Defining Risk Assessment Severity Level of Geographical Indication Product Salak Pondoh (*Sallaca edulis cv Reinw)* Sleman

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Abstract

Assessing severity level of agricultural products, including those with geographical indication (GI), is important to properly maintain their quality level. This study aimed to identify risk types of GI products and define their severity levels. The identification of risk types and definition of severity levels of GI products had been done on *Salak Pondoh* Sleman, which has been certified since 2014. These two objectives had been achieved through two approaches: (1) the use of international/ national quality standards of horticultural products; and (2) in-depth interview with each business actor at all tier of the product's supply chain. The results are discussed in the paper.

Keywords: geographical indication, risk assessment, Salak Pondoh Sleman, severity level

1. INTRODUCTION

Geographical Indications certification for *salak pondoh Sleman* is a form of legal protection for excellent commodity that unauthorized parties are not allowed to use geographical indications if such use is likely to deceive the consumer society of the region of origin of the product. Geographical indications can be used to give added value in the commercialization of products and for social purposes (Conneely and Mahon, 2015). *Salak Pondoh Sleman* certified as a geographical indication products since 2014, with a specificity that is reflected from the sweetness of the fruit is still unripe and crunchy texture (HAKI and RGI Book, 2015).

In line with Teuber (2011), the growing consumer interest in product attributes such as origin, sustainability, traceability and authenticity has fuelled the demand for regional foods, regional specialties, regional differences in climate, varieties, and local production techniques. According to Conneely and Mahon (2015), protected geographical indication scheme's is essential to promote opportunities that link specific localities and regions to high quality food and food production, and through this to enable those places to create and retain value-added from that product or process.

Sleman district is the largest production region for *salak pondoh* in Indonesia with production dominated by reaching 662 321 quintals, up about 34.13 percent over the previous year as many as 493 764 quintals in 2013. The district Most of fruits are cultivated in Turi, Pakem and Cangkringan produced 97, 23 percent of the total production of Sleman (BPS Sleman, 2014). There are another areas of *salak* cultivation in Indonesia, such as Banjarnegara and Magelang, Central Java. *Salak pondoh* can be planted and harvested throughout the year (RGI Book, 2015). Unstandardized postharvest handling and poor distribution caused damage and also inauthentic cases which occur due to low performance good agricultural practices, good handling practices, and good manufacturing practices.

Defining the risk assessment of *salak pondoh*, as a geographical indication products, required precise quality control and standardization for compliance with the rules and peculiarities. Measuring their risk for damage plays important role to identify the supply chain disruptions caused by the activities of distribution and handling due to low facilities

and infrastructure level. Defining risk measurement *salak pondoh* focused on reducing the potential for losses and damage. Risk analysis was conducted by using the information available from the agricultural harvest bark and distributor and systematically to determine the interaction between the *salak* and the environmental impact of postharvest. Quality standard for *salak pondoh* in Indonesia refers to the SNI No.01-3167-1992, while the quality standards at the ASEAN level serves to provide special provisions for each class and the tolerances allowed, fruits must be:

- Whole, undamaged
- Shows the varietal characteristics company
- Free from rot or damage that may make it unfit for human consumption
- Clean
- Practically free from visible foreign matter;
- Practically free of mechanical damage and / or physiological;
- Practically free of pests and damage caused by them affecting the general appearance of the produce
- Free of abnormal external moisture, excluding condensation followin g removal from cold storage; and
- Free from foreign smell and / or taste. (ASEAN Stan 19: 2010).

After harvesting, most of the damage due to the distribution inappropriate packaging, can be reduced by using cushions to give more protection for fruits. Bamboo basket with a capacity of 25-40 kg is the most common bulk packaging to transport the fruits of the harvest to exporters or processing units. Regulatory structures are easily deformed due to inappropriate facilities and infrastructures. A lot of bruised fruit in the lives of fellow fruit collisions and excessive charges. Quality standards including packaging is still intact in bunches placed in the center and surroundings are placed grain leather that has been separated from the bunch.

