60. Effects Honey on Different Levels of Antioxidant Activity and Chemical of Pasteurized Eggs

by Y Yusrawati

Submission date: 02-Feb-2019 12:34PM (UTC+0700)
Submission ID: 1071913021
File name: srawati_perlu_perbaikan_penulisan_pustaka_-_icastunhas_2018.docx (24.86K)
Word count: 1600
Character count: 8667

Effects Honey on Different Levels of Antioxidant Activity and Chemical of Pasteurized Eggs

Yusrawati, Nahariah, Farida Nur Yuliati, Hikmah M Ali

Faculty of Animal Science Hasanuddin University, 90245
Jl. Perintis Kemerdekaan km 10, Makassar,

email: yusrawatidarwis@gmail.com

Abstract. Pasteurization is the process of heating food or drink of killing harmful microbes such as viruses, protozoa, and bacteria. The pasteurization process in eggs can lower protein levels and decrease antioxidant activity. Retention of proteins in pasteurized eggs can be minimize by the addition of fructose, one of the foodstuffs of animals that have high levels of fructose is honey. Honey is also a food that contains high antioxidants. This studies aims to explain the use of honey at different levels of antioxidant activity and the physical and chemical characteristics of pasteurized eggs. Parameters measured in this study was antioxidant activity, total protein, moisture content and pH value. The research design used was Completely Randomized Design (CRD) with 4 treatments and 5 replications. The treatment given in this study was P1 (control) without the use of honey, P2 = 3% honey additions, P3 = 6% honey additions, P4 = 9% honey additions. The results showed that the addition of different levels of honey in the pasteurisasi eggs had a very real effect ($P < 0.01$) on antioxidant activity. Result of research on total protein, water content and pH value did not have real effect ($P > 0,05$ The addition of honey to the level of 9% can be increase antioxidant activity and maintain the chemical properties of pasteurized eggs

1. Introduction

Eggs are the one of nutritious foodstuffs. Fresh egg quality cannot be maintained for a long time without special treatment. Declining storage power quality will cause the egg to be poor for the advanced process. One way to improve the quality of eggs is to the heating process in the form of pasteurization.

The process of heating in eggs can reduce protein levels by a protein denaturation mechanism. The decrease in protein content in heating is to release of protein bonding due to heat which can cause the dissolution of protein components in water. Nahariah *et al.* (2014) states that heating temperatures at certain times affect the breakdown of proteins which can produce a sequence of amino acids (peptides) and are indicated as antihypertensive. However, the heating process also

resulted in a decrease in antioxidant activity in eggs that had been warmed at 45^0C for 9 minutes (Nurhamdayani, 2012).

Protein retention in pasteurized eggs can be minimized by the addition of fructose, one of the animal food ingredients that has high levels of fructose is honey. Honey is also an ingredient that contains high antioxidants. The antioxidant properties of honey are caused by various components in honey.

The use of honey in pasteurized eggs is expected to have an influence on antioxidant and physicochemical activities including total protein, water content and pH. But not many studies have examined the use of honey levels to produce antioxidant activity and physicochemical properties in pasteurized eggs so this research is important to do. This study aims to explain the use of honey at different levels of antioxidant activity and physical and chemical characteristics of pasteurized eggs. The usefulness of the research is as scientific information for academics and the public in terms of egg processing with the use of honey levels in pasteurized eggs.

2. Material and Methods

This study was prepared using a Completely Randomized Design (CRD) using 5 replications. The level of honey (%) is 0, 3, 6 and 9. The number of eggs used is 80. The eggs used are one-day broiler eggs from the same farm in Maros Regency, and Cerana honey from beekeeping in Bulukumba Regency.

Weighing the whole egg then doing cleansing using chlorine and alcohol, soaking the eggs into hot water with a temperature of 70^0C for 5 minutes. The egg contents were removed from the shell and homogenized using a mixer, adding honey at the level of (%) 0, 3, 6 and 9 then given the treatment of pasteurization for 9 minutes at 550C. After that, testing the parameters of antioxidant activity, total protein, water content and pH value.

3. Results and Discussion

The results of the study included antioxidant activity, total protein, , water content and pH value the study period presented in Table 1.

