

CHAPTER 1 INTRODUCTION

1.1 Background

Broiler chicken is one of commercial chicken beside the layer chicken in the poultry production which is a top priority in meeting the needs of animal protein. Broiler chicken has superior characteristics which do not require a large area for maintenance and broiler chicken also have fast and efficient growth in converting feed into meat (Ensminger *et al.*, 2004).

Avian coccidiosis is an enteroparasitic disease caused by multiple species of the protozoan parasite of the genus *Eimeria*. It is one of the most common and economically most important diseases of poultry worldwide (Khaled Kaboudi *et al.*, 2016). There are seven species of *Eimeria* as causative agents of coccidiosis in chickens, of which *E. tenella*, *E. maxima*, *E. necatrix*, and *E. brunetti* are highly pathogenic. Others, like *E. acervulina*, *E. mitis*, and *E. praecox* are less pathogenic (Taylor *et al.*, 2007).

E. tenella is one of the important coccidian species in chickens due to its pathogenic characteristics that cause problems and disadvantages to the poultry production (Chapman, 2003). Chickens that infected by *E. tenella* will show damage to the mucosa of the chicken cecum, the cell of cecum will rupture causing symptoms of bloody diarrhea. The severity of chickens infected with *E. tenella* can be seen by detecting the number of oocysts in chicken feces (Chapman *et al.*, 2010).

Coccidiosis can cause large economical losses for poultry sector due to inhibition of chicken growth, decrease at body weight, carcass quality, and egg production (Tampubolon, 2004). In the world, economic losses due to subclinical

coccidiosis are significant, estimated at more than US\$3 billion annually (Dalloul and Lillehoj, 2006). The poultry production and related parties have made various effort to control coccidiosis, but the results obtained are still not satisfactory. Common methods are used for controlling and preventing coccidiosis include maintaining good sanitation to prevent oocysts from polluting dust, water, feed and cage equipment (Juwandi, 2000).

Another method that used to prevent and control coccidiosis is by administering coccidiostat mixed in feed or drinking water. The use of coccidiostat on chicken feed or drinking water must be followed by the method and dosage that becomes the provision so that it can prevent the side effects. The use of one type of coccidiostat continuously in chicken feed or drinking water can lead to resistance of coccidian to drug (Tabbu, 2006). Resistance of coccidian to drug were reported from River State in southern Nigeria (Ojimelukwe *et al*, 2018). In addition, the use of coccidiostat in the long term can cause residues in meat and eggs that can have a negative impact on human health (Michels *et al*, 2011)

The search for new drugs and the use of new methods in poultry management arrangements to overcome resistance of coccidian to drug have been carried out, but these methods have an impact on rising costs in the poultry production (Youn and Noh, 2001). Through this research, proposed a preventive solution or alternative that are cheaper, does not pose a danger of resistance, easily obtained and safe for chicken farmers and consumers. The prevention solution in the form of laserpuncture technology.

The way laserpuncture works is based on acupuncture that's use points on the surface of the body for stimulation. The points that's used in this research were *Wei Gen* point and *Hu Men*. According to Adikara (2016) shooting at the point of *Wei Gen* will optimize the immune system, the optimal immune system will increase the body's defense against *E. tenella* so that the production of oocysts will decrease. In the other hand, shooting at the *Hu Men* point functions to increase appetite and drink and increase digestive organ activity to be more optimal, optimal digestive organ activity will reduce chicken weight loss due to coccidiosis. Through the shooting of laserpuncture at the point of *Wei Gen* and *Hu Men*, it is hoped that it can help reduce the production of oocysts and can improve the body weight of chickens infected with *E. tenella* parasites.

Based on the description of the background above, this research proposal is proposed to examine the effect of laserpuncture on body weight and the number of oocyst production of broiler chicken infected by *E. tenella*.

1.2 Problem Statements

Based on the background above, the problem statments can be formulated as follows:

1. Does the shooting of laserpuncture at the *Wei Gen* and *Hu Men* point affect the body weight of broiler chicken infected by *E. tenella*?
2. Does the shooting of laserpuncture at the *Wei Gen* and *Hu Men* point affect the oocyst production of broiler chicken infected by *E. tenella*?