2. METHODOLOGY

Discussion and depth interview were conducted with the Association of *Salak Pondoh* Sleman well as the management of the Community Protection of Geographical Indications *Salak Pondoh* Sleman (KPIG SPS), chairman of group of Farmers, individual farmer, collectors, traders, suppliers, retailers, and in supermarket level. Identification of the types of risks and defining the severity implemented using two approaches, namely (1) the quality standards of horticultural products internationally or nationally, and (2) in-depth interviews (in-depth interviews) on every business in every tier entire supply chain. The steps for this study were conducted by

- interviewing all the potential causes and the extent of damage and the risk
- determining inauthenticity that may arise at each stage and possible causes.
- determining the categories of damage and inauthenticity.
- analyzing the relationship between damage and inauthentic and causes (based on the GAP, SOP and GMP during processes).
- analyzing the possibility of damage and inauthentic as well as the severity of the condition that occurred
- identifying whether a potential significant damage and inauthentic or not.

Stakeholders should be understand in supply chain interdependencies, identifying potential risk factors, their likelihood, consequences and severities. Defining risk assessment is essential to preferably avoid the identified risks, or if not possible, at least mitigate, contain and control the product (Tummala and Schoenherr, 2011). In order to determine the extent of mechanical damage on *salak* fruits, three main operations were considered, namely, a) picking, b) packing and, c) delivery to the market. Samples of fruits were collected after completion of each operation and delivered to a laboratory with care to prevent fruits from further damage.

3. RESULTS AND DISCUSSION
3.1. Determining grading system for severity

Tracing and tracking *salak pondoh* as a geographical indication products became the main activity in defining the severity level and inauthenticity. Several factors that are inappropriate carried out based on the findings for distribution and verified by experts at all levels (Table 1). Qualitative measurements carried out by observing and measuring damage to the area and also the mechanical properties of fruits. The mechanical properties of fruit showed that their ability to withstand without

damage and deterioration. Evaluation of the recommended handling practices to reduce the adverse effects of shock and vibration as the interaction mode of transport conditions, packaging, and roads as well as the settings in the package.

Table 1. Grading system with considered value for severity.

Grade	Value	Description
Very low	1	Diameter or length of physical and mechanical damage 0-10 mm, inauthentic percentage 0-1%
Low	2	Diameter or length of physical and mechanical damage 10.1-15 mm, inauthentic percentage 1-5%
Medium	3	Diameter or length of physical and mechanical damage 15.1-20 mm, inauthentic percentage 5-10%
High	4	Diameter or length of physical and mechanical damage 20.1-25 mm, inauthentic percentage 10-15%
Very high	5	Diameter or length of physical and mechanical damage $\geq$25 mm, inauthentic percentage >15%

Condition and types of damage were found during the distribution chain and the handling of potentially cause bruising, hardness and darken color of the fruit after peeling was measured and discussed for subsequent use as a basic for determining the severity. Most of them occur due to inappropriate arrangements or patterns of fruit in the package, the absence of protective material (cushion), and the impact between the fruit and packaging.

3.2. Determining grading system for inauthenticity

Inauthentic assessments were conducted by experts in each tire of the chain through discussion and depth interview with the stakeholder of each tier salak pondoh supply chain. Inauthentic was determined by identifying inauthenticity or non IG fruit but stated as *salak pondoh* Sleman which sell in each tier and market/retailer. Observation was conducted to track and trace them from IG farmer or group of IG Farmers with likelihood views of frequencies actions. Determining the level of authenticity 1 until 5 was a bit of a 'subjective' based on assessment to respondents (Table 2).

Table 2. Grading system with considered value for authenticity

Grade	Value	Description
Very rarely	1	never happened in a span >1 year
Rarely	2	never happened in a span >6 months
Medium	3	never happened in a span 3 months
High	4	never happened in a span 1 month
Very high	5	occurs at least once in 1 week

Based on observation, inauthenticity identified through the use of experts credibility, comparing the attributes attached to products that are authenticated with a standard product, the use of documents issued by the competent authority.

