The Opportunity of Lemongrass, Zinger and Turmeric Supported Development of Export Products in North of Sumatera, Indonesia

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Abstract. Indonesia has abundant spices are used for cooking. lemongrass, ginger, and turmeric are the most widely used plants as spices in cooking which serve to enhance taste and preservative of food. In the North of Sumatra, UD. Ryori Indonesia and Mitra Tani, both of Small Medium Enterprises (SME’s) as a partner of Universitas Sumatera Utara produces spices and vegetables especially, lemongrass, ginger, turmeric, celery, onion, garlic, and instant dried spices which are exported to Malaysia, Brunei Darussalam, Philippines and Singapore. This export funded by export-import grant of Ministry of Research, Technology, Directorate General of Higher Education Indonesia activity was carried out for 6 months (January to June 2018) through Belawan harbor, North of Sumatera with the highest export amount of lemongrass (7,305.80 kg), followed by ginger (7,297.63 kg), and turmeric (6,372.63 kg). The identified problems of import-export activities of dry seasoning from North of Sumatra are the availability of limited and fluctuating sources of raw materials (quantity, quality and price); production process using simple technology; as well as the distribution of marketing and business management is still conventional. The solutions offered to SME’s partners are intensification of planting land of lemongrass, ginger and turmeric; compile the design and production of citric slicing machine, make Standard Operational Procedure (SOP) in accordance with the machine to be held; and design packaging that can maintain product quality. The seasoning of exports has met the standard of product that is produced: organoleptic standard (color, aromatic, texture and taste); chemical standards (moisture content = 7-8%); and free of microbiology (coliform and salmonella microorganisms) with supervision. this contribution is expected to encourage the development of horticultural agribusiness, particularly competitive spice dry season and increase the income of farmers and entrepreneurs in North of Sumatra.

1. Introduction
The basic ingredients in making spices are spices. Spices can come from several parts of plants such as roots, tubers, bark, seeds, fruit flesh, and flower buds. Spices contain essential oils that are high enough so that they are very aromatic and as a component of forming a specific flavor on the spices. In addition,
the advantage possessed by spices is as a food preservative, has therapeutic properties and stimulates the release of enzymes that facilitate digestion [1]. Cooking spices are a combination of spices and basic herbs such as garlic, onion and salt added to food ingredients before serving. The use of spices can increase the level of consumer acceptance because seasoning can improve the natural taste of food, so the spices that are mixed into the cuisine will have an appetizing effect and give its own characteristics to the cuisine [2].

Indonesia has abundant spices. Generally spices are used as a spice in cooking. For the addition of spices, it serves to improve the taste and preservative of food. The resulting flavor can be a pleasant aroma and taste. Another term spice is also known as seasoning. Seasoning is often found in powder form. The advantage of the powder form is that it has a high economic value because it makes it easy to package and transport [3], but the problem that is usually found in powdered products is clotting which causes solubility, increased fat oxidation, enzyme activity, loss of taste and crispiness, and organoleptic decline and shelf life [4]. The quality standards of spices or powder according to SNI 01-3709-1995 are determined by smell, taste, moisture content, ash content, smoothness, metal contamination, arsenic contamination, and microbial contamination.

Lemongrass is a plant that enters the grass family. Also known as lemongrass (Indonesia, especially in the Sundanese). This plant is known as Lemongrass because it has a strong odor like lemon, often found to grow naturally in tropical countries [5]. The composition of lemongrass oil consists of several components, which include alcohol, hydrocarbons, esters, aldehydes, ketones, oxides, lactones, terpenes and so on. The main components of lemongrass oil consist of Sitronelal (antioxidants) 32–45%, Geranioil (antioxidants) 12-18%, Sitronellol 12-15%, Geranioil acetate 3-8%, Cytronellyl acetate 2 - 4 L-Limonene, 2-5 Elemol, and Seskwiterpene other 2-5%, and Elemene & Cadinen 2 – 5%[6].

