

DEVELOPMENT OF THE POTENTIAL OF ESSENTIAL OIL AS A RAW MATERIAL FOR THE PRODUCTION OF ANTI DERMATITIS PERFUME IN ALU AWE VILLAGE, MUARA DUA DISTRICT.

Teuku Rihayat^{1*}, Nelly Safitri², Aida Safitri³, Umi Qhanita Putri Swya⁴, Isra Adelya Izzati¹

^{1,3,4}Department of Chemical Engineering, Politeknik Negeri Lhokseumawe, 24301 Lhokseumawe, Aceh Utara

²Department of Power Plant Engineering, Politeknik Negeri Lhokseumawe, 24301 Lhokseumawe, Aceh Utara

Email: Teukurihayat.1007@gmail.com

ABSTRACT

Along with the development of modern industries such as the perfume, cosmetic, food, aromatherapy and pharmaceutical industries, the world's need for essential oils is increasing every year. Several parameters developed in this article include the effect of pressure (1, 2, 4, 6, 8) mmHg and time (20, 40, 60) minutes until final boiling point on the volume of oil produced and geraniol concentration. The analysis carried out was GCMS analysis and bacterial activity in the application of perfume products. From the research results it was found that at 1 atm pressure the geraniol concentration increased by 50% to 80.11%. Apart from these compounds, other compounds were also obtained such as citronellol, rhodinol and cheprol. at this pressure also produced the highest product volume of 21.2 ml. The application of the product resulting from the vacuum distillation process in the form of an anti-bacterial perfume at an incubation time of 48 hours has the strongest anti-bacterial activity with a diameter of 10.13 mm against *Staphylococcus aureus* bacteria.

Keywords: Characterization, Citronella Oil, Vacuum Distillation, Perfume, Terpene

INTRODUCTION

Essential oils have now been developed and become Indonesia's export commodities which include essential oils from patchouli, fragrant root, nutmeg, cloves, citronella, ylang, eucalyptus, sandalwood, pepper, and cinnamon [15]. Essential oils can be obtained through several separation methods including hydrodistillation which is the most conventional practice [18]. Different

separation methods such as distillation (hydro and steam), solvent extraction and supercritical liquid extraction can be used to extract essences or volatiles. However, the quality and quantity of oil yield depends on the extraction technique used [16]. Essential oils are the essence of aromatic plant species obtained by hydrodistillation or steam distillation of the whole plant or from specific parts such as

flowers, fruits, leaves, roots, bark and seeds [12].

Citronella is one of the essential commodities that is very prospective and rich in benefits. The demand for citronella oil is quite high and the price is stable and tends to increase so that the citronella oil processing industry contributes greatly to improving the community's economy. The main ingredients of essential oils are citronellal, citronellol, geraniol, and citral. The amount of compound content contained is also related to the plant species. The chemical components in citronella oil are quite complex, but the most important components are geraniol and citronellal [1]. Citronellal plays an important role as the main source of pleasant odor in citronella oil so that it can be used as the main ingredient in the process of making perfume.

Perfume dermatitis is a solution to overcome body odor caused by sweat mixed with bacteria. Currently there are many kinds of perfumes on the market, but perfumes that have been produced, only prioritize fragrance substances, where the combination of these substances can trigger allergenic compounds. Most perfumes that have been tested, show that the concentration of the perfume is beyond safe limits, so it can potentially cause allergic contact dermatitis.

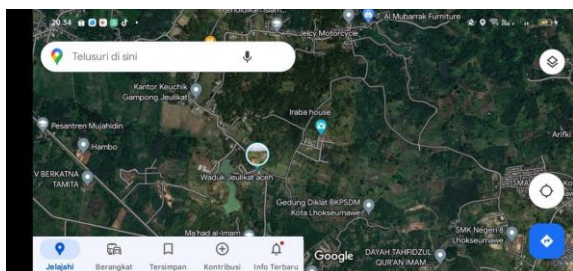


Picture 1. (a) Distillation Equipment (b) Distilled Essential Oil Products

Vacuum distillation is a distillation whose operating pressure is below atmospheric pressure. This principle is based on the laws of physics where a liquid will boil below its normal boiling point if the pressure on the surface of the liquid is reduced or vacuum. The function of vacuum distillation is to lower the boiling point so as not to damage the components of the separated substance. This principle of pressure drop is very suitable for refining essential oils to avoid cracking or damage to essential oils [6].

