

# SALTED EGG INTERIOR QUALITY WITH STARFRUIT EXTRACT

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## Abstract

The purpose of the research were: 1) to determine the optimum time of the soaking salted egg with saturated salt solution, 2) to determine the quality of the interior from salted egg after stored for 15 days at room temperature. The research material were duck eggs as much as 36 grains. The experimental design is Completely Randomized Factorial Design  $2 \times 2 \times 3$ . If there are differences among treatments, there will be done Duncan's New Multiple Range Test 5 % and 1 %. Such treatments are BoG<sub>1</sub>: eggs without being washed with starfruit extracts and soaked in a saturated salt solution for 5 days; BoG<sub>2</sub>: eggs without washing with starfruit extracts and soaked in a saturated salt solution for 7 days; B<sub>1</sub>G<sub>1</sub>: egg extracts were washed with starfruit and soaked in a saturated salt solution for 5 days; B<sub>1</sub>G<sub>2</sub>: egg extracts were washed with starfruit and soaked in a saturated salt solution for 7 days. All salted eggs were stored at room temperature for 15 days. Variables observed included yolk index, albumen index and hough index. The results of the research were that the egg that was washed with starfruit extracts before soaked saturated salt solution, indicating very significant effect on yolk index, albumen index and hough index. Long immersion in saturated salt solution was also devined very significant effect on yolk index, albumen index and index hough. There is no interaction of the two treatments. Conclusion that the optimal soaking time the eggs in a saturated salt solution is 7 days. The Interior quality of salted egg with starfruit extracts after being stored for 15 days at room temperature, was best achieved by the treatment B<sub>1</sub>G<sub>2</sub> with yolk index value of 0.89; albumen index of 0.075 and hough index of 85.046.

**Keywords:** starfruit extract, saturated salt solution, the quality of the interior

## 1. Introduction

Eggs are one of the animal foods that contain high nutritional value. Duck eggs have a high nutrient content, especially protein that is equal to 12.8% - 13.4% (9). Egg protein contains essential amino acids that are complete enough. The content of other nutrients are fats, carbohydrates, vitamins and minerals. To keep the eggs stay in good quality or at least to reduce damage to the eggs, it can be done the preservation process. The principle of preserving eggs is to keep the contents of the egg from the evaporation and keep the contents of the eggs from outside air contamination. There are many methods of egg preservation, one of the easiest to do is salting eggs. The egg preservation principle is to keep the contents of the egg from the evaporation and keep the contents of the eggs become in contaminated by outside air. Salting egg will extend the shelf life as well as to diversify processed livestock products with basic ingredients of eggs. Salt is a preservative element that is hygroscopic and can inhibit egg damage caused by microorganisms. The

method for making salted eggs that were already widely known is the traditional method, which takes relatively long time ( $\pm 14-21$  days).

One effort to speed up the process of making salted egg is by washing the egg to a solution of acetic acid. Egg washing can also be done with acids other than vinegar, all kinds of acids can be used to lyse the cuticle on egg shells. The more concentrated acid solution used to be the faster process pelisses cuticles layer (10 and 4). Added by (11) that extracts of lemon juice can also be used as an egg wash to lyse the cuticle, as extracts of lemon contains citric acid. Salting eggs with egg washing method using lemon extract and immersion in a saturated salt solution takes only 6-7 days.

Starfruit is vegetable material that has organic ingredients that contain a wide variety of acids including formic acid, succinic acid, citric acid, tartaric acid (6). (1) also says that extracts starfruit contains citric acid.

This cuticle when exposed to acid, soon would lysis, so that the pores of the egg shell will open, allowing the entry of saline solution into the egg

become faster. Also added by (6), that starfruit besides containing citric acid and formic acid also contains tartaric acid and succinic acid.

