



Testing Honey on Chicken Embryos as Candidates for Herbal Medicine in Indonesia

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Abstract

The nutrients in honey had function as antioxidants. The aim of this study was to testing honey on chicken embryos as candidates for herbal medicine in Indonesia. This study used treatment method, consisting of 6 (six) doses of honey products. The solution volume of each treatment dose was fixed at 10 l/egg via the route to the air bag. At the age of 13 days, embryo morphology and possible abnormalities were observed in all treatments. Each two eggs are cracked. The remainder was continued by incubation in the incubator until day 21. During this time the eggs were observed and the number was recorded to find out which eggs would die and which eggs would hatch at the end of the incubation period. Newborn chicks (DOC) were weighed and observed for possible morphological abnormalities. From the results of the research conducted, it was found that the percentage of viable chicken eggs sprouted after being injected with honey (days 13-21 after inoculation) and the morphology of chicken embryos after being injected with honey. Chicken Embryo Weight and Body Length Measurements were carried out in chicken embryos. The conclusion of the study is that propolis from honey products can be used as herbal medicine.

Keywords: *Chicken, Embryo, honey, herbal medicine*

Abstrak

Nutrisi dalam madu berfungsi sebagai antioksidan. Penelitian ini bertujuan untuk menguji madu pada embrio ayam. Penelitian ini menggunakan metode pengobatan yang terdiri dari 6 (enam) dosis produk madu. Volume larutan dari masing-masing dosis pada observasi dengan perlakuan ditetapkan pada 10 l/telur melalui rute ke kantong udara. Pada umur 13 hari diamati morfologi embrio dan kemungkinan kelainan pada semua perlakuan. Setiap dua telur dipecahkan. Selebihnya dilanjutkan dengan inkubasi di dalam inkubator hingga hari ke-21. Selama itu telur diamati dan dicatat jumlahnya untuk mengetahui telur mana yang mati dan telur mana yang menetas pada akhir masa inkubasi. Anak ayam yang baru lahir (DOC) ditimbang dan diamati kemungkinan kelainan morfologinya. Dari hasil penelitian yang dilakukan didapatkan persentase telur ayam yang hidup berkecambah setelah diinjeksi madu (hari ke 13-21 setelah inokulasi) dan morfologi embrio ayam setelah diinjeksi madu. Pengukuran Berat Embrio Ayam dan Panjang Badan dilakukan pada embrio ayam. Kesimpulan dari penelitian ini adalah propolis dari produk madu dapat digunakan sebagai obat herbal.

Keywords: *ayam, embrio, madu, obat herbal*

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INTRODUCTION

Honey is a thick liquid produced by bees from various nectars that still contain the active diastase enzyme. Various advantages of honey as a high nutrient food have been known since ancient times ¹. Total cholesterol concentrations could be reduced by administering 75 grams of honey every day. Research by ² showed that honey can reduce lipid peroxide and malonaldehyde or often abbreviated as MDA. The mechanism for reducing cholesterol and MDA in honey administration is thought to be due to the antioxidant activity contained in honey.

Pure honey contains several nutrients such as carbohydrates, proteins, amino acids, vitamins and minerals ³. The vitamins contained in honey include Vitamins, flavonoids, as well as antioxidant minerals ⁴. The nutrients in honey that function as antioxidants are vitamins C, B3, organic acids, enzymes, phenolic acids, flavonoids, vitamin A and vitamin E, thus honey contains many nutrients that function as antioxidants ⁵.

Embryo development requires increased nutrition, oxygen, and removal of cellular metabolic wastes ⁶. This increased need cannot be met by diffusion, so a new system is needed to ensure the survival and development of the embryo. The first

thing that happens is the differentiation of mesenchymal cells (hemangioblasts) into endothelial cells so that new blood vessels are formed de novo. This event is called vasculogenesis ⁷.

Vasculogenesis is regulated by various factors with a complex sequence of events. Hemangioblast precursor cells depend on a variety of growth factors ⁸, including basic fibroblast growth factor 2 (FGF2) and vascular endothelial growth factor (VEGF). VEGF is very important in the events of embryonic angiogenesis ⁹. VE-cadherin (Vascular-endothelial cadherin), a protein that plays a role in adhesion to the endothelium also has molecular interactions with the VEGF receptor ¹⁰.

VE-Cadherin is exclusively expressed in endothelial cells and expressed only in angioblasts. VE-Cadherin is known to play a role in regulating adherent junctions in endothelial cells that regulate intercellular adhesion, permeability, and endothelial cell migration ¹¹. This event is followed by angiogenesis, which is the formation of new blood vessel branches through the elongation of pre-existing small blood vessels ¹². Angiogenesis is required in the process of embryonic growth, as well as the process of postnatal physiological repair¹³. The process of vasculo-angiogenesis in embryos is often studied using



chicken embryos (and other aves families) because it is easier to study, and to reduce the use of mammals as experimental animals ¹⁴.