According to Ref. [7] the moisture content of lemongrass stems is 76.78%, ash content is 0.79%, and the content 0.25% essential oil. Vitamin A ranges from 0.1 IU/100 g, vitamin B ranges from 0.8 mg and vitamin C is around 4 mg. Also provides important minerals such as potassium, calcium, magnesium, phosphorus, manganese, copper, zinc and iron needed for healthy body function. Lemongrass does not contain in harmful cholesterol or fat. The benefits of lemongrass especially on dried stems and leaves are used for cooking spices, perfume, herbal ingredients, and also made essential oils. The chemical content of lemongrass is more in the stems and leaves. How to find essential oils of lemongrass which can be done by means of smoothed stems and leaves, then mixed with solvents and produce essential oils containing citronella and geranioil compounds [8].

Lemongrass stems can be more than 30 cm long. Lemongrass stems can be used as urine laxative, sweat laxative, sputum laxative or cough medicine, mouthwash, body warmer, indigestion, abdominal pain, colds, anti-fever, prevention of vomiting, and others. Lemongrass has lemongrass which makes lemongrass has a distinctive aroma with a slightly spicy taste [9]. Other ingredients contained in lemongrass are essential oils. Based on the research conducted, the content of essential oil contained in lemongrass is 0.25%. The test results of volatile oil content that was carried out on lemongrass powder drink were 0.1%. According to Ref. [10], lemongrass has a fairly sharp aroma because lemongrass contains essential oils with its main components citronella and geranioil. The cheap price of lemongrass and rarely used to make this plant seems useless.

The characteristic lemongrass aroma can be used as a product that attracts consumers' attention. The use of lemongrass into a new product is important as food diversification. Lemongrass has antimicrobial substances. The content is especially useful in treating the Universitas Sumatera Utara with 7 infections in the stomach, intestines, urinary tract, and wounds. Lately lemongrass is also widely believed to cure various around the digestive tract such as abdominal pain, colds, reducing gas in the intestine, infection of the digestive tract and also diarrhea, antimicrobial substances can reduce bad microbes in the body and repair damaged digestive cells. Infection of the urinary tract is usually caused by bacteria or other bad microbes, antimicrobial substances in lemongrass can overcome them. Antimicrobials are biological or chemical compounds that can interfere with the growth and activity of microbes, especially destructive and spoilage microbes [11,12].

Lemongrass can also help increase or facilitate urination so that it can help the performance of the pancreas, kidneys and bladder [11,13]. Ginger Ginger is one of the agricultural commodities in the form of herbs that have high social and economic value, very important in everyday life, especially in...
the health sector. Ginger products have become one of the export commodities even included in the top nine spices traded in the world. Many people in Indonesia use ginger not only for kitchen spices but also as drinks such as ginger [14, 15].

Chemical composition of fresh ginger in 100 g of ingredients of component unit of amount of Carbohydrates: 10.1 g; Water: 86.2 g; Calories: 51.0 cal; Calcium 21.0 mg; Phosphorus 39.0 mg; Vitamin C: 5.0 mg; Iron 1.6 mg; Vitamin B 0.2 mg; Protein 1.5 g; Fat 1.0 g [16].

According to [11], the ginger contains various antioxidant compounds, namely zingiberol 28.93%, zingerol 33.23%, and zingeren 36.75%. Ginger also contains sodium 0.03%, potassium 1.4%, vitamin B1 0.05 mg/100 g, vitamin B2 0.13 mg/100 g, niacin 1.9% and vitamin C 12 mg/100g. Ginger has long been used as a kitchen spice. The distinctive aroma and taste causes the use of ginger for kitchen spices to be more popular in the community. This can be seen from the many requests for ginger as a kitchen spice that reaches 30,000 tons per year (only for the domestic market). These needs are ranked first compared to turmeric, galingale, and galangal which are also often used as kitchen spices [11,17].

The use of ginger as a traditional medicine has long been done by people. Fresh ginger can be used directly as a medicine. Sucked ginger slices can expose the throat. In addition to efficacious to ward off wind attacks and warm the body, this herb also activates blood circulation in the body. Ginger can also be made in the pharmacology drug industry such as perfume, anti-vomiting, anti-microbial, laxative sweat, and stimulate the release of gastric sap and bile latex [11,18].

Instant seasoning is a mixture of various spices with a certain composition and can be used directly as a cooking spice for certain dishes. There are two types of instant herbs, namely dry and wet instant seasoning. Instant dry seasoning is powdered, while instant seasoning is wet. Instant spices derived from formulated spices can be used for daily household consumption or industry.

