Indonesian Journal of Chemical Science and Technology (IJCST)

State University of Medan, https://jurnal.unimed.ac.id/2012/index.php/aromatika

IJCST-UNIMED 2023, Vol. 08, No. 1 Page; 40 – 45

Received : Oct 08th, 2024 Accepted : Jan 13th, 2025 Web Published : Jan 31st, 2025

Exploration of Making Perfume based on Extracts of Pandan Wangi (*Pandanus amaryllifolius*), Lemongrass (*Cymbopogon citratus*) and Orange Leaves (*Citrus hystrix*): Natural Aroma Innovation

Putri Faradilla[1*], Moondra Zubir [1], Ani Sutiani [1], Dinda Dwi Hasanah [1], Dian Finensia Saragih [1], Putri Rahmayani [1], Tesa Juliana Br.Samosir [1]

[1] Department of Chemistry, Faculty of Mathematics and Natural Sciences, Universitas Negeri Medan, 20221, Indonesia
*Corresponding author: putrifaradilla@unimed.ac.id

ABSTRACT

Perfume is a familiar product used in daily life, as a necessity to appear confident. Natural perfume is currently an essential use such as the use of panda, lemongrass and orange leaf extracts because the use of plants as basic perfume ingredients is safe and has minor side effects. This research aims to make a perfume that is durable, safe to use and low in alcohol content. The method used is the extract filtration method and then organoleptic test, alcohol content test and pH test. From the research conducted, perfume with pandanus extract has a longer lasting fragrance and is safe to use.

Keywords: alcohol, extract, perfume

1. INTRODUCTION

Abundant natural resources spread throughout the country. The tropical climate makes Indonesia rich in various flora and fauna that grow and develop in Indonesia, including Indonesia is known as a producer of essential oils. Essential oils come from every plant, namely leaves, flowers, fruits, seeds, bark, and roots. Essential oils are odorous substances contained in plants. Essential oils are also called volatile oils, etheric oils, or essential oils because at normal temperatures (room temperature) they evaporate easily in the air, have a distinctive odor according to the odor of the plant that produces them, bitter, intoxicating, soluble in organic solutions but insoluble in water. Essential oils are odorous substances found in several plants, because they evaporate easily when left open at room temperature they are called volatile oils, etheric oils or essential oils. In general, essential oils cannot be mixed with water, are soluble in ether, alcohol, mostly soluble in organic solvents, are optically active, have a high refractive index, specific rotation and are often used as diagnostic tools. In general, essential oils consist of the elements carbon (C), hydrogen (H), and oxygen (O), sometimes consisting of nitrogen (N) and sulfur (S). In addition, essential oils also contain components that cannot evaporate, namely resin and wax, but in small amounts. Based on the chemical composition and elements, essential oils are divided into two, namely:

e-ISSN : 2622-4968, p-ISSN : 2622-1349

hydrocarbon and oxygenated hydrocarbon. Hydrocarbon has the elements hydrogen (H) and carbon (C). [5]

Perfume is a product that is no longer foreign in everyday life, especially now the aroma of perfume offered is very diverse, both for men and women. Perfume has become a necessity to appear confident. Perfume is a mixture of aromatic compounds, essential oils, fixatives, and solvents used to provide a fragrant smell. The types of liquid perfume vary depending on the percentage of aromatic compounds, including eau de parfum, eau de toilette, eau de cologne. Obtained from a study, namely consumers feel better and more confident after using perfume. In addition, consumers use perfume with several considerations, namely the first is considering the scent of the perfume they like, then the brand, price and packaging of the perfume itself. [8]

In this modern era, more and more people are turning to natural products, including perfumes, in response to the growing awareness of health and the environment. Making perfume from natural extracts is not only an art, but also a process that allows us to connect with nature and utilize the wealth of ingredients available around us. Natural extracts, such as essential oils from pandan, orange leaves and lemongrass, offer unique aromas and provide therapeutic benefits. [8]