This research was conducted with the purpose of: 1) to determine the optimal time in soaking with salt saturated solution after washing egg shells with starfruit extracts; 2) to determine the quality of the interior on the out come of salting after being stored for 15 days at room temperature

## 2. Research Methods

This research was conducted for 6 months, in the laboratory of the Agriculture Faculty University of Veteran Bangun Nusantara University of Sukoharjo, and laboratory of Agricultural Technology of SebelasMaret University.

The materials used in this study were: duck eggs age 0 day weighing between 60-70 grams, starfruit extract, and saturated salt solution. The experimental design used in this research was a completely randomized of factorial design, replicated as much as 3 replication and each replicate consisted of 3 eggs. The first factor is washing eggs with the starfruit extract, which consists of: 1) without being washed with starfruit extract; 2) The eggs was washed with starfruit extract. The second factor is the soaking time in a saturated salt solution, consisting of: 1) soaked in a saturated salt solution for 5 days; 2) soaked in a saturated salt solution for 7 days. Combination treatments are: BoG1: eggs without being washed with starfruit extract and soaked in a saturated salt solution for 5 days; BoG2: eggs without being washed with starfruit extract and soaked in a saturated salt solution for 7 days; B1G1: egg being washed with starfruit extract and soaked in a saturated salt solution for 5 days; B1G2: egg being washed with starfruit extract and soaked in a saturated salt solution for 7 days. Once soaked in saturated salt solution, drained eggs and stored at room temperature for 15 days.

Variables observed include: yolk index, albumin index and index hough. The data obtained were statistically analyzed by variances analysis of factorial design. If there is a difference between treatments, there would be done further test with a Duncan't multiple range test (5 dan 8).

## 3. Results and Discussion

### 3.1 Yolk Index of Salted Egg

Yolk index value of research results is shown in table 1. Based on Table 1, it is seen that the average of value of salted eggs yolk index is between

0,571-0,891. After conducted a statistical test, it was found that the treatment combination washing egg with starfruit extracts and different time of soaking gave a highly significant influence on the value of salted egg yolk index ( $P < 0.01$ ) but showed no interaction between the two of treatment. The test results of Duncan't Multiple Range Test indicate that salted eggs treated with extracts starfruit before soaked in saturated salt solution and stored for 15 days at room temperature, it has a value of the yolk index higher than eggs without being washed before. Likewise, soaking the eggs in a saturated salt solution for 7 days, the yolk index value is very significantly higher than those soaked for 5 days. Yolk index values of salted eggs highest reached by treatments B1G2 (0,891), followed by B1G1 (0,795), BoG2 (0,665) and the lowest BoG1 (0,571). This is because the salted egg which were washed with starfruit extract has a higher salt content so that undergo a process of gel formation in egg yolk is more powerful than salted egg without being washed before. Gel formation in egg yolk will cause the height of yolk increases while the diameter decreases, so the yolk index values high. (7) say, that the salt can cause occurrence denaturation and gel formation in the yolk. Added by (3), that the salted egg yolk index were which stored at room temperature for 1-22 days was 0,455 - 1,019.

Table 1. Value of Yolk Index of Salted Egg Starfruit with Different Soaking Time

Replication	Treatment			
	BoG1	BoG2	B1G1	B1G2
1	0,530	0,628	0,767	0,903
2	0,629	0,654	0,772	0,891
3	0,553	0,714	0,847	0,879
Average	0,571 d	0,665 c	0,795 b	0,891 a

Description: The different superscript in the same row and different column showed a highly different significant ( $P < 0.01$ )

### 3.2. Salted Egg Albumen Index

Albumen index value of research results from the salted egg of starfruit extract with different soaking time are listed in table 2. According to table 2, it is seen that the average value the albumen index of the salted eggs of starfruit extract is between 0,040-0,075. After conducted a statistical test, it was found that the treatment combina-

tion washing egg with starfruit extracts and time of soaking different gave a highly significant influence on the value of salted egg albumen index ( $P < 0.01$ ) but showed no interaction between the two of treatment.

