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# Study in Agroindustry of Salted Egg: Length of Salting Process and Marketing Reach Aspects

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## Abstract

Homemade salted egg production leading to one of agro-industry products has been identified as profitable, yet processing technology of salting needs to be improved. The objective of the study was to analyze the length of salting application of salted eggs, marketing reach, and association between the lengths of salting application with marketing reach. Forty respondents determined by purposive random sampling was carried out on agro-industry center of salted eggs in Brebes, Central Java. The primary data (length of salting and marketing reach) were collected by interview using questionnaire and observation. The levels of NaCl of salted eggs were measured by Argentometri Mohr method. The secondary data were collected by recording relevant documents. Data of length of salting and marketing reach were analyzed descriptively. Relationship between the length of salting and the marketing reach of salted eggs were analyzed using contingency tables with the $X^2$ test. The result showed that all respondents applied length of salting with time duration of salting varied from 12 to 30 days, during which period 52.5% respondents did the salting in >14-18 days. The salinity was still relatively higher than that of recommended by the Indonesian Industry Standard (SNI), which is 2.0%. The respondents also functioned as marketing components; such as consumers, retailers-consumers, and collectors - retailers - consumers with the percentage of 52.5, 35, and 12.5%, respectively. As conclusion, the length of salting technology application might influenced marketing reach and the length of salting technology application mostly could only reach the short marketing.

## Introduction

One of agro-industry products widely recognized by the people of Indonesia is salted egg from Brebes, one of the centers of salted egg production in Indonesia. Brebes is a regency in Central Java Province that is strategically located in between Central Java and West Java provinces in term of main access transportation. As its geographical advantages supports the development of agro-industry of salted egg, the economic development in Brebes has been improving ever since. In 2018, the production of salted egg in Brebes Regency was 6,630,165 eggs with the value of IDR. 7,735,193,000. However, the technology applied on processing salted egg, particularly duck eggs, is considered traditional, while salted egg agro-industry is developing leading to market demanding specific and particular quality of salted egg.

In urban areas, processing industries play an important role in alleviating poverty (Sumekar et al., 2016) and the key factor affecting technical efficiency is socioeconomic, such as farm size and management practice (Wongvilairat, 2007; Chang and Villano, 2008; Andrabe and Anneberg, 2014). Previously, Lanfranchi and Giannetto (2014) stated that business characteristics, such as production scale, local economy, local products, distribution channel, and marketing are the factors determining the feasibility of the market organization. Meanwhile, Achoja et al. (2006) indicated that the farmer's external factors influence marketing of duck products, as distance between supply centers and sales (-0.74) and transport (-0.98) are negatively affect marketing efficiency of poultry feed. The price and poor condition of roads (market access) are the major problems affecting the marketing efficiency of poultry feed, and marketing of poultry feed is dominated by retailers (70%) and brokers (30%).

Furthermore, Helfand and Levine (2004) argued that access to industry, markets, and input are the crucial factors related to efficiency of agricultural business. The motivation of farmers, in relation with stakeholders, increases their bargaining position (Sulaksana, 2011). The empowerment of duck farmer group members in Brebes Regency is low, particularly in their technological access and the abilities (Sumekar *et al.*, 2013; Taubadel and Saldea, 2014).

Given this situation, the aim of the research was to study the association between marketing reach and the application of length of salting technology in the agro-industry of salted egg so that the applicability of technology to reach the broadness of marketing could be identified.

**Materials and Methods**

This research was conducted from June 2018 to November 2019. As much as 52 active agro-industries of salted eggs having PIRT (Home Industry License) located in 12 sub-districts out of 17 sub-districts in Brebes Regency was applied in this research. The samples, 40 industries determined by purposive random sampling, were sub-districts with the most number of salted egg agro-industries (sub-districts of Brebes, Bulakamba, and Warnasari). The respondents were the owners of the agro-industry of salted eggs selected as the samples. The laboratory measurement was conducted in Central Laboratory for Research and Services Diponegoro University (CORESDU).

Measurement for NaCl Levels

Levels of NaCl of salted eggs were measured by Argentometri Mohr Method (Underwood and Day, 1992).

Data Collection and Analysis

The primary data (marketing distribution of salted eggs and length of salting) were collected by interview using questionnaire and observation. The secondary data were collected by recording relevant documents. Data of marketing distribution of salted eggs and length of salting were analyzed descriptively. The relationship between marketing distribution of salted eggs and length of salting was analyzed using contingency tables with the $X^2$ test (Steel and Torrie, 1980). The statistically hypothetical tests were: $H_0$ represents there is no association between the application of technology and marketing reach. $H_1$ indicates there is an association between the application of technology and marketing reach.