Table 1. Antioxidant activity and physicochemical of pasteurized eggs with different levels of honey

No	Levels honey (%)	Antioxidant activity (%)	Total Protein (%)	Water content (%)	pH value (%)
1	0	13,03±2,67^{a}	7,65±0,37	67,74±23,88	6,81±1,16^{b}
2	3	18,12±3,22^{ab}	7,55±0,20	68,90±18,99	6,24±0,9^{ab}
3	6	24,08±4,16^{bc}	7,43±0,36	74,74±13,27	6,04±0,89^{ab}
4	9	29,88±6,26^{c}	7,31±0,16	77,13±12,51	5,26±0,53^{a}
	Rata-rata	21,28±7,58	7,48±0,29	72,12±16,80	6,09±1,00

Keterangan : Superskrip yang berbeda pada kolom yang sama menunjukkan perbedaan yang sangat nyata (P<0,01)

3.1 Antioxidant activity

The results of variance analysis (Table 1) showed that the addition of different levels of honey in pasteurized eggs had a very significant effect (P <0.01) on antioxidant activity. These results indicate that the honey level contributed to the antioxidant of pasteurized eggs. Duncan's further test results (Table 1) showed that the addition of different levels of honey in pasteurized eggs was significantly different (P <0.01) to increase antioxidant activity.

Antioxidant activity increases with the addition of honey levels. However, there is no difference between the use of honey levels between 0 and 3%. This increase in antioxidant activity is likely due to the increasing use of honey at each level.

Honey has flavonoid compounds that are able to prevent oxidation. This is in accordance with the opinion of Al Waili (2004) which states that the mechanism of action of bee products as an antioxidant of flavonoids is to prevent oxidation from the beginning of the reaction, inhibit the oxidation process immediately when the reaction occurs, and repair damage due to oxidation.

3.2. Total Protein

The results of variance analysis (Table 1) showed that the addition of different levels of honey did not significantly (P> 0.05) the total protein. These results indicate that the honey level does not contribute to the total pasteurized egg protein.

Table 1 shows a decrease in total protein as the level of honey used increases. Sihombing (2005) states that honey contains 17.2% water, 82.3% carbohydrates, 0.3% protein, other ingredients in the form of 0.2% ash. The average total pasteurized egg protein is 7.48%, a decrease compared to the total fresh egg protein which is 12.7%. This is probably caused by heating done during the egg pasteurization process. Nahariah et al. (2014) which states that the heating temperature at a certain time affects the breakdown of proteins which can produce a sequence of amino acids (peptides) and are indicated as antihypertensive.

3.3. Water content

The results of variance analysis (Table 1) showed that the addition of different levels of honey did not significantly affect (P> 0.05) the water content. These results indicate that the honey level does not contribute to the water content of pasteurized eggs.

The amount of water content is increasing as the level of honey is used. This increase in water content is probably caused by environmental humidity factors and honey which easily absorbs water. This is consistent with the opinion of Sumoprastowo (1980) which states that the moisture content of honey is influenced by the existing environmental humidity, this is because honey has hygroscopic properties, which is easy to absorb water.

3.4. pH value

The results of variance analysis (Table 3) showed that the addition of different levels of honey did not significantly affect (P> 0.05) the pH value. These results indicate that the honey level does not contribute to the pH level of pasteurized eggs

The pH value decreases with increasing levels of honey used. Fresh egg pH value is 7.6. Decreasing the pH value is likely due to the addition of honey to the eggs. Honey contains organic acids and glutamate acid. According to Sumoprastowo (1980), in the content of honey there are a number of organic acids that play an important role in the body's metabolic processes. The types of metabolism are formic acid, acetic acid, citric acid, lactic acid, butyric acid, oxalic

acid and succinic acid. Hamonangan (2009) also added that the main acid contained in honey is glutamic acid. These acids cause honey pH of 3.4-4.5.

4. Conclusion

Based on the results and discussion it can be concluded that the use of honey with different levels can increase the antioxidant activity of pasteurized eggs but does not improve the physicochemical characteristics of pasteurized eggs. The addition of 9% honey level can increase antioxidant activity and can maintain the chemical properties of pasteurized eggs.

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