

ESSENTIAL OIL DEVELOPMENT AND POTENTIAL IN INDONESIA

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Abstract- *This study aims to determine the development and potential of essential oils in Indonesia. This study uses a qualitative method based on interviews and discussions with five expert resource persons, developers, and Essential oil business actors. This research study uses three stages, namely description, reduction, and selection. Research results: Essential oils are known as essential oils which consist of organic compounds with alcohol, aldehyde, ketone, and short-chain groups. The essential oil is in the form of a soft liquid, aromatic thick, and volatile. Essential oils are obtained from the extractor distillation of flowers, seeds, leaves, bark, wood, and roots of plants. Plants need to be processed to produce essential oils, where there are several types of processing with different technologies. Classical technology for essential oils there is three ways, namely pressing, solvent extraction, and distillation. And there is one method of processing essential oils that is environmentally friendly, namely using bentonite. Essential oils are needed in the perfume industry, cosmetic industry, pharmaceutical industry, food, and beverage industry. Indonesia's opportunities are wide in the Essential oil industry where abundant natural resources support Indonesia's active participation in competing with other countries in the Essential oil market. The large value of essential oil imports shows that the potential of the domestic market is still very wide open. There are still many ingredients containing essential oils there are traded in fresh form at low prices with the development of Essential oil processing technology that can be processed into essential oils with high selling values.*

Keywords: *Essential oil, Bentonite, Pressing, Solvent Extraction, Distillation.*

1. INTRODUCTION

Indonesia is a tropical country that is rich in biodiversity, one of them is an essential oil that has many benefits and can be used in various industries ranging from food, cosmetics, and medicine. It's estimated that there are 150-200 species of essential oil-producing plants, including the families Pinaceae, Labiatae, Compositae, Lauraceae, Myrtaceae, and Umbelliferaceae. Indonesia is a natural place for the development of the essential oil industry. There are about 40 types of essential oils produced in Indonesia. Twelve of which are commercially developed on an industrial scale, including patchouli (patchouli), vetiver (Vetiver), Cananga (Ylang), cajuput (Eucalyptus), lemongrass (Citronella), clove (Cloves), sandalwood (Sandalwood), nutmeg (Nutmeg), cinnamon (Cinnamon), cubeb or Javanese pepper (Mucus), and pepper (Pepper). Essential oils can be produced from certain parts of plants, namely leaves, flowers, seeds, fruit, stems, bark, and roots. Essential oil processing in Indonesia is generally carried out by a distillation process. The essential oil extraction process itself can be carried out in several ways, namely: distillation, pressing, solvent extraction, and extraction with fat depending on the type of plant.

In general, essential oils are used as binding agents in the manufacture of perfumes, fragrances, cosmetics, pharmaceuticals, and flavoring agents in the food and beverage industry. In addition, the essential oil produced from cloves and cubeb is widely used as a spice. Essential oil sourced from lemongrass is well known for anti-mosquito function, nutmeg oil as an anti-inflammatory, eucalyptus oil as an anti-irritant, ginger as a stimulant, analgesic, anti-inflammatory, kaffir lime oil as an anti-depressant, and agarwood oil as an anti-rheumatism.

Currently, the total production capacity of Indonesia's essential oils can reach 5,000-6,000 tons per year with the number of business actors reaching out to 3,000 businesses. From industrial data, we can see that although Indonesia is the world's largest producer of essential oils. The number of downstream imports of Essential oil products in the form of perfumes and food flavorings has reached US\$ 401 million, while data on exports of Essential oil raw materials is only US\$ 103 million. That shows there was a deficit of up to four times between the exports and imports value. The disparity between exports and imports of essential oils continues to this day. These data indicate that the development of the Indonesian Essential oil industry is not yet fully optimal. The potential of Indonesia's essential oils needs to be improved. By providing added value through increased production. Quality improvement and product diversification. In addition, the development of appropriate technology is a must to increase the effectiveness of the production process and guarantee a stable production capacity¹.

¹ Dwinna Rahmi, "Minyak Atsiri Indonesia dan Peluang Pengembangannya", April 2018, quoted in <http://bbkk.kemenperin.go.id/page/bacaartikel.php?id=OSCDT7v3kbO42NmtwHDAEGAxVG96ARtA072jn2iwylQ>, accessed on Friday, September, 10 2021.

Essential oils have a rich and complex composition, but their use is still limited to the cosmetic and fragrance domains. Therefore, further research is needed to provide a better understanding of the chemical and biological properties of extracts and their components. It's intended that the understanding gained can be utilized as new and valuable applications in human health, agriculture, and the environment².