Various Farmer Empowerment Programs in order to improve the welfare of farmers have been carried out by the government, one of which is through an Export Product Development Program (PPPE) which is quite effective for accelerating the application and utilization of natural resources and technology and the use of various information technology tools in supporting the efforts of farmers' business development and a more profitable and sustainable family can be achieved. Various technology application activities are in accordance with the needs of farmers that have been determined through a series of analyzes of the potential of the commodity until the marketing chain is carried out to determine the development of a potential commodity [19,20]. The development of a commodity has enough comprehensive basis to continue, but its sustainability must pay attention to the support of local natural resources and be environmentally friendly [16,18]. North Sumatra, especially the city of Medan has considerable potential in the development of Horticultural processing technology, including types of herbs and vegetables. Annual production for Horticulture crops in North Sumatra is quite large, for seasonings and vegetables exceed 25 tons per month [21], such as: lemongrass, ginger and instant seasoning.

Ginger Ginger (Zingiber officinale (L.) Rosc.) Is a rhizome that is widely used in Indonesia. The benefits of ginger are as a medicine, a source of essential oils, as a flavoring agent, and as a spice used in flavoring. There are three types of ginger, namely: white ginger, ginger, and red ginger. According to research the nutritional value of dry ginger with 15% moisture content has a fat composition of 5.5-7.3 g, ash 2.5-5.7 g, iron 9.41 mg, calcium 104.2 mg, and phosphorus 204.75 mg. Ginger has several components such as gingerol, shagaol, and zingeron gives pharmacological and physiological effects such as antioxidant, anti-inflammatory, analgesic, anticarcinogenic, non-toxic and non-mutagenic even at high concentrations [22].

Lemongrass lemongrass has efficacy as sweat laxative, sputum diluent, and citronellol in it which are antiseptic [20,21]. The chemical content of citronella is 0.4% essential oil with components consisting of citral, citronellol (66-85%), α-pinene, kamfen, sabinen, miren, β-felanderan, p-simen, limonen, cis-osomes, terpopole, citronellall, borneol, terpinene-4-ol, α-terpineol, geraniol, farnesol, methyl heptenone [23].

2. Materials and Method
The activity was carried out in North Sumatra, in two partner SMEs, namely SME’S Farmers Partners in Helvetia, Marelan, Medan, North of Sumatra and SME’S D. Ryori Indonesia at Jalan Bajak II H,
Gang Kelapa Sawit No. 9 Medan, Amplas-Medan. The processing industry is located at Jalan Nusa Indah Kel. Tambak Rejo, Kayu Putih, Deli Serdang, and JL. Binjai, Km. 9, 7 No. 550-B, Lalong, Medan Sunggal, Paya Geli, Sunggal, Deli Serdang Regency, North Sumatra 20351, Indonesia. The choice of processing location is based on the proximity of the area to the source of raw materials, namely Berastagi. UD. Ryori Indonesia is engaged in the processing of agricultural products, especially horticulture from types of vegetables such as: celery leaves, leeks, carrots, cabbage, shallots, garlic, lemongrass, cinnamon, and so on. Activities in the form of direct practice in the field with about 10 farmers in two locations in February-April 2018. Other activities include literature studies to support the management of environmentally friendly vegetable foods. The main ingredients used are lemongrass, ginger and instant dry seasoning. Then the processing results in the application by farmers as their own consumption or processed by the company for export.

Mitra Tani is a business unit formed by several farmers located in Helvetia, Marelan, Medan, North of Sumatra, formed in 2010, chaired by 1 (one) person appointed directly by a member of the farmers, and tasked with active communication with UD. Ryori Indonesia about the production plan, so that members can plan planting, time and area of land to be planted. In addition to serving as a liaison to UD. Ryori Indonesia, the chairman is also responsible for harvesting and paying for crops that are cultivated by Mitra Tani members.