Pandanus amaryllifolius Roxb. has long been used as a flavoring agent in food. Based on several studies that have been conducted, it was found that pandan leaves contain essential oils. Cheetangdee & Siree (2006) stated that the basic aroma components in pandan leaves come from the chemical compound 2-acetyl-1- pyrroline. In addition to these compounds, there is a 3-hexanol compound that makes up the aroma components of pandan and also determines the aroma of pandan. [1]

The various ingredients in kaffir lime leaves (Citrus hystrix) have many benefits in various fields, so the abundance of kaffir lime leaves during the harvest season can be overcome by making essential oil from kaffir lime leaves. The price of orange leaf oil extract is relatively expensive. The process of extracting kaffir lime leaf oil can be done using the method. It's simple using equipment that is not too expensive. If kaffir lime leaves are distilled, an essential oil is produced that is colorless (clear) to greenish, and smells fragrant like the leaves. The chemical components in kaffir lime leaf oil are very complex, but the most important components are citronellal and geraniol. Differences in the chemical content of the oil will cause differences in the smoothness and softness of the aroma. The softer and smoother the aroma, the higher the content of geraniol, citronellal, hydroxycitronellal, linalol and linalyl acetate. Geraniol ($C_{10}H_{18}O$) is an acyclic monoterpene alcohol which is a compound consisting of two isoprene molecules and one water molecule. Pure geraniol is an oily, colorless liquid with a characteristic aroma. When oxidized it will become geranial or citral. The main cause of the odor in kaffir lime leaf oil is citronellal, which is the basic ingredient for making perfume, therefore kaffir lime leaf oil with high levels of citronellal will be of better quality. Citronellal has antibacterial activity which can inhibit the growth of Salmonella, other Enterobacteria and antioxidant activity. [5]

Among the various medicinal plants that exist, citronella (*Cymbopogon nardus L.*) is one plant that has many benefits. From the distillation of citronella leaves and stems, essential oil is obtained which is known in the trading world as Citronella Oil. According to Burdock (2002), the main compound components of citronella oil consist of citronellal, citronellol and geraniol. Luangnarumitchai et al. (2007) explained that the citronellal, geraniol and citronellol content in citronella oil is also able to inhibit bacterial activity. Putriningtyas (2014) in his study reported that the essential oil of citronella leaves from Tawangmangu was able to produce an inhibitory zone against S. aureus and E. coli. The results showed that the antibacterial activity of citronella leaf essential oil was greater against S. aureus bacteria. Another study conducted by Brugnera et al. (2011), the essential oil of citronella leaves from Brazil which contains the chemical components citronellal (34.6%), geraniol (23.17%), and citronellol (12.09%) is also able to inhibit the activity of S. aureus bacteria and is able to inhibit activity of gram-negative bacteria, namely E. coli and P. aeruginosa. [6] Therefore, the researcher intends to making perfume formulations by

e-ISSN : 2622-4968, p-ISSN : 2622-1349

using pandan essential oil, orange leaves and lemongrass as well Considering that perfume preparations from natural extracts have their own advantages, namely that they are made from natural ingredients, provide a fresh and calming aroma and contain antioxidant, anti-inflammatory and antibacterial properties.

2. EXPERIMENTAL

2.1. Chemicals, Equipment and Instrumentation

This research uses an experimental method to compare perfume variations from pandanus, orange leaf and lemongrass extracts that are long-lasting. In addition, this research also aims to determine the variations of perfume from pandanus, orange leaf and lemongrass extracts that are low in alcohol content. To produce pandanus, orange leaf and lemongrass extracts using a filtering process. The tools used are plastic containers, blenders, knives, and filters. Then the materials used are water, pandan leaves, orange leaves and lemongrass. Then the alcohol test is carried out using an alcoholmeter and a 100 mL measuring cup and the material used is alcohol. Furthermore, the pH test is carried out using litmus paper.

2.2. Filtration of samples

About 500 grams of pandan leaves, 250 grams of orange leaves and 300 grams of lemongrass were prepared. The sample is washed then cut and then smoothed using a blender. After all the samples are smooth, the sample is then added with water and filtered and the first filtration result is taken.

