


CHAPTER I

INTRODUCTION

This chapter consists of the background of the problem, problem formulation, research objectives, research scopes, and outline of the report.

1.1 Background of The Problem



Indonesia is geographically located in an area with a tropical climate so that it has the potential for abundant and very diverse natural resources. Indonesia is also known as an agricultural country because most of its population works in the agriculture sector to process and utilize the available natural resources to meet the economic need. In fact, according to the Ministry of Communication and Information Technology in August 2019, the agricultural sector is still a profession that dominates as a major employment area of 27.33% (Kominfo, 2019). As a result, a lot of growing cultivating and processing of agriculture products to support the economic sector.

One of the well-known agricultural processing products in Indonesia is essential oil. Essential oils are agro-industrial products produced from the distillation of various plant types (Sani, 2011). Essential oils are obtained from every part of the plant, such as roots, stems, leaves, flowers, fruits, and seeds (Yuliana et al., 2020). Plant types that can produce essential oils are patchouli, cloves, lemongrass, nutmeg, sandalwood, cinnamon, and various other plants which have an aroma (Qodri, 2020). The extraction process can be done in several ways, such as pressing, refining, extraction using solvents, and extraction using fat, depending on the type of plant processed (Tanasale, 2012). Pengelly (2004) in Dacosta et al. (2017) stated that essential oils are also known as flying oils which have a bitter taste and unique aroma according to the type of plant that produces

them. Essential oils are volatile and oxidized when exposed to light and air (Effendi dan Widjanarko, 2014).

The Ministry of Industry and Trade (2002) in Dacosta et al. (2017) explains that various types of essential oils are produced by Indonesian farmers, namely Cananga oil, clove oil, vetiver oil, patchouli oil, eucalyptus oil, citronella oil, and nutmeg oil. One of the best-known types of oil among the seven essential oils is citronella oil. Citronella oil is produced from the extraction of the leaves and stems of the lemongrass plant. Lemongrass plant contains citronellal, citronellol, and geraniol which have the preferred citrus characteristic odor (Setyaningsih et al., 2007). This oil is used as a flavor and aroma agent in the food industry, cosmetics, perfumes ingredients, and medicine (Zaituni et al., 2016).

Citronella oil is one of Indonesia's most prospective export commodities rather than other types of essential oils (A'yun *et al.*, 2020). Based on data from BPS in 2011, essential oil export revenues from citronella oil reached 6.89%. The demand for citronella oil in the world market is slightly high and increases annually by around 3-5% per year (Sulaswatty *et al.*, 2019). The substantial need for citronella oil exports has encouraged lemongrass plant cultivation in various regions in Indonesia.

One of the citronella oil-producing areas is in West Sumatra. Based on the Presidential Regulation of The Indonesia Republic Number 28 of 2008 concerning National Industrial Policy, West Sumatra is one of the areas selected as the development location for the regional superior commodity processing industry, namely the essential oil industry (Indonesia Republic, 2008). The West Sumatra regional government also stated in the West Sumatra Provincial Regulation Number 13 of 2012 concerning the 2012-2032 West Sumatra Provincial Spatial Plan that essential oils are a leading industry to develop in West Sumatra Province (West Sumatera, 2012). This policy encourages the plant's cultivation which can produce essential oils. One of which is lemongrass to produce citronella oil.

The largest citronella oil-producing area in West Sumatra is Solok City. Based on data from the Office of Agriculture and Fisheries of Solok City, there was a 21.5-hectare lemongrass garden area with a yield of about 84 tons of lemongrass in 2017. In 2018, there was an increase in land area to 40.2 hectares with a production yield of 103 tons (Barus, 2019). These agricultural products are supported by the development of the citronella oil refining and processing industry in Solok City.

There have been many small and medium industries that have pioneered citronella oil processing businesses in Solok City. One of which is Kebun Shaleh's SME. The lemongrass is taken from their plantations and purchased from local farmers. This material is distilled for 7-8 hours to produce citronella oil. Currently, Kebun Shaleh's SME can produce citronella oil up to 2 kg per day. It is because of an effective and efficient refining process that can see in **Figure 1.1**.



Figure 1. 1 Citronella Oil Distillation Place

Kebun Shaleh' SMI also produces citronella oil derivative products in the form of soap to increase the selling price of the products. The citronella soap product can be seen in **Figure 1.2**. The average number of sales of citronella soap per month is 500 pieces from each citronella SME in Solok City.