Essential oil is one of Indonesia's plant commodities that has the potential to increase the national economy. Essential oils are widely used as the main basic ingredients in the perfume, cosmetic, pharmaceutical, food, and beverage industries. The perfume industry is one of the biggest users of essential oils. While in the culinary field, producers usually combine essential oils with other ingredients to produce food products. The various benefits contained in essential oils can certainly be used as business opportunities for industries that can manage them well. Essential oils produced from aromatic plants become non-oil and gas export commodities that are needed in various perfume industries, cosmetics, pharmaceuticals/medicines to food, and beverages. In the world of international trade, non-oil and gas export commodities are considered to have a strategic role in producing primary and secondary products for domestic and export need³.

Indonesia is one of the countries that have the potential to produce essential oils. The potential of essential oils in Indonesia can not only sell in the form of raw goods. But can also be processed into products that have a high selling value. With this potential, it's hoped that it can participate in improving the welfare of the community, managers of local industries, and farmers of essential oil-producing plants. By writing this article, it is hoped that it can become a medium of introduction to the wider community to get to know essential oil products as one of Indonesia's wealth and be the next step to further maximize the extraordinary potential of Essential oils in Indonesia.

2. METHOD

In the process of making it, this study uses discussions and interviews with various sources as the main sources. This is done in order to get the maximum possible results. Essential Oils are basically very diverse, it is not easy to be able to know and understand the various types of oil. Therefore, the interview and discussion sessions are considered effective in order to learn more about essential oils, ranging from their meaning, types to benefits.

This study uses a qualitative method based on interviews and discussions as the main source by using various sources with various backgrounds in order to get maximum results. This study has three stages, namely the description stage, the reduction stage and the selection stage.

² L. Ristia Eiska, Minyak Atsiri : Potensi dalam Bidang Kesehatan, Volume 3, Issue I, Februari 2021, p. 43 -50, hal. 2-3.

³ Yusdar M., Pengembangan Minyak Atsiri Tumbuhan Indonesia sebagai Potensi Peningkatan Nilai Ekonomi, hal. 1 -5.

A. Stage Description

At the initial stage, the researcher still felt layman and lacked depth about the object to be studied, namely essential oil. In order to add insight and knowledge about essential oils, researchers studied through various sources from various backgrounds in order to obtain the desired source of material. There were five speakers who were brought in during the five-day webinar session that the researchers held, starting on the first day, namely Mr. Irwan Nugraha from UIN Sunan Kalijaga who discussed "the use of clay for essential oils", he explained many things about essential oils, starting from the definition, types of -types, to benefits, lastly he talked about his research, namely the use of clay to filter oil, not only essential oils but also various types of oil.

Apart from Mr. Irwan, there were also several other resource persons, both from UIN and the Indonesian Islamic University (UII) and Gadjah Mada University (UGM). The webinar session, which includes discussion sessions, interviews and question and answer sessions, provides the authors with many primary sources to complete the research.

B. Reduction Stage

After obtaining material from various sources with various backgrounds, a very broad material regarding essential oils was obtained. The researcher considers that the material needs to be simplified at this stage. Therefore, the author uses the reduction stage in order to reduce materials that are considered unnecessary. The author only focuses on processing and empowering the Atsiri community in Indonesia.

C. Selection Stage

After the reduction stage which aims to focus the material on processing and empowering the Atsiri community in Indonesia, the authors try to draw conclusions and present the research results in detail and as accurately as possible according to existing data sources.

3. RESULT AND DISCUSSION

The methods used to obtain the data are interviews and discussions with five expert speakers, the essential oil developers and businessmen. By using three steps, namely description, reduction, and selection, the results will be obtained the selected result studies. Then the selected data is processed into qualitative data which is strengthened by several related journals regarding the development and the potential of essential oil.

A. The Development of Essential Oil

Essential oils which are also known as aromatic oils usually consist of organic compounds with alcohol, aldehyde, ketone groups and have a short chains. These essential oils are generally soft liquid and have thick aromatic at the room temperature but volatile (easily evaporated at normal temperatures) so it gives a

distinctive aroma as a base for perfumes. This oil obtained from the extract or distillation of flowers, seeds, leaves, bark, wood, and roots of plants. Plants need to be processed to produce essential oils, which there are several types of processing with different technologies. There are three ways for the classic technology to produce essential oils, namely pressing, solvent extraction, and distillation. The distillation technique so far is still very simple, where the handling of production is not optimal thus susceptible to oxidation, hydrolysis, or polymerization. The essential oils will look darker, blackish, or greenish due to the contamination from ferrous metals (Fe) and copper (Cu). For this reason, a good and correct essential oil processing technology needs to be developed in order to fulfill the quality requirements⁴.