**Results and Discussion**

General Condition of Salted Egg Agro-Industry

Family-managed industries of salted eggs in Brebes Regency has existed for generations. They belonged to small scale business, had only small piece of land surrounding their house, started business with their own capital, and had got less attention from local government either in the form of business training or business counseling. As a result, the production cycle was long or even uncertainty, the standard quality varied, and the prices were also diverse. Meanwhile, external factors influencing the productions of salted eggs were the fluctuated price of raw materials, long chain market, and public perception of excessive danger of salt intake. Among reasons people buy salted egg from Brebes was its specifications. The salted egg from Brebes was considered unique, such as its bright orange yolk. (Sumekar *et al.*, 2013) and a variety of breeding patterns producing different appearance of raw egg materials (Roessali et al., 2012).

Table 1. Salting technology in the agro-industry of salted eggs

| Type of Technology | Number of Respondent | |
| --- | --- | --- |
| | n | % |
| Salting Materials | | |
| soil, ash, salt, water | 22 | 55.00 |
| red brick, soil, salt, water | 6 | 15.00 |
| ash, salt, water | 12 | 30.00 |
| Length of Salting (day) | | |
| ≤ 14 | 13 | 32.50 |
| >14 – 18 | 21 | 52.50 |
| >18 | 6 | 15.00 |

Table 2. NaCl content in salted eggs

| Egg Component | NaCl Content (%) |
| --- | --- |
| Egg White | 3.86 |
| Egg Yolk | 2.31 |

Note: data represents mean±standard deviation from 40 industries in Brebes in two times repetition

Table 3. The number of respondents by marketing reach of salted eggs

| Marketing Reach | Number of Respondent | |
| --- | --- | --- |
| | n | % |
| Consumers | 21 | 52.50 |
| Retailers-Consumers | 14 | 35.00 |
| Collectors- Retailers-Consumers | 5 | 12.50 |

The Application of Technology on the Agro-Industry

Table 1 shows that respondents apply different type of technology in producing salted egg. The combination of soil, ash, salt, and water with the length of salting between 14 and 16 days was applied by 55 and 52.5% respondents, respectively. The rest of the respondents apply different composition of salting materials and duration. Meanwhile, the salting process was conducted manually, and the total production of the salted egg was in between 5,000 and 11,000 eggs per week. This indicated that the agro-industry of salted egg in Brebes Regency was still relatively small and traditional.

The used of different salting material and composition as well as its duration suggested that the applied technology of salting egg varied and unique (Sumekar *et al.*, 2017). The used of ash and brick might relate to the fact that there were 202 brick industries that used rice husk and rice straw as burning material producing ash (Brebes Regency in Statistics, 2018).

In term of the duration of salting, Lesmayati and Rohaeni (2014) identified that within 15 to 20 days the smell and color of salted egg produced are preferred by consumers. Previously, Surainiwati *et al.* (2013) found that keeping the salted egg for more than 10 days

caused the egg white salty and the egg yolk color brownish; the more brownish the yolk color, the more oil is produced.

The Quality of Salted Egg

The quality of salted egg was measured by assessing the salinity of egg white and yolk. The average quality of salted egg is shown in Table 2 which shows that the salinity (or the level of NaCl) of both egg white and egg yolk was 3.855 and 2.313%, while the standard salinity according to Indonesian Industry Standard (SNI) is 2.0%. the T-test at a single population showed that the salinity of egg white and yolk was higher that of SNI standard (p>0.01).

According to Surainiwati et al. (2013) and Nurliyani et al. (2015), being storage in more than 10 days, the salinity of egg white and yolk increases. The salt content of egg white at 21 days' storage is higher than that of 0 and 7 days of storage (Nurliyani et al., 2015). Previously, Kaewmanee et al. (2009) found that protein and lipid content slightly increase in both interior (viscous portion) and exterior (hardened portion) of the egg yolk following the increased salting time.

Salted Egg Marketing

Table 3 shows that 52.5% respondents directly marketed their salted egg to the consumers, 35% respondents marketed their production to retailers – consumers, and 12.5% had a market chain as collectors – retailers – consumers.

Although Brebes Regency was known as the center of salted egg industry in Central Java, the location of the producers spread out throughout many sub-districts, but closed to the duck farm centers. As they belonged to small scale business, it was presumably that the market expansion was not needed. However, retailers benefit less from buying group scale when the group is more heterogeneous in terms of member size and when it extends its scope across too many markets (Geyskens et al., 2015).

The Association of Length of Salting and Marketing

The association of marketing reach with the application of technology is shown in Table 4. Although marketing and technology application are associated, the agro-industry of salted eggs still applied the technology only for a limited market or the technology was only for short-reach marketing. It is suspected that the agro-industry was still relatively small with the salted egg production which was relatively small of no more than 2000 eggs per day.

This finding is in line with the opinion of previous researcher (Sumekar et al., 2013) that traditional behavior traditional influences the application of technology related to business risk. The salted egg by traditional roasting was recommended for processing method with shelf life for 7 days at room temperature. (Nurliyani et al., 2015). Staphylococcus aureus dan Clostridium perfringens growth in line with length time of salted egg sales (Wongvilairat, 2007).

Conclusion

The salting process with > 14-18 days was applied by most respondents. The salinity of salted egg was still higher than the SNI standard. The length of salting processing might influenced marketing reach and the length of salting mostly could only reach the short marketing.

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