3. Results and Discussion

3.1. Raw Material

UD. Ryori Indonesia is an agricultural product, especially horticulture from the types of vegetables such as: celery leaves, leeks, carrots, cabbage, shallots, garlic, lemongrass, cinnamon, and so on. The company’s focus from the beginning was in the field of drying. The source of raw materials is farmers, one of whom is the partner of this activity, Mitra Tani. At first farmers planted corn and cassava, but because of the price, production and safety of the cultivated plants, it was not guaranteed that the farmers finally proposed to cooperate with UD. Ryori Indonesia as a partner for the procurement of raw materials and finished products needed. The distance from the industrial location to the highway, Tuntungan road is around 500 m, with rocky road conditions, but the road size is 4 m wide, so the transportation of raw materials and goods is very easy.

Prices of raw materials that are generally vegetable products and spices are not fixed, so the company takes policy by carrying out the production process when the price of raw materials is low. So far, most of these commodities have been sold in fresh form, while the potential for developing
processed products is quite large, especially when the harvest is abundant, the diversification of product processing is an alternative for improving the quality and value added of products [17].

As an effort to develop technology for processing spices and dried vegetables as well as to increase the effectiveness of technological innovations such as designing spice chopper machines [adopted by 24, 25], Universitas Sumatera Utara collaborates with Small and Medium Unit in technology assistance and facilitating and supporting activities carried out by partners, farmers and entrepreneurs. Business investment can be seen from table 1 below.

Table 1. Investment Calculation

| SME’S-1 | Investment x Rp.1000,- |
|----------|------------------------|
| UD. Ryori Indonesia | Amount | Total(Rp.) |
| 1. Land area | 594 m² (22 m x 27 m) | 297,000 |
| 2. Building | 276 m² (23 m x 12 m) | 96,600 |
| 3. Storage room | 72 m² (6 m x 12 m) | 25,200 |
| 4. Initial production room (sorting, washing and slicing / shrinking size) processes | 84 m² (7 x 12 m) | 29,400 |
| 5. The main production room (drying, grinding and packaging) | 96 m² (8 m x 12 m) | 33,600 |
| 6. Slicer machine | 2000 m² | 30,000 |
| 7. Packaging machines | 1 unit | 30,000 |
| 8. Oven | 500 m² | 3,000 |
| 9. Stove + LPG | 1 unit | 5,000 |
| 10. Car (Truck) | 1 unit | 75,000 |
| **Amount** | | **624,800** |

| SME’S-2 | Investment x Rp.1000,- |
|----------|------------------------|
| Mitra Tani | Amount | Total(Rp.) |
| 1. Land | 6 ha | 300,000 |
| 2. Plant seed (16 species) @Rp. 3000 | 15,000 | 45,000 |
| 3. Fertilizer NPK, ZA, Ammoniac @Rp. 3000 | 480 kg | 4,320 |
| **Total** | | **349,320** |

3.2. Production

The production process in the company was identified as very simple and the production capacity was still very small. The average amount of dried spices and vegetables is 60 tons per year. The process of sorting and washing is done manually, while the slicing process uses its own assembled machine with a capacity of 50kg per hour. This assembly machine does not guarantee the uniform size and investment of the company as shown in Table 1 below.

The drying process uses a homemade drying machine using LPG gas. The use of LPG fuel is intended to get complete combustion so that it does not cause combustion smoke, but it affects the high fuel costs. The drying process for an amount of 500 kg of raw material with a drying room temperature of 60°C takes 6-7 hours. The milling and drying process is also very simple (Figure 2), so that the heat distribution in the drying chamber is uneven which is characterized by the uneven drying.
3.3. Process
The general production process starts from the raw material coming, then is sorted to separate the material from foreign material or material that is not in accordance with the permitted specifications. After the raw material is sorted, it is then washed to remove small foreign materials such as sand and ash and also pesticides that are still attached. After the raw material is washed then sliced according to the size requested or ordered by the consumer, usually the slice length is 5-10mm.

After the slicing process is complete, the next process is drying. The drying process is carried out at a temperature of 60oC. This process takes 6 to 7 hours. The dried product is stored in a storage room before packing. However, currently the storage room has not been equipped with temperature and humidity control devices, this has the effect of easily drying the product again due to the high humidity and low room temperature [21, 25, 26]. Due to moist products, it causes difficulties in packaging, because it must be reprocessed. In addition to being packaged directly, sometimes requests from consumers must be in the form of flour, so the moist product must be dried again.