The conventional technology generally takes a long time, less environmentally friendly, and has potential to trigger a compound damage. Over time, the essential oil researchers continue to find innovations in processing essential oils that are environmentally friendly by using the materials or tools that can be found in the surrounding environment. One of the processing essential oils methods that is environmentally friendly is by using bentonite. Bentonite are known as clay which has many types. Bentonite clay is obtained in the Nanggulan area, Kulonprogo; Pacitan, East Java; and also Tasikmalaya. The use of bentonite clay is one of the activities to explore the environment around us to be utilized which is a synchronization of the natural resources and the academic activities. Bentonite is widely studied because chemically has a porous structure, silica group, and alumina. Silica has a similar property as oil (hydrophobic), while alumina is hydrophilic so bentonite has two sides that can be used. And the pores in bentonite have a function to absorb objects other than things inside the clay itself.

Bentonite has a chemical characteristic named expanding, which has its own advantages when it comes to absorbing organic compounds inside the oil. So bentonite has a much higher ability or capacity of absorption than other soil types. Bentonite has a relatively high effectiveness and low price. Besides, the process is easy so it will be more profitable to use bentonite than other types of soil (from an industrial point of view). The part of the bentonite used in the oil processing is the pores which are able to absorb impurities from the oil. After using bentonite, the impurities inside the oil are removed so it will make the color clearer and increase the eugenol content, which is one of the oil quality parameters. Aside from that, bentonite clay has been used for refining patchouli oil with the percentage of patchouli alcohol as the main quality parameters and purification of citronella oil with quality parameters from the percentages of citronellol, isopulegol, citronellol, and geraniol. Besides being used to produce essential oils, bentonite clay also has been used in the processing of vegetable oils such as crude palm oil (CPO), coconut oil, candlenut oil and klentik coconut oil. However, the research of bentonite clay for

⁴ Anny Sulawatty. *Penerapan Teknologi Nonkonvensional dalam Ekstraksi Komponen Utama Atsiri dan Produk Turunannya di Indonesia*. (Jakarta: Lembaga Ilmu Pengetahuan Indonesia, 2019).

processing animal oil has not been carried out due to financial constraints and the materials relatively rare on the market. As an alternative, this bentonite research has been applied for the processing of used lubricating oil so it can be reused and not become waste that pollutes the environment⁵.

Besides using bentonite, several methods have been developed for the processing of essential oils. For example is the distillation method used by the vetiver oil producers in Garut. They process the oils using steam distillation with high pressure that will result in poor quality, such as a charred smell and dark color. To obtain the high-quality oils, distillation is carried out at the low pressure and temperature. Some modifications of the distillation process are steam-hydro distillation and hydro distillation using a microwave. The yield from the steam-hydro distillation process is quite large and the water contact with the material is more controlled so the oil evaporation process can be maximized. While the microwave steamhydro distillation method produces oil that is more in line with the physical and chemical properties of SNI standards than the hydro distillation method. The oil extracted using microwave is better in quality and quantity than the extraction without microwave⁶.

B. The Potential of Essential Oils in Indonesia

The potential of natural oil resources in Indonesia is very large. The oil comes from nature both from animals, plants and minerals, where the potential for utilizing oil is very large. In fact, there are many kinds of oil that have not been researched, utilized, or empowered by the community. The special geographical location causes Indonesia has a lot of plants, animals and minerals that can produce oil. So the potential for the abundance of oil in Indonesia is extraordinary. For examples are in Ngargosari, which produces clove oil and patchouli oil. As for Yogyakarta, precisely in Samigaluh, Kulonprogo, they are currently still exploring clove leaf oil and patchouli oil. Also in Tasikmalaya, they use castor oil for biodiesel. As for the eastern part of Indonesia, which is rich in spices, there is a lot of potential that can be extracted for the essential oils such as nutmeg. In Aceh itself (especially the Gayo area) has the potential to produce citronella oil, clove leaf oil and clove oil. Therefore, the potential around us can be utilized as well as possible. Essential oils that produced from aromatic plants are non-oil and gas commodities that are needed in various sectors such as parfume industries, cosmetics, pharmaceutical industries, food and beverage industries. In the commercial industries, essential oil communities have an important role in producing primary and secondary products.

There are so many industries that really need essential oils as raw materials for their products. We can say that essential oils are still needed as long as there is a

⁵ Irwan Nugraha. *Pemurnian Minyak Daun Cengkeh Samigaluh-Kulon Progo Menggunakan Bentonit Teraktivasi Asam*. Prosiding Seminar Nasional Kimia UNJ ANI-HKI 2016.