1.3 Theoretical Base

Laser technology is an appropriate technique in providing biological stimulation to livestock so that there is an increase in livestock productivity which includes the production of eggs, milk, meat by using a laser called laserpuncture technology. The technology has been practically tested in the field of animal husbandry, especially to spur growth, increase reproductive and productivity and control disease. Laserpuncture technology is used as a stimulant media that can stimulate certain organs to function optimally (Syahrir and Syahriani in Widiastuti 2015)

Immune mechanisms in poultry against parasites consist of specific and nonspecific immune systems (Lillehoj and Lillehoj, 2000). The specific immune system consists of the cellular immune system and humoral. T cells are the primary cellular immune system to fight against protozoan infections, while the humoral immune system, B cells, plays a small role against protozoan infections (Laurent *et al*, 2001). According to Adikara (2016), stimulation at the point of *Wei Gen* can increase the body's immune system humorally and cellularly so that it can increase the body's defense to more optimal. The optimal body defense will decrease the production of *E. tenella* oocysts. Previous studies have been carried out by Hardijanto and Adikara (1994) which show that the treatment of laserpuncture shot at *Wei Gen* point on a 4-week-old Hubbard strain chicken can increase immunity against *tetelo* (Newcastle Disease). The shooting at the point of *Wei Gen* was able to increase chicken antibody titers which decreased due to Newcastle disease.

Stimulation is also given at *Hu Men* point which functions to increase appetite and drink and increase digestive organ activity to be more optimal (Adikara, 2016). Along with the increase in appetite and drinking and increased activity of the digestive organs, this will also affect the body weight of chickens that have decreased due to coccidiosis. The shooting at *Wei Gen* point aims to reduce the decrease in chicken body weight, so that even though chickens are exposed to coccidiosis, the weight of the chicken is still within the specified range.

The laser used for stimulation at the acupuncture point is a low power laser. Low power laser can provide biological stimuli such as changing membrane cell potential for Na, K and Ca ions and can increase central and peripheral nerve regeneration power. Low power lasers can also increase cellular activity and the ability to produce hormones and enzymes (Karu, 2000 in Kusuma, 2013). The light in the laserpuncture contains electrical impulses, when shot at the acupuncture point, it will cause chemical changes in the cell membrane, this causes changes in the bioelectric potential which affects the modification of the function. Sympathetic nerves will stimulate the release of nor ephinephrine which results in increased permeability of sodium ions (Na) to membrane cells. The permeability of potassium ions and calcium (Ca) ions will also increase with membrane cells. The movement of Na, K and Ca in and out of cell membranes is called a change in potential energy that delivers impulses from acupuncture points to target organs (Kushardjito, 2001 in Pebri, 2015).

1.4 Aim of Research

The aim of this research is to investigate the effect of shooting of laserpuncture on *Wei Gen* and *Hu Men* points on broiler chicken infected with *E. tenella* toward broiler chicken body weight and *E. tenella* oocyst production.

1.5 Benefits of Research

1.5.1 Theoretical Benefits

The benefits of the research that the authors do are expected to be a reference or reference to the results and proof that by using laserpuncture technology, it can be used as an alternative prevention, control and treatment of coccidiosis.

1.5.2 Practical Benefits

The benefits of the research that the authors do are expected to provide information to the public, especially broiler farmers so that efforts to prevent, control, and treat coccidiosis can be done through the use of laserpuncture technology.

1.6 Hypothesis

Based on the identification of problems and aims of research list above, it can be proposed hypothesis as follows:

1. The Shooting of laserpuncture at *Wei Gen* and *Hu Men* points in broiler chicken infected by *E. tenella* can reduce oocyst production.
2. The Shooting of laserpuncture at *Wei Gen* and *Hu Men* points in broilers infected by *E. tenella* can reduce the rate of decrease in chicken weight due to coccidiosis