3.3. Determining damage during distribution

Table 3. Types of damage and its percentage during distribution

Stake holder	Number of damage per package	Type of damage and non conformity
Farmer	3 – 4.5%	Size and shape are not uniform, rupture, cut, broken rind, overripe
Group of farmers	5 – 6%	cut, rupture, broken rind, bruise, rotten
Small collector / association	3 – 4%	Rupture, broken rinds, bruise, rotten
Big collector/association	3 – 5%	rupture, broken rind, bruise, rotten
Exporters	± 4%	rupture, broken rind, bruise, rotten
Big suppliers	-	-
Retailers	8 – 10%	rupture, broken rind, bruise, rotten
Domestic consumer	5 %	rupture, broken rind, bruise, rotten
Overseas consumer	-	-

Some suppliers mixed different maturity,

dimension, and size in the same packaging which sometimes over capacity. Based on the table 3, losses of salak were caused due to high mechanical damage during harvest and fruit diseases before harvest. At the level of traders because sorting activity is done visually, so often mixed among pieces of good quality with low quality fruit, as well as packaging that exceeds the capacity.

Tabel 4. Risk mapping for severity level in distribution system of *salak pondoh Sleman*

Severity score	Likelihood				
	1	2	3	4	5
5					
4		RR 3			RR 1
3			RR 17	RR 4	
2		RR 7, RR 9		RR 2, RR 6, RR 8	
1	RR 5, RR 10, RR 12, RR 13, RR 14, RR 15, RR 16, RR 18				RR 11

RR 1 = Land clearing; RR 2 = Plant nursery; RR 3 = Plant maintenance; RR 4 = Salak Postharvesting; RR 5 = Sorting at the farmers level; RR 6 = Transporting to group of farmers; RR 7 = Sorting at the farmer groups level; RR 8 = Transporting to the processing unit; RR 9 = Material handling; RR 10 = Weighing; RR 11 = Cleaning; RR 12 = Sorting at the processing unit level; RR 13 = Weighing; RR 14 = Packing; RR 15 = Labelling; RR 16 = Packing; RR 17 = Transporting to retailer; RR 18 = Sorting at retailer level; RR 19 = Storing at the retailer level

Color area information:

	Acceptable
	Supplementary Issue
	Issue
	Unacceptable

Land clearing and cleaning processes caused more damage to the fruits then prone to decay.

Tabel 5. Risk mapping for inauthenticity level in distribution system of *salak pondoh Sleman*

Inauthen-tic score	Likelihood				
	1	2	3	4	5
5					
4					
3				RO 5	
2				RO 7	
1	RO 1, RO 2, RO 3, RO 4, RO 6, RO 9, RO 10, RO 11, RO 12, RO 13, RO 14, RO 15, RO 16, RO 17, RO 18, RO 19	RO 8			

RO 1 = Land clearing; RO 2 = plant nursery; RO 3 = Plant maintenance; RO 4 = Salak Postharvesting; RO 5 = Sorting at the farmers level; RO 6 = Transporting to group of farmers; RO 7 = Sorting at the farmer groups level; RO 8 = Transporting to the processing unit; RO 9 = Material handling; RO 10 = Weighing; RO 11 = Cleaning; RO 12 = Sorting at the processing unit level; RO 13 = Weighing; RO 14 = Packing; RO 15 = Labelling; RO 16 = Packing; RO 17 = Transporting to retailer; RO 18 = Sorting at retailer level; RO 19 = Storing at the retailer level

Sorting at the farmers level was the highes for potential forgery and inauthenticity. The percentage of inauthenticity level is rarely find and tolerable for domestic market.

CONCLUSSION

To maintain Superior Quality possessed of the geographical indication products start by analyzing the activity on each tier in the supply chain of *salak pondoh* Sleman. The development in technology, including postharvest technology, have been able to maintain the quality of existing food products, so that managerial and system approach can optimize the maintenances of the quality of the product to the hands of consumers. Identify risk types of GI products by using international and national quality standards of horticultural products. Severity level of *salak pondoh* can be defined by the skin areas where damage were occurred. Inspection and evaluation of postharvest handling and increase the ability of farmers harvesting, sorting, and documentation
of geographical indications for products highly recommended for the improvement and evaluation.

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