⁶ Maulana M Al Hanief. *Ekstraksi Minyak Atsiri dari Akar Wangi Menggunakan Metode Steam-hydro Distillation dan Hydro Distillation dengan Pemanas Microwave*. Jurnal Teknik Pomits. Vol. 2 No. 2 (2013) hal. 222

human life. Everyone needs essential oils from the time he wakes up until he goes to sleep again. For example are the products used in our daily life such as shampoo, soap, toothpaste, perfume, hand & body lotion, and so on. Every year, the world's consumption of essential oils and their products has increased. The increase of essential oil's consumption is due to the increasing of essential oil's demand for various industries. The shift in consumption patterns of synthetic materials to natural materials has also contributed to cause the increase of essential oil production. As a repository of essential oil raw materials, many potential plants in Indonesia are still unknown⁷.

In addition to being utilized in the perfume industry or products of daily needs, essential oils are also used in the healthcare industry. The active components in the essential oils have various abilities such as anti-inflammation, antiseptic, appetite stimulant, deodorant, expectorant, insecticide, and sedative. Several types of spices that can produce essential oils can also be used as antimicrobial ingredients such as citronella oil which can inhibit the *Malassezia furfur* fungus (fungus that causes tinea versicolor)⁸. Essential oil that has anti-inflammatory properties (relieves inflammation) is lavender oil which is usually used to treat the minor inflammations such as sunburns. The compounds contained in the essential oils that are effective for removing body odor or deodorant are geraniol, patchouli, and linalool. These compounds can be found in the patchouli, ginger, nutmeg, and lemongrass oils. In addition, it is also used as a relaxing aromatherapy which can be combined with a relaxing massage⁹.

Indonesia has a high opportunity in the essential oil industry where abundant natural resources support Indonesia's active participation in competing with other countries in the essential oil market. According to Gus Windiarto, The Managing Director in charge of the Indonesia Eximbank Institute (IEB Institute) on Saturday (7/8/2021), Indonesia's essential oil export value until April 2021 reached USD 83.9 million with a growth of 15.5% yoy. This increase was supported by the increase of essential oil prices which soared up during the pandemic¹⁰. However, the competition of essential oil market between Indonesia with the other countries will also be getting tougher, therefore it is necessary to have both national and international quality standards for the essential oil products. With the fulfillment of quality supporting factors such as the type of raw material used, handling of fresh ingredients, drying process, oil production process, and determination of essential oil quality, the essential oil market competition between countries can be balanced because the quality is guaranteed from the essential oils from Indonesia. The high value of the essential oil imports shows that the potential of the domestic market in

⁷ Yusdar M., *Pengembangan Minyak Atsiri Tumbuhan Indonesia sebagai Potensi Peningkatan Nilai Ekonom.* hal. 1 -5.

⁸ Yusdar M. Bioaktivitas Minyak Atsiri Sereh (*Cymbopogon Citrates* Stapf) dalam Menghambat Pertumbuhan Jamur *Malassezia Furfur* Penyebab Panu (*Pitiriasis versicolor*) [Skripsi]. Jurusan Biologi FMIPA Universitas Hasanuddin Makassar.

⁹ Yusdar M., *Pengembangan Minyak Atsiri Tumbuhan Indonesia sebagai Potensi Peningkatan Nilai Ekonomi.* hal. 1 -5.

Indonesia is still open widely. Until now, there are still many ingredients that containing essential oils are traded in fresh form at low prices. Whereas through the development of the essential oil processing technology, these materials can be processed into essential oils and can be sold at the higher prices.

4. CLOSING

Essential oil consists of organic compounds with alcohol, aldehyde, ketone, and short-chain groups. The form of essential oil is a soft liquid, thick aromatic at room temperature, and volatile volatile oil. Essential oil is obtained from the extractor distillation of flowers, seeds, leaves, bark, wood, and roots of plants. Classical technology for essential oils there is three ways, namely pressing, extraction using solvents (solvent extraction), and distillation. One method of processing essential oils that is environmentally friendly is by using bentonite.

Essential oils are needed in the industry of perfume, cosmetics industry, pharmaceutical industry, the food, and beverage industry. The competition for Indonesian essential oils with other countries is getting tighter. So Indonesia needs to improve national quality standards because the supporting factors for the quality of essential oils are seen from what types of raw materials are used, how to handle fresh ingredients, drying processes, processing oil production, and determination of Essential oil mutt. Currently, the import value of essential oils in the domestic market is still very wide open, unfortunately, many ingredients containing Essential oils are traded in fresh form at low prices. It's necessary to develop Essential oil processing technology. The processed materials can become Essential oil products with high selling prices and quality.

The researcher suggests furthering researchers to focus on research on Indonesia's efforts. In dealing with the problem of trade in ingredients containing fresh essential oils so that they are not sold at low prices and how to develop good essential oil. Use processing technology so that the processed ingredients can be Essential oil products that are sold with high quality and high price.

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