1. Average Rates of SGOT and SGPT of Cihateup Ducks

Parameter	Treatments			
	T0	T1	T2	T3
SGOT (U/L)	21,00 ± 4,32	8,75 ± 8,26	19,25 ± 6,65	22,00 ± 11,60
SGPT (U/L)	26,00 ± 4,32 <sup>a</sup>	12,75 ± 9,06 <sup>b</sup>	24,25 ± 6,65 <sup>ab</sup>	32,25 ± 2,62 <sup>a</sup>

The average SGOT level was in the range of 8.75 ± 8.26 U/L to 22.00 ± 11.60 U/L where the level is still normal in poultry. SGOT levels in the study tended to decrease in T1 treatment, although it was not significant. This is likely due to the lack of response of SGOT levels in the measurement. SGOT levels at low concentrations are detected in the blood, while SGPT can be found in several organs, such as the brain, liver, and kidneys. SGPT levels are considered more specific in knowing liver performance (Nasution et al., 2016). Normal levels of SGOT and SGPT are various, in the range of 4.80 ± 0.53 U/L to 19.00 ± 6.58 U/L (Darmawan et al., 2016; Salam et al., 2014). The use of natural isotonic means it can decrease the level of heat stress, even in the maintenance of dry

systems. This is because the mineral content of electrolytes in natural isotonic derived from celery and lime extracts. Also, there is the addition of mineral sodium from salt. In heat stress conditions, poultry will lose some mineral ions in the body which are excreted through excreta and panting. Isotonic consumption by drinking water can replace the loss of mineral ions (Ahmad et al., 2009). The level of antioxidant flavonoids in celery, a type of apigenin, gives some functions as an anti-inflammatory agent, anti-hypertension, and also can help to reduce the secretion of the hormone cortisol in the blood (Rusdiana, 2018).

The level of natural isotonic consumed by optimal ducks at T1 was 25 mg celery extract, 2% lemon juice and 0.8 g

of salt added. At higher doses, T2 and T3 showed levels of SGOT and SGPT which actually increased. This is likely a dose that is too concentrated in an isotonic solution. Herbal extracts in isotonic solutions contain antioxidants which are phytochemicals. Levels that are too high are not optimal. In studies using herbal extracts at doses above 20 mg/kg body weight, it actually reduces the effectiveness of the extract (Dibyantini, 2010). In the treatment of T2 and T3 celery extracts used reached 50 mg and 75 mg so that these levels are too high when given to poultry.

In addition, levels that are too high in the isotonic solution consumed will increase body organs' performance to metabolize. The condition of liver performance is illustrated by the average levels of SGOT and SGPT in the blood. In dry maintenance conditions, the risk of Cihateup ducks being attacked by oxidative stress is very high. Under conditions of oxidative stress, there will be a build-up of free radicals in the body and a decrease in antioxidants in plasma and tissue that triggers cell damage (Adenkola et al., 2017). The liver will produce SGOT and SGPT enzymes as an indication of whether there are side effects from the consumption of additives (Salam and Sunarti, 2014). Increased levels of SGPT indicate impaired liver function due to enzyme biosynthesis and decreased membrane permeability. The damage of liver function is likely due to direct exposure by toxic substances during detoxification of metabolite products (Arjadi et al., 2017). So,

the use of natural isotonic also needs to be limited to a certain level to meet optimal work.

### Conclusion

Natural isotonic origin of herbal extracts at T1 level with 7% sugar formulation + 2% lime juice + celery extract 25 mg + salt 0.8 g, can overcome oxidative stress in the maintenance of the dry system without disturbing liver performance, as indicated by the lowest levels of SGOT and SGPT.

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