2.3 Alcohol Analysis

About 100 mL of pure alcohol (containing ethanol, denatured alcohol and benzyl alcohol) was put into a measuring cup then put the alcoholmeter into the alcohol until the alcoholmeter floats. For the alcohol test on the sample, put 50 mL of alcohol and 100 mL of sample extract into the container. Then from the mixture of sample and alcohol, put 100 mL into the measuring cup. Then put the alcoholmeter and observe until the alcoholmeter floats.

2.4 pH Analysis

About 100 mL of alcohol were measured and pour it into a perfume container. Put the litmus paper into the perfume container and wait until the litmus paper show changing color.

2.5 Organoleptic Test of Samples

Spray the perfume from the mixture of sample and alcohol into the hand.

3. RESULTS AND DISCUSSION

3.1 Organoleptic Test of Pandan Leaf, Orange Leaf and Lemongrass Extracts

The fragrance durability test (organoleptic test) was conducted to determine how long the perfume aroma can be used and the aroma is still felt by the user.[13] This test was carried out on hands that have been sprayed with perfume by conducting a scaled test by giving various assessment as we can observed in table 1. The results of the fragrance resistance test on the sprayed perfume were proven to pass 4 hours and were detected as far as 10 cm on the sense of smell. The results of the fragrance resistance test showed that all perfume formulations of pandan extract, lemongrass extract and citrus leaf extract were still smelled at 0-1 hour. However, at 2-5 hours, lemongrass extract and orange leaf extract no longer produce fragrance.

e-ISSN : 2622-4968, p-ISSN : 2622-1349

Table 1. Organoleptic analysis of perfume based natural products

Extract	Time (hours)					
	0	1	2	3	4	5
Pandan leaf	✓	✓	✓	✓	✓	✓
Lemongrass	✓	✓	–	–	–	–
Orange Leaf	✓	✓	–	–	–	–

3.2 Analysis of Alcohol Content of Pandan Leaf, Orange Leaf and Lemongrass Extracts

The alcohol content test was carried out to find out how much alcohol content was in the perfume and to find out which perfume had lower levels.[16] The pure perfume alcohol previously tested with an alcoholmeter had a level of 87%. The analysis of alcohol content in perfume-based plants were depicted in Figure 1.

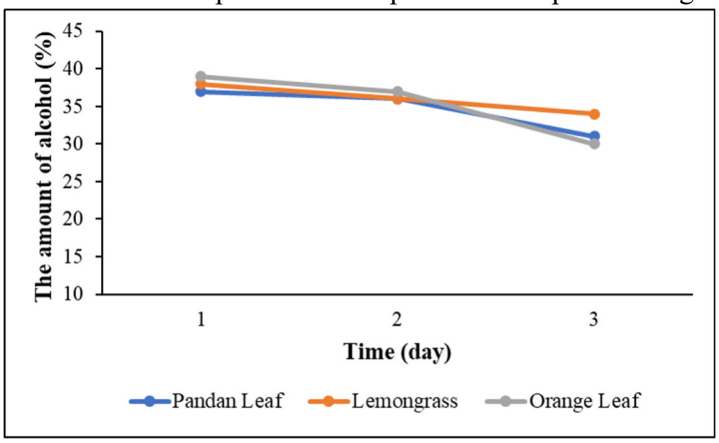

Figure 1. The amount of alcohol in perfume-based plants for several days

The result of testing the alcohol content for 3 consecutive days using an alcoholmeter is that the alcohol content that has been mixed with the extract is lower than the pure alcohol content and the alcohol content decreases every day due to evaporation due to long storage. Based on the alcohol content test that illustrated in Figure 1, pandan extract has a long-lasting time because the aroma of pandan extract comes from the oxygenation degradation of yellow carotenoid pigments but pandan extract has a low alcohol content on day 3 which is 31%.[1] Lemongrass extract has 34% alcohol content on the third day. According to Kawiji (2010), the more components that contain -OH groups, the higher the solubility, on the other hand, the fewer terpene compounds, the lower the solubility. This is a factor in the decrease of alcohol content in lemongrass extract.[2] Then, the citrus leaf extract had a low alcohol content from day one to day three because citrus leaves contain various bioactive compounds, such as flavonoids, essential oils, and organic acids. Some of these compounds may have alcohol-binding properties or affect the solubility of ethanol, which could lead to a decrease in the alcohol concentration in the mixture.[12]