The purpose of this community service is to provide knowledge and understanding to the community about the Development of Essential Oil Potential as a Raw Material for Making Amore Noodle Perfume in Jeulekat Village, Blang Mangat District through a distillation process using vacuum distillation so as to produce oil with good quality and large yields, as well as knowledge about product marketing techniques by involving a number of lecturer experts and contributions students in the application of MBKM in the field of community service to support rural communities. For this reason, through this program, the proposer tries to produce and develop campus products in the form of perfumes derived from plants producing essential oils as local products become one of the

national leading products to help farmers and the community in increasing the productivity of essential oil-producing plants that have a large economic prospect in Jeulekat village, Blang Mangat district.



Picture 2. Map of Community Service Activities in Jeulekat Village, Blang Mangat District

The target to be achieved in this Community Service Program is to increase the productivity and effectiveness of the development of quality essential oil-producing plants that can improve the economy in the local and world markets and help establish cooperation between farmers and consumers in an effort to increase the availability of essential oil-producing plants. Improvements in the field of essential oil distillation processes in accordance with its standards. The method is carried out using a vacuum system distillation tool that was previously prepared by the proposer. The target of this product itself is to increase the selling value of essential oils produced by adding product innovations in the form of miamore perfume and Through products that will be developed later, farmers will be taught in the form of superior technology in carrying out the refining process so that the yield and quality of the oil produced will be higher. In addition, the technology that will be introduced later will reduce operating costs and lower operating time compared to what they did before.

In this program, the planned output achievement targets are as follows:

- a. Increase income for the community with the proceeds from the sale of perfume products
- b. Increase the quantity and quality of essential oil products
- c. Increase public understanding and skills in the field of perfume processing to become a superior product of the community

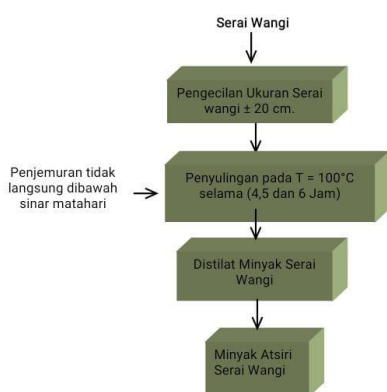
METHOD

The raw materials used to make this anti-dermatitis perfume are plant products derived from nature. Fragrant lemongrass plants, mint leaves and lemon peel are obtained from farmers who grow crops in one of the highlands in Aceh, namely in the Central Aceh region, Takengon. So far, farmers have been refining simply so that the yield produced is lower and the quality of the oil produced is also low. This also pushed the selling price of crude essential oil down. The raw materials used to make this anti-dermatitis perfume are plant products derived from nature. Fragrant lemongrass plants, mint leaves and lemon peel are obtained from farmers who grow crops in one of the highlands in Aceh, namely in the Central Aceh region, Takengon. So far, farmers have been refining simply so that the yield produced is lower and the quality of the oil produced is also low. This also pushed the selling price of crude essential oil down.

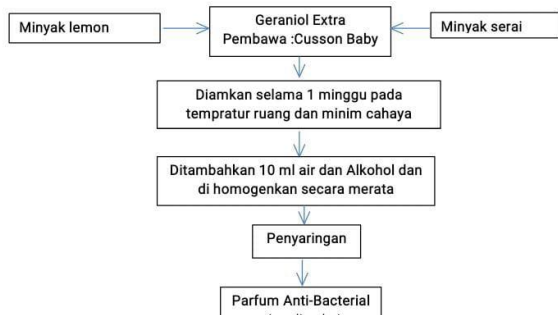




Picture 2. Vacuum System Distillation Equipment



Picture 3. Citronella Distillation Diagram



Picture 4. Perfume Making Diagram

In this dedication, synthetic perfume will be made with alternative ingredients that are safer and more natural, namely by utilizing citronella oil. Citronella essential oil sold in the market will be improved quality levels of geraniol substances using the vacuum distillation method. The function of vacuum distillation itself is to prevent damage / removal of geraniol which has a high boiling point. Previous research in increasing geraniol levels has

been carried out using the vacuum distillation method by varying the temperature, which at higher temperatures will affect the increase in geraniol, but only able to increase from 5.36% to 21.78% at operating temperature.

