


Utilization Of Black Tea Pulp Extract (Black Tea) As An Active Ingredient In Hand Wash Preparation

Arandi Tubagus Kurniawan^{1*}, Joko Santoso², Purgiyanti³

^{1,2,3}Departments of Pharmacy, Politeknik Harapan Bersama, Tegal, Indonesia

Article Info	ABSTRACT
<p>Keywords: Black Tea Dregs, Black Tea Dreg Extract, Hand wash, Physical test</p>	<p>In the use of natural hand wash, black tea pulp (<i>Camellia sinesis</i> L.) contains useful active substances. The preparation helps reduce the spread of germs originating from physical contact. Extraction was carried out using maceration extraction technique. This study aims to explore the physical properties of the developed hand wash dosage formulation, containing black tea pulp extract. Using various testing parameters. The testing methods involved organoleptic test to evaluate the homogeneity properties, pH measurement to assess the acidity or basicity level, foam height measurement of the preparation and viscosity measurement to understand the flowability. In addition. Specific gravity test of hand wash preparations to determine the specific gravity that has been made so as to obtain ideal pharmaceutical preparations. Hand wash preparation of black tea pulp extract with 5%, 10%, 15% concentration. By utilizing these various parameters, the study aims to provide a comprehensive picture of the physical properties of the product, helping to identify the strengths and weaknesses of the formulation. This forms the basis for further development to improve the quality of the hand wash, with the added value of the natural extract of Black Tea Dregs.</p>
<p>This is an open access article under the CC BY-NC license</p> 	<p>Corresponding Author: Arandi Tubagus Kurniawan Politeknik Harapan Bersama Tegal Jl. Mataram No.9, Pesurungan Lor, Kec. Margadana, Kota Tegal, Jawa Tengah 52147 randitegal2000@gmail.com</p>

INTRODUCTION

One of the products that we use most often in our daily lives is soap, which is included in health products containing sodium or potassium with various fatty acids derived from vegetable oils or animal oils. animals in solid, soft or liquid form, foaming, with or without additives such as fragrances and other non-toxic ingredients are healthy and non-irritating to the skin (Koh & P. 2018). The use of natural ingredients in skincare and personal hygiene products is increasing along with the growing awareness of the adverse effects of synthetic chemicals. Black tea pulp is one such natural ingredient of interest. Polyphenols and caffeine, bioactive compounds in black tea grounds, have antimicrobial and antioxidant properties. With black tea pulp hand wash as an active ingredient in hand soap, the main objective of this study is to produce an effective, safe, and environmentally friendly hygiene product (Dandekar & Lokhande, R. 2020).

The polyphenols in black tea grounds serve as antibacterial agents that can stop the development of pathogenic bacteria. Studies have shown that these polyphenols inhibit the growth of both gram-positive and negative bacteria. Therefore, black tea grounds can be used in hand soap to enhance its antibacterial performance. In addition, the antioxidant power of black tea protects the skin from oxidative damage caused by free radicals. This antioxidant effect is very important for skin care to prevent premature aging. With the antioxidant content of black tea pulp, this research is expected to produce a hand soap formulation that is good for cleaning hands while maintaining skin health. This research also increases the economic value of black tea pulp which has only been considered as waste so that it becomes a safe and environmentally friendly product. Although black tea pulp contains bioactive compounds with great potential, most of it is only considered as waste with no additional value. This shows the discrepancy between the potential of natural materials and how they are used. In addition, the use of synthetic chemicals in hand soaps raises concerns about the hazards to human health and impact on the environment (Okoye, P. U., & Achakpa, P. M. 2019). Therefore, alternatives that prioritize the use of natural materials are needed.

By using black tea grounds in hand soap, it can reduce sustainable waste. Making useful products from tea waste is an important part of waste reduction and environmental conservation. Analysis of the active components of hand soap, antibacterial test and antioxidant activity, and formulation of hand soap products are part of this study which aims to evaluate the potential benefits of black tea pulp.

In addition to the technical aspects, this study also looked at the economic and sustainability benefits of black tea grounds. This research not only provides a scientific understanding of the possible use of natural materials in hygiene products, but also helps the industry reduce organic waste from the tea industry and develop safer and environmentally friendly hygiene products (Gupta, S. 2020). This research also opens up new opportunities to manage tea waste in a wise way. By using black tea pulp in hand soap that can make a natural and effective product. It is hoped that this research will make a significant contribution to the development of innovative, efficient, and environmentally friendly hand soaps, as well as provide economic and social benefits through better waste treatment.

METHODS

The research object in this study is the utilization of black tea pulp extract in hand wash preparations. The research will focus on analyzing the physical properties of the hand wash preparation. The sample used in this study was a hand wash made using black tea pulp extract taken from household waste in Tegal City and surrounding areas. The hand wash was made in the pharmacy laboratory of Politeknik Harapan Bersama Tegal. Sampling of hand wash can be done by total sampling method because all samples were tested.

The independent variable used in this study is an ingredient that is expected to influence the physical properties of the Hand wash preparation, black tea pulp extract (*Camellia sinensis* L). is a liquid or solution obtained from steeping or soaking black tea pulp, which contains various active chemical compounds such as polyphenols, flavonoids, and tannins. The black tea pulp extract used in the preparation is 5%, 10%, and 15%. The dependent

variable of this study is testing the physical properties of Organoleptic Test, pH Test, Foam Height Test, Homogeneity, Viscosity specific gravity. handwash produced from black tea pulp extract (*Camellia sinensis* L). Some of the variables that can be controlled in this study include the method of extraction of ingredients, extraction temperature, extraction duration, composition of the extraction medium, and how to make hand wash preparations.

Data collection was carried out with the method used was the experimental method. The research was conducted in the laboratory of Politeknik Harapan Bersama Tegal. The types of data used were qualitative and quantitative. Tools and materials are analytical scales, pH meter (CP-407), and viscometer (Brookfield DV-E), object glass, measuring cup, stirring rod, beaker glass, picknometer, ruler, filter paper and parchment paper. Black tea pulp, SLS (Sodium lauryl sulfate), Na₂SO₄ (Sodium Sulfate), STTP, Citric Acid, perfume, Foam booster, distilled water.

The analysis applied in the study included evaluation of physical properties of hand wash. Test Results, Organoleptic test, Foam height test, pH test, Viscosity test, Specific gravity test, it was noted that the hand wash met the standards in organoleptic aspects, and homogeneity, Anova test was used as a significant proof of the data generated from the test to prove that the variable actually exists. The hand wash stability assessment showed that there was no significant difference in the statistical results in each physical evaluation of the hand wash, indicating that the hand wash extract from black tea pulp can be considered a stable hand wash.

RESULTS AND DISCUSSION

Black Tea Extract Made into Hand Wash Preparation

Tea can be classified into several types, including green tea, long tea and black tea. About 75% of global tea production is black tea. Black tea is consumed by 87% of American tea drinkers. The resulting tea waste is an organic material that can be utilized such as *Camellia sinensis* rich in organic carbon, 20% copper, 10% magnesium, 13% calcium, flavonoids, caffeine, tannins, polyphenols, alkaloids and also epigallocatechin gallate (Asiva