3.3 pH Analysis on Pandan Leaf, Orange Leaf and Lemongrass Extracts

The pH test on perfume aims to determine the pH of the perfume because if the pH of the perfume is not appropriate, it will cause side effects in the form of irritation on the user's skin. [13]

e-ISSN : 2622-4968, p-ISSN : 2622-1349

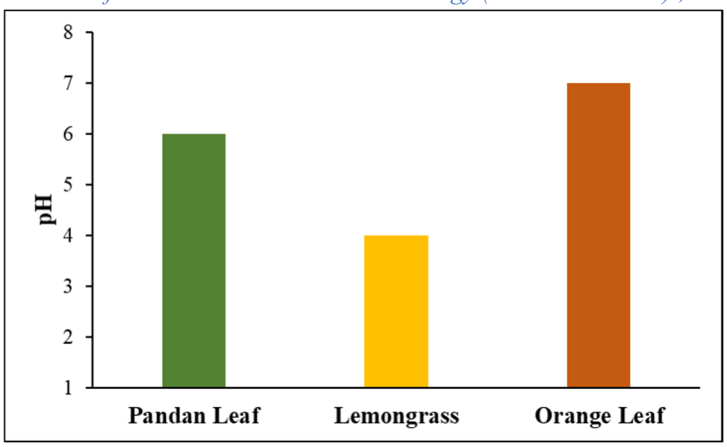

Figure 2. pH test of perfume based pandan leaf, lemongrass and orange leaf extracts.

The results of the pH test on pandanus, orange leaf and lemongrass extracts found that the perfume with the three extracts was acidic as shown in Figure 2. According to Pertiwi et al (2020), if the pH of the preparation is too low, it can cause skin irritation, while if the pH is too high, it can cause the skin to peel or scaly. The safe pH to use is the pH range of 6-7. Based on the results of the research conducted, pandan extract perfume and orange leaf extract are safe to use because the pH of pandan extract is 6 while the pH of orange leaf extract is 7.[14]

4. CONCLUSION

Based on the results of the research that has been done, it can be concluded that pandan extract can be used as a natural ingredient for making perfume because perfume with pandan extract has a long lasting time of 16 hours, low alcohol content and safe pH because it does not irritate the skin and orange leaf extract are also safe to use as perfume extracts because they have neutral pH levels and fairly low alcohol levels but perfumes with orange leaf extract are not long-lasting.

ACKNOWLEDGEMENT

The authors would like to thank the lecturers of the Gas and Thermodynamics course for the guidance and direction provided during the process of writing this article and research.

REFERENCES

1. Mubarokah, L & Efendi M. R. S. (**2024**). Qualitative and Quantitative Identification of Alcohol using the Conway Microdiffusion Method and Gas Chromatography-Flame Ionization Detector (GC-FID) on Evidence at the East Java Polda Bidlabfor. *Indonesian Journal of Chemical Science*, 13(2), 135-142.
2. Golda J, O. (**2022**). Perfume Extraction and Formulation from Lemongrass Leaves. *Iconic Research and Engineering Journals, 5* (11).
3. Sari, N.M., Setyabudi, L. S. W., Yasiroh, H. H., Sani & Puspitawati, I. N. (**2023**). Pemanfaatan Bunga Mawar (*Rosa sp*.) Sebagai Minyak Atsiri Untuk Peningkatan Ekonomi Masyarakat Desa Kalipucang, Kec Tutur, Kab. Pasuruan. *Jurnal Pengabdian Masyarakat (Environation), 2* (2).
4. Hardiyati, I, Fajar, I. R. F & Novitasari, N. (**2020**). Formulasi Dan Evaluasi Solid Parfumedengan Basis Karagenanan Menggunakan Essensial Oil Citrus *(Citrus sinensis*), Jasmine (*Jasminum sambac*) dan Vanila (*Vanila planifolia*). *ISTA Online Technol Journal, 1* (1).