Making this Anti-Bacterial Perfume is done by inserting 15 ml of carrier oil into the beaker glass. Then added orange fragrance 25 ml as middle notes. Added 10 ml of geraniol extract to the beaker glass containing the carrier oil. Add 95% alcohol to 20 ml. The mixture is allowed to stand for 50 hours at low light room temperature. Beaker glass is insulated using aluminum foil to speed up the evaporation process and mixed fragrances. After that, 8 ml of mineral water is added and homogenized. The mixture is then filtered using filter paper and the filtering results are put into a perfume bottle. Furthermore, the perfume that has been produced is tested anti-bacterial on agar media in a petridish.

RESULTS AND DISCUSSION

This activity is carried out by counseling, management training, business management training, and mentoring. The design of this activity includes providing information to citronella farmers or the surrounding community about how to increase the selling value of essential oils, namely by processing them into derivative products such as perfumes and also the production of essential oils with good quality and higher yields, this can also increase the selling value of the essential oil. In PKM activities carried out, partners are given guidance and assistance in the process of making perfumes:

- a. SOP for essential oil distillation using vacuum distillation SOP pembuatan parfum
- b. Packaging design
- c. Marketing strategies



Picture 5. Distillation process of Mi Amore Essential Oil and Perfume Products

Follow-up is feedback from the results of PKM program evaluation, directing program sustainability or program improvements that can be done in the future. Based on the results of evaluation and reflection, it is necessary to follow up as follows:

1. Ongoing assistance for product marketing.
2. Ongoing assistance in registration at BPPOM and Halal certification.
3. Continuous assistance on product quality improvement. Based on the explanation above, the continuous mentoring program is expected to make partners more independent and globally competitive.

CONCLUSION

Assistance program for the Development of Essential Oil Potential as a Raw Material for Making Amore Noodle Perfume in Jeulekat Village, Blang Mangat District. This activity has added value to essential oil-producing plant farmers and essential oil-producing communities. For marketing itself, farmers become a potential market. However, ongoing assistance is still needed as an effort to strengthen licensing for product standardization and inadequate halal certification.

ACKNOWLEDGEMENTS

The author would like to express his utmost gratitude and appreciation to the Ministry of Research, Technology and Higher Education of the Republic of Indonesia and Lhokseumawe State Polytechnic and express his gratitude to our partners, namely the people from Jeleukat Village, Blang Mangat sub-district who have participated in this service activity.