After the drying process of spices and dried vegetables is packaged and distributed to customers. Some dried spices and vegetables are currently produced only based on consumer orders, so the product must be adjusted to consumer demand. The scheme for processing spices and dried vegetables can be seen in Figure 3.
3.4. Product

The product produced is in the form of dried vegetables and vegetable flour (spices and dried vegetables). The products produced are usually used by the cooking seasoning industry and instant noodles [27]. The standard products produced are generally divided into 3 (three) parts, namely organoleptic, chemical and microbiological standards. Organoleptic quality standards consist of color, aroma, texture and taste of products, chemical standards are usually only on water content testing (7-8%) and microbiological standards are usually measured from the total number of microorganisms, coliform and salmonella. To get this standard, the company carries out strict controls ranging from raw materials, sorting washing, slicing, drying and storage and also reprocessing because the product is moist. However, the company has a temperature and humidity controller and water content testing equipment, so this test is not based on the estimation [25] (Figure 4).

Figure 3. Scheme of processing spices and dried vegetables
3.5. Management
The management of both SMEs still adheres to conventional management. The ability to run a business is based on experience and there is no organization of employees. In terms of business assets, these two SMEs have the potential to be developed.

3.6. Marketing
Some companies that use UD products. Ryori Indonesia, among others: for the territory of Indonesia: PT. Alam Raya, PT. Kerry Ingredient, PT. Kiantata Rasa, and so on. Whereas Abroad PT. Adabi International, Malaysia. The extent of the company's marketing area also creates special problems in packaging. For example, shipping products abroad requires a long time 1 month (starting from the goods at the Belawan warehouse, checking documents, container orders and ships), this results in the mass of the product sometimes being different when it is packaged early and when it arrives at the ordering company. The number of exports to foreign countries is 3-3.5 tons per month or 40 tons per year. The slicing machine design was designed to produce 6,480 kg of dried lemongrass, 5,674 kg of dried turmeric and 4,372 kg of cinnamon during February to April 2018 exported to Malaysia, Singapore and Brunei. The marketing methods carried out in exhibition such as described into Figure 5.

3.7. Human Resources (HR)
Labor used by UD. Ryori Indonesia consists of 20 (twenty) people, consisting of 15 (fifteen) wholesale employees, 2 (two) daily employees, and 3 (three) monthly employees (permanent). This proportion of employees is carried out by the company because the source of raw materials is not fixed, both in terms.
of quality, quantity and especially prices. Meanwhile Mitra Tani itself consists of 7 (five) farmers including the Chair of Mitra Tani.

3.8. Facilities
The technology used is still very simple and uses a fairly simple machine. This results in limited production quantity and insecure product quality. Products that are not uniform and do not meet the standards of the product ordering company. The machine used consists of cutting machines, drying machines and milling machines. While for sorting is done manually with facilities at SME’S-1 (UD. Ryori Indonesia) consisting of 20 people, 1 person experienced with facilities: slicing machine, drying machine, grinding machine, packing machine, warehouse, LPG, car, thicksaw, bicycle motorcycle. Even though, SME’S-2 (Mitra Tani) consists of 5 peoples, 1 experienced person has assets in agricultural land and 4 persons from farmers of spices and vegetables.

4. Conclusions
UD. Ryori Indonesia collaborates with farmers and explores the possibility of alternative sources of raw materials. To meet the standards of products produced, namely: organoleptic standards (color, aroma, texture and taste); chemical standards (water content = 7-8%); and microbiology (microorganisms, coliform and salmonella), the company conducts a fairly strict supervision, but there are still problems with the dried product stored in storage space which until now has not been equipped with temperature and humidity control, which has an impact on the ease of dry and humid products due high humidity and low temperature. Due to moist products, it causes difficulties in packaging, because it must be reprocessed. During this time testing was carried out based on experience / estimation alone. For this reason it is necessary to control temperature and humidity and test the water content.

The production process in the company is still very simple and the production capacity is still very small. The process of sorting and washing is done manually, while the slicing process uses its own low-capacity assembly machine. This assembly machine does not guarantee size uniformity. For this reason, a sorting device, a washing device and a slicing machine with high capacity and precision are needed.

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