Physicochemical properties and total plate count of raw salted eggs with blanching and different concentration of aloe vera solution during the salting process

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Abstract. Salted egg is a typical popular snack in some societies in Indonesia. However, it contains high NaCl and cholesterol. One way to cope with it is by utilizing aloe vera which has the chemical composition of a complete and well-known traditional medicine. The purpose of this study is to determine the physicochemical properties and the bacterial colonies forming raw salted eggs with different temperature and concentration of aloe solution for 5 days salting process. This study used 2×3 factorial design with three replications, factor A (without blanching and blanching) and factor B concentration of aloe vera solution (2, 8 and 14%). According to the research, there was an interaction between the process of the different heating and concentrations on NaCl, yolk and albumen pH, cholesterol and total plate count raw salted eggs were produced. The heating process of aloe vera increases the content of NaCl, albumin pH, cholesterol and bacterial colonies formed. Treatment with blanching at 14% concentration effectively produced lowest moisture content, yolk pH, cholesterol, and highest ash content, NaCl content, Albumen pH, total solids and total plate count the best raw salted eggs.

Keywords – raw salted eggs, NaCl content, cholesterol, total plate count, blanching.

1. Introduction
An area which famous for salted egg in West Sumatra is Sicincin [1], while the most famous area for salted eggs in Java is Brebes. The developments of salted eggs making are also supported by the increase of duck population in West Sumatra. The data in the 2007-2009 shows that its population increased from 1 million in 2007 to 1.19 million in 2009. The duck which is mostly kept by people is laying ducks.

For people who have cholesterol problems, blood clots, and heart disease, the salted egg should not be consumed excessively since it has the high content of cholesterol content. Cholesterol contained by duck egg yolk of Ptilah is 239.81 mg/dl [2]. Salted egg cholesterol level can be lowered by implementing 2 parts of the salting process which can make the salted egg cholesterol level becomes 89.30 mg/dl [3]. In addition to lowering its cholesterol is to make the herbal salted egg.

Salted herb is a salty snack made from eggs. It is a source of vegetable protein which also has the effect of herbal for those who consume them. Research on salted egg with the effects of herbs by adding natural ingredients in the treatment process which has been done is by using onion skin [4], ginger and white turmeric extract [5], garlic oil which has antibacterial activity [6], gambier liquid waste [7],[8], and aloe vera [9].

Aloe vera has a function to increase the thyroid function and autoimmunity[10], extend the shelf life of chicken nuggets stored in the refrigerator [11], antifungal and anti-ochratoxigenic activities
[12], diabetic ulcers [13], antibacterial and ant biofilm potential [14], immunomodulatory, gastroprotective, hypoglycemic anticancer, anti-inflammatory properties, as well as wound and burn healing [15]. This main function of Aloe vera is affected by the compounds of acemannan, aloin, saponins, enzymes, amino acids, carbohydrates, vitamins, minerals which will affect the salting process of salted eggs produced.

The heating process or blanching solution of aloe vera was done in the temperature of 80˚C. On the other hand, the salted egg making without the heating process was done through a process of salted herbal aloe vera diffusion through the shell pores. The specific objective of this research is to produce salted egg with herbal quality and preferably through the utilization of aloe vera and concentration different blanching in salted egg salting.

2. Research methods
This study uses duck egg from Tegal (Anas javanica) with bluish green colored egg shells, aged up to 48 hours as many as 72 items weighing 65-70 grams obtained from duck breeders in Piai. Meanwhile, the aloe vera was obtained from Koto Parak yard, Pauh District, Padang, Indonesia. The other materials are husk ash, salt, and water. The adjuvant for the analysis is distilled cholesterol kit. In addition, the equipment used was an analytical scale and spectrophotometers.

The method used was an experimental method using a factorial randomized block design. If the result of the variance is influential then further test of Duncan's is conducted by using pattern of 2x3 for 3 replications factor A (without blanching and with blanching) and factor B concentration of aloe vera (2, 8, and 14%) was observed at day 5 on moisture, ash, salinity, pH and salted egg yolk and white, total solid, total cholesterol content and bacterial colonies.