Figure 1. 2 Examples of Citronella Derivative Products

Most of the products from the processing of citronella oil in Solok City sell to exporters in Padang City. However, the selling price tends to be volatile and low because being controlled by the exporter. As a result, many SMEs in Solok City have switched professions from lemongrass farmers. It will result in reduced yields of lemongrass and citronella oil production.

The Office of Trade, Cooperatives, and SMEs in Solok City comes up with the innovative idea to produce derivative products from citronella oil to overcome this problem. The derivative product can increase the selling price of citronella oil. The high selling price can encourage the interest of lemongrass farmers in Solok City to develop the processing industry so that citronella oil becomes a leading commodity for Solok City.

Currently, citronella oil marketing is limited because they do not have a distribution permit from the BPOM. A distribution license is the approval assessment of a product for distribution in Indonesia result of the safety, quality, and nutritional criteria. The BPOM label on product packaging influences people's purchasing decisions and interests. Without the BPOM license, the products marketed do not have quality and safety guarantees. So that consumer confidence is low. Many SMEs and farmers in Solok City find it difficult to distribute their

products in various supermarkets that require BPOM permits for the products they sell.

There are various conditions and criteria required to obtain BPOM distribution permits. It is based on BPOM Regulation Number 26 of 2018 concerning Electronically Integrated Business Licensing Services in the Drug and Food Sector. The administrative requirement is a document on the results of an audit of production facilities of a factory building for the production and processing of products. The management of distribution permits from BPOM for Essential SMEs in Solok City is still constrained because these SMEs do not have a production house to produce their products. It has prompted the Office of Trade, Cooperatives, and SMEs in Solok City to assist in the production house construction that facilitates all essential SMEs in Solok City through the Laing Sepakat Cooperative. The production house will be built next to the Laing Sepakat Cooperative.

One of the initial steps to plan a new factory construction is planning the plant layout and facilities. Factory layout is a procedure for setting up factory facilities to support the smooth production process (Hadiguna & Setiawan, 2008). Layout arrangements take advantage of the area to place machines and facilities to support production activities. Good design can minimize material transfer distances, material handling costs, and back and forth movements within the factory area (Safitri et al., 2017). Even effective and efficient layout planning can provide advantages in the production system (Wignjosoebroto, 2009).

The design of a production house must meet BPOM standards from the start of the planning. It includes room layout, facility design, material handling, and others that meet the GMP (Good Manufacturing Practice) requirement. GMP assessment is carried out through the filling process of questions containing GMP aspects and documentation to know the state of the processing room, the state of the production site, production equipment, water supply, personal hygiene, etcetera (Dinnur dan Efendy, 2020). The assessment is conducted with the standard

parameters set from each of these elements. The layout design of factory facilities for essential oil UKM in Solok City must fulfill the GMP aspects to obtain a distribution permit from BPOM. The layout design in this study expects to be managed by the Department of Trade, Cooperatives, and SMEs in Solok City as a guide in the factory construction of citronella oil derivative products in Solok City.

1.2 Problem Formulation

Based on the background of the problem above, the problem formulation for this research is "How are the layout design and facility for processing plant derivatives of citronella oil derivatives in Essentials SME Solok City that meets BPOM standards?"

1.3 Research Objective

The purpose of this study is to design the layout and facilities of a processing plant for citronella oil derivative products at Essentials SME Solok City that meets BPOM standards.

1.4 Research Scopes

There are several boundaries to solving problems in this study, including:

1. This study does not account for the cost factor in designing the layout and plant facilities
2. The area based on the layout design adapts to the current land area availability.



1.5 Outline of The Report

The systematics of writing presents an outline of the contents of each chapter which arrange systematically. The author compiles this research report divided into several chapters.

CHAPTER I INTRODUCTION

This chapter contains background of the problem, problem formulation, research objectives, research scopes, and outline of the report.

CHAPTER II LITERATURE REVIEW

This chapter contains a systematic description of the theories that support problem-solving in this research which consists of essential oils, factory building requirements in GMP standards, production planning, and factory facility layout design.

CHAPTER III RESEARCH METHODOLOGY

This chapter contains the stages and procedures used in designing the layout of the factory and facilities at essentials SME.

CHAPTER IV PLANT LAYOUT AND FACILITIES DESIGN

This chapter contains designing plant layouts process and facilities, starting from data collection, data processing, to obtain the final design of the plant layout and facilities.

CHAPTER V ANALYSIS

This chapter contains the analysis of the layout design results. The analysis is carried out on production targets, material requirements, facility requirements, and overall plant facility layout design.

CHAPTER VI CLOSING

This section contains the conclusions from the results of the research and suggestions concerning the results of the analysis that has been carried out.