Table 2. Value of Albumen Index of Salted Egg Starfruit with Different Soaking Time

Replica-tion	Treatment			
	BoG1	BoG2	BiG1	BiG2
1	0,044	0,060	0,066	0,077
2	0,039	0,059	0,060	0,073
3	0,037	0,050	0,066	0,076
Average	0,040 bc	0,056 ac	0,064 a	0,075 a

Description: The different superscript in the same row and different column showed a highly different significant ( $P < 0.01$ )

The test results of Duncan's multiple range indicated that washing salted eggs treated with extracts of starfruit before soaking in saturated salt solution and stored for 15 days at room temperature, has a value of the albumen index higher than eggs without washed before. Likewise, soaking the eggs in a saturated salt solution for 7 days, the albumen index value is very significantly higher than those soaked for 5 days. Albumen index values of salted eggs highest reached by treatments BiG2 (0.075), followed by BiG1 (0.064), BoG2 (0.065) and the lowest BoG1 (0.040). This is because the salted egg which were washed with starfruit extract has a higher salt content so that more resistant to attack by microorganisms that are likely to get into an egg that will lead to the break up of ovomucin in albumen so that albumen becomes dilute consequently lower the value of albumen index. According to (2), that salt causes plasmolysis and dehydration on the bacterial cell. Besides, it also can inhibit the action of proteolytic enzymes, and decreased the activity of water. Added by (3), that the albumen index of salted egg which stored at room temperature for 1-22 days is 0.094-0.201

### 3.3. Hough Index

Hough index value of research results from the salted egg of starfruit extract with different soaking time are listed in table 3. According to table 3, it is seen that the average value the hough index of the salted eggs of starfruit extract is between 69,073 – 85,046. After conducted a statistical test, it was found that the treatment combination washing egg with starfruit extracts and dif-

ferent time of soaking gave a highly significant influence on the value of salted egg on hough index ( $P < 0.01$ ) but showed no interaction between the two of treatment.

Table 3. Value of Hough Index of Salted Egg Starfruit with Different Soaking Time

Replica-tion	Treatment			
	BoG1	BoG2	BiG1	BiG2
1	70,250	75,565	80,100	85,212
2	69,755	73,620	79,525	84,907
3	69,105	72,530	81,000	85,015
Average	69,703d	73,905c	80,208b	85,046 a

Description: The different superscript in the same row and different column showed a highly different significant ( $P < 0.01$ )

The test results of multiple range Duncan's indicate that salted eggs washing treated with extracts of starfruit before soaked in saturated salt solution and stored for 15 days at room temperature, has a value of the hough index higher than eggs without washed before. Likewise, soaking the eggs in a saturated salt solution for 7 days, the hough index value is very significantly higher than those soaked for 5 days. Hough index values of salted eggs highest reached by treatments BiG2 (85.046), followed by BiG1 (80.208), BoG2 (73.905) and the lowest BoG1 (69.703). This is because the salted egg which were washed with starfruit extract has a higher salt content so that salt as preservative can prevent the entry of microorganisms many more on the salted egg which washed with starfruit extract before soaking compared with salted eggs that do not get such treatment. As a result, changes in the contents of the egg, including CO<sub>2</sub> and water evaporation during storage occurs more slowly, so it can maintain the value of the index hough. (10), said that the decline in the index hough caused by the evaporation of the CO<sub>2</sub> content of the egg, so the egg white ovomucin consequently broke into a dilute aqueous viscous. Added by (3), that the salted egg hough index were stored at room temperature for 1-22 days is 69.54 to 86.40

### 4. Conclusions and Recommendations

The conclusions as the result of this research were: the optimum time of soaking eggs in a saturated salt solution to obtain salted egg extracts starfruit is for 7 days. Quality of the interior of-

salted egg extracts starfruit after being stored for 15 days at room temperature, which is best reached by treatment with the B1G2 that yolk index value of 0.891; albumen index of 0.075 and hough index of 85.046.

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