3. Results and discussion

Table 1. Total mean of bacterial colony physicochemical and raw salted egg salting for 5 days.

| Parameter Observed          | Treatment                  |
|-----------------------------|----------------------------|
|                             | Without Blanching (A1)     | Blanching (A2)                |
|                             | 2% (B1) 8% (B2) 14% (B3)  | 2% (B1) 8% (B2) 14% (B3)     |
| Moisture content (%)        | 62.11 63.72 57.14          | 62.60 60.83 55.89            |
| Ash content (%)             | 1.86 1.85 1.81             | 2.17 1.84 2.35               |
| NaCl content (%)            | 1.06<sup>c</sup> 1.47<sup>bc</sup> 1.11<sup>bc</sup> | 1.52<sup>b</sup> 1.52<sup>ab</sup> 1.53<sup>a</sup> |
| Yolk pH                     | 6.80<sup>a</sup> 6.61<sup>c</sup> 6.70<sup>b</sup> | 6.60<sup>c</sup> 6.80<sup>a</sup> 6.60<sup>c</sup> |
| Albumen pH                  | 6.91<sup>c</sup> 8.33<sup>b</sup> 6.81<sup>c</sup> | 8.79<sup>a</sup> 8.40<sup>b</sup> 8.41<sup>b</sup> |
| Cholesterol content (mg/dl) | 80.27<sup>cd</sup> 84.77<sup>bcd</sup> 128.00<sup>abc</sup> | 135.37<sup>b</sup> 148.47<sup>a</sup> 56.13<sup>d</sup> |
| Total solids                | 38.70 38.28 48.18          | 38.98 40.92 46.51            |
| Total plate count (x10<sup>2</sup>CFU/g) | 2.67<sup>a</sup> 1.33<sup>b</sup> 2.33<sup>ab</sup> | 2.00<sup>b</sup> 2.67<sup>a</sup> 3.33<sup>a</sup> |

Description: The average of the different small superscript indicates that the interaction is significantly different (P <0.05).

The analysis result of variance shows that the interaction between blanching and concentration of aloe vera shows a different solution of the levels of NaCl, pH yellow yolk and egg white, cholesterol levels and total bacterial colonies producing the raw salted eggs. The best treatment is A2B3 which are liquid aloe vera in blanching, the concentration of 14%, lowest moisture content, yolk pH, cholesterol, and highest ash content, NaCl content, Albumen pH, total solids, and total plate count (Table 1).

Along with the high concentration of aloe vera blanching solution, it lowers the water content, cholesterol, egg white pH and increases the ash content, total solids and total bacterial colonies. This is
caused by the fiber and enzymes contained in aloe vera. The fiber content of the aloe vera solution in the blanching will be perfectly deposited so that its concentration of 14% is optimized in its function as an adsorbent that absorbs water from the eggs and cholesterol in the yolk. Thus, the water content of the cholesterol is the lowest. In addition, the diffusion process of mineral and NaCl in the salting solution is also not disturbed because the fibers are sediment so that the ash and NaCl are highest for the salted egg which is made through blanching process. Also, according to [16], aloe vera has anti-nutrition compounds; aloin and saponins which in the extraction for 60 minutes need to be heated in the temperature of 80°C. This anti-nutrition inhibits the substances and increases the antioxidant activity [16].

The treatment is effective in lowering cholesterol without blanching with a concentration of 2% ie A1B1 treatment. Along with increasing the concentration of the solution, using aloe vera also increases the blood cholesterol levels of salted eggs produced. It is affected by the content of enzyme in aloe vera solution which is still active (without blanching). The blanching process will inactivate the enzymes to work, avoids the degradation of the protein, improved the molecular weight of the protein and the color [17]. The process of adsorption of cholesterol in the treatment without blanching at the lowest concentration of 2%, with the increase in concentration will increase the enzyme activity that would interfere the absorption of cholesterol so that the cholesterol content increases.

Salted egg making without going through the blanching process produces lower salt levels than the making which uses the blanching process. It is also affected by the activity in the enzyme that inhibits the absorption of NaCl.

4. Conclusion
From the research conducted, it can be concluded that in order to get the herbal salted egg by using aloe vera, the best treatment is through salting process for 5 days using aloe vera solution at blanching and the concentration of 14%.

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