Chicken eggs are one of the media for the growth of various types of viruses such as the New Castle Disease (ND) virus, Avian Influenza, and Measles ¹⁵. In recent years, embryonic chicken eggs have been widely used as a model for studying the process of tumor development and tumor treatment in humans and the impact of addictive substances such as alcohol on human fetuses ¹⁶. This in vivo testing method has several advantages over in vitro testing using cell culture because it does not require media and complicated laboratory conditions so that the costs required are relatively low ¹⁰.

Embryo egg as a dynamic biological system is expected to describe in vivo conditions ¹⁷. The in vivo condition in question is the ongoing metabolism and development of embryonic cells in the egg. Chemicals, including antiviral agents, can also be inoculated into eggs ¹⁸. The effect of these substances on viruses and embryos is influenced by the age of the embryo, the application of the route of administration to the egg (embryo, allantois, yolk sac, air sac, amnion), the ability to absorb substances by the embryo, and the pharmacological structure of the

substance itself ¹⁹. The aim of this study was to examine the toxicity of honey products as a potential protective and therapeutic agent in chicken embryos. The aim of this study was to testing honey on chicken embryos as candidates for herbal medicine in Indonesia.

METHODOLOGY

This study used experimental method to determine the effect of Honey products on the development of chicken embryos, according to the study conducted by ²⁰. An experiment was designed by giving a series of doses of Honey to a number of chicken eggs that sprout ²¹. In this case the treatment consists of 6 (six) levels of honey product dosages, namely:

- (1) control (0 ng of honey /eggs);
- (2) 15.6 ng of honey /egg products;
- (3) 31.2 ng of honey /egg products;
- (4) 62.5 ng of honey /egg product;
- (5) 125 ng honey /egg product;
- (6) 250 ng honey /egg.

The volume of solution from each treatment dose was set at 1 ml/egg, injected via the allantois space route. Each treatment (treatments 1 to 6) was injected into 100 brood chicken eggs aged 12 days in the air bag line with a volume of 1 ml/egg. The control (treatment 1) was only injected with a solution without honey products with the same volume of 1 ml in 12-day-old sprouted chicken eggs. The injection



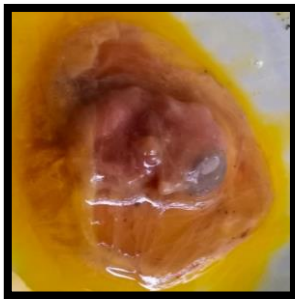
hole was closed again with liquid paraffin and incubated in an incubator and observed (candling) every day. At the age of 21 days, the embryo morphology and possible abnormalities were observed in all treatments, two eggs were broken each.

Newborn chicks (DOC) were weighed and observed for possible morphological abnormalities. The design used in this study was a

simple completely randomized design (CRD) with 6 (six) treatments. To see the effect of treatment on chick body weight (DOC), the data obtained were analyzed by means of variance ²². While other data are presented based on the percentage of embryonic mortality by comparing between treatments. This was according to the study conducted by ²³.

RESULT AND DISCUSSION

From the results of the research conducted, it was found that the chicken embryos that had been injected with honey with various concentrations were as follows:



A



B



C



D



E



F



Figure 1 (A-F). Observation of embryo morphology in each treatment. A. control (0 ng of honey /egg); B.15.6 ng of honey /eggt; C. 31.2 ng of honey /egg; D. 62.5 ng honey /egg; E.125 ng honey /egg products; F. 250 ng honey /egg products

From the results of the research conducted, it was found that on day 21 obtained embryo morphology of each treatment, in the control treatment group (0 ng honey/eggs); 15.6 ng honey/eggs; 31.2 ng of honey/egg products; 62.5 ng of honey/egg product; 125 ng of honey/egg product an abnormal embryological picture was obtained. At a concentration of 250 ng of honey/egg product, an abnormal embryological picture was obtained.²⁴

Study by Dewi et al reported that hatchability was not affected when eggs were injected with amino acids, vitamin C, hormones, carbohydrates, and pollen extracts, respectively. Moreover, it also reported that in-ovo injection with vitamin C, ascorbic acid, carbohydrates, and glucose, respectively, had no significant effect on embryonic mortality. In this study, it was found that the weight of the chicken embryo after being injected with honey on the 21st day in each treatment and the length of the body

part of the chicken embryo at the age of 21 days after being injected with honey in each treatment. In-ovo injection of some nutrients can cause nutritional imbalances in the eggs, and consequently can limit the maximal growth and development of the embryo during incubation ²⁵.

CONCLUSION

The conclusion of this study was that the morphological description of the embryo on the 21st day after injection, at a concentration of 250 ng of honey/egg product, an abnormal embryological picture was obtained. Chicken Embryo Weight and Body Length Measurements were carried out in chicken embryos. The conclusion of the study is that honey can be used as herbal medicine. Suggestions for this research are: further testing was carried out using various experimental animals, further testing was carried out using different parameters and doses.

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