e-ISSN : 2622-4968, p-ISSN : 2622-1349

5. Damayanti M, Nurjanah S, Bunyamin A & Pujianto T. (**2020**). Ekstraksi Minyak Atsiri Pandan Wangi (*Pandanus amaryllifolius Roxb*.) dengan Lama Waktu Penyulingan yang Berbeda. *Jurnal Ilmu Pertanian Indonesia, 25* (4), 653-656.
6. Rakhmatullah A.N, Andina L, Syahfari I, & Rio P. D. (**2022**). Analisis Kandungan Alkohol pada Parfum yang Dibuat dari Bahan Sintetik dan Bahan Alam Menggunakan Metode Kromatografi Gas. *Jurnal Surya Medika*
7. Ekasari S.R. (**2020**). Pengaruh Metode Pengambilan Minyak Atsiri Dari Daun Jeruk Purut (Citrus Hystrix) Terhadap Kandungan Geraniol Dan Sitronelal. *Jurnal Inovasi Teknik Kimia, 7,* (2), 185–189.
8. Masita, M., Masriany, M., Sulaiman T. N. S, Wibowo, W.A & Daryono, B.S. (**2024**). Pembuatan sediaan serum dari ekstrak Gama Melon Parfum (GMP) di Laboratorium Farmasi Universitas Gadjah Mada. *Filogeni: Jurnal Mahasiswa Biologi, 4,* (1), 13-18.
9. Bota, W., Martosupono, M & Rondonuwu, F.S. (**2015**). Potensi Senyawa Minyak Sereh Wangi (Citronella oil) dari Tumbuhan *Cymbopogon Nardus L*. sebagai Agen Antibakteri. *Seminar Nasional Sains dan Teknologi Fakultas Teknik Universitas Muhammadiyah Jakarta.*
10. Nurcahyo H. (**2016**). Formulasi Minyak Atsiri Daun Jeruk Purut (*Citrus Hystrix D.C.)* sebagai Sediaan Aromaterapi. *Pancasakti Science Edu ation Journal,*
11. Aisyah, S. S., Hasyimuddin, H & Samsinar, S. (**2019**). Uji Alkohol pada Fermentasi Tuak. *Teknosains: Media Informasi Sains dan Teknologi, 1,* (1).
12. Ariana, D. (**2018**). Uji Antibakteri Perasan Daun Pandan Wangi (Pandanus Amaryllifolius Roxb) terhadap Shigella Dysentriae. *The Journal of Muhammadiyah Medical Laboratory Technologist*, *1,* (1).
13. Hirzi, M.H., Yurnalis & Sidabalok, I. (**2022**). Pengaruh Jumlah Bahan dalam Tangki Penyuling Metode Uap dan Air terhadap Rendemen serta Mutu Minyak Sereh Wangi (*Cymbopogon nardus L. Rendle*). *Jurnal Research Ilmu Pertan*ian, *2* (1), 64-77.
14. Alves, M.S, Campos I.M, Brito, D.M.C, Cardoso C.M, Pontes, E.G & Souza, M.A.A (**2019**). Efficacy of lemongrass essential oil and citral in controlling Callosobruchus maculatus (Coleoptera: Chrysomelidae), a post-harvest cowpea insect pest. *Crop Protection, 119,* 191-196.
15. Helena, A, Kurniasari, S & Rahman, A. (**2024**). Pengaruh Persepsi Konsumen terhadap Kualitas Produk Parfume Alkohol dan Non-Alkohol Di Toko Lanaresa Parfume di Kota Tanjungpinang *Jurnal MBISKU: Manajemen Bisnis dan Keuangan, 10* (4), 233-240.
16. Efendi, D., Budiarto, R., Poerwanto, R., Santosa, E & Agusta, A. (**2021**). Relationship among agroclimatic variables, soil and leaves nutrient status with the yield and main composition of kaffir lime (Citrus hystrix dc) leaves essential oil. *Metabolites, 1* (5), 260.

e-ISSN : 2622-4968, p-ISSN : 2622-1349