REFERENCES

- [1] Bota, W., Martosupono, M., & Rondonuwu, F. S. (2015). Karakterisasi Produk-Produk Minyak Sereh Wangi (Citronella Oil) Menggunakan Spektroskopi Inframerah Dekat (NIRs). *Prosiding Semnastek*.
- [2] Agustina, A., & Jamilah, M. (2021). Kajian Kualitas Minyak Serai Wangi (*Cymbopogon winterianus* Jowitt.) pada CV AB dan PT. XYZ Jawa Barat. *Agro Bali: Agricultural Journal*, 4(1), 63-71.
- [3] Putriningtyas, D. 2014. *Aktivitas Antibakteri Minyak Atsiri Daun Sirih Merah (Piper crocatum ruiz & pav.) dan Minyak Atsiri Daun Sereh Wangi (Cymbopogon nardus (L.) rendle) Asal Tawangmangu Terhadap Bakteri Staphylococcus aureus dan Escherichia coli*. Univ. Muhamadyah. Surakarta.
- [4] RAHAYU, S. N. (2019). *Isolasi Minyak Atsiri Dari Temulawak (Curcuma Xanthorrhiza) Dan Identifikasi Bioaktif Dengan Menggunakan Gcms* (Doctoral dissertation, INSTITUT KESEHATAN HELVETIA MEDAN).
- [5] Pamungkas, K. (2013). Pengaruh Teknik Pemotongan Bahan Baku Dalam Pembuatan Minyak Nilam (Patchouli Oil) Dengan Metode Distilasi Vakum (*Effect of Materials Cutting Techniques in Production of Patchouli Oil with Vacuum Distillation Methods*) (Doctoral dissertation, Undip).
- [6] WITRI, P. S. (2017). Optimasi Peningkatan Kadar Patchouli Alcohol Dalam Minyak Atsiri Daun Nilam Menggunakan Metode Distilasi Vakum Dengan Variasi Suhu (*Optimization of Increasing Patchouli Alcohol Content in Essential Oil of Patchouli Leaves Using Vacuum Distillation with Temperature Variations*) (Doctoral dissertation, undip).
- [7] Fitri, N. (2020). Pengaruh Bioaditif Fraksi Sitronelal dan Fraksi Sitronelol-Geraniol terhadap Kualitas Bahan Bakar Biosolar.
- [8] Sembiring, B. B., & Manoi, F. (2015). Pengaruh pelayuan dan penyulingan terhadap rendemen dan mutu minyak serai wangi (*Cymbopogon nardus*). In *Prosiding Seminar Nasional Pengembangan Teknologi Pertanian*.
- [9] Wijayanti, L.W., 2015. Isolasi Sitronellal Dari Minyak Sereh Wangi (*Cymbopogon Winterianus* Jowit) dengan Distilasi Fraksinasi Pengurangan Tekanan, *Jurnal Farmasi Sains dan Komunitas* (Journal of Pharmaceutical Sciences and Community), Vol. 12, No. 1,
- [10] Kua, M. Y., & Bakti, S. C. (2021). Tabung Suntik Untuk Hukum Boyle, Simulasi Pengukuran Tekanan Udara Dengan Real World Problem

- Sebagai Alternatif Pemecahan Masalah. *Jurnal Imedtech (Instructional Media, Design and Technology)*, 4(2), 43-53.
- [11] Rizkita, A. D. (2017). Efektivitas antibakteri ekstrak daun sereh wangi, sirih hijau, dan jahe merah terhadap pertumbuhan streptococcus mutans. *Prosiding Semnastek*.
- [12] Timung, R., Chitta, R.B., Sukumar, P., Vaibhav, V., & Gouda. (2016). Composition and anti-bacterial activity analysis of citronella oil obtained by hydrodistillation: Process optimization study. *Industrial Crops and Products*. 94 (2016) 178–188.
- [13] Lin, Y., Jingru, L., Wanwen, C., Xiaoli, L., Qixing, J., & Wenshui, X. (2017). Geraniol grafted chitosan oligosaccharide as a potential antibacterial agent. *Carbohydrate Polymer* 356-364.
- [14] Keila, L., Yagmur, Y., Zevallos, C., Kerth, M.A., & Thomas, M.T. (2018). Geraniol-loaded polymeric nanoparticles inhibit enteric pathogens on spinach during posttreatment refrigerated and temperature abuse storage. February 2018 | Volume 2 | Article 4.1-14
- [15] Feriyanto, Y. E., Sipahutar, P. J., Mahfud, M., & Prihatini, P. (2013). Pengambilan minyak atsiri dari daun dan batang serai wangi (*Cymbopogon winterianus*) menggunakan metode distilasi uap dan air dengan pemanasan microwave. *Jurnal Teknik ITS*, 2(1), F93-F97.
- [16] Chanthai, S., Prachakoli, S., Ruangviriyachai, C., (2012). Influence of extraction methodologies on the analysis of five major volatile aromatic compounds of Citronella grass (*Cymbopogon nardus*) and lemongrass (*Cymbopogon citratus*) grown in Thailand. *J. Assoc. Anal. Communities Int.* 95, 763–772.
- [17] Gavahian, M., & Farahnaky, A. (2018). Ohmic-assisted hydrodistillation technology: A review. *Trends in Food Science & Technology*, 72, 153-161.
- [18] Gavahian, M., & Farahnaky, A. (2018). Ohmic-assisted hydrodistillation technology: A review. *Trends in Food Science & Technology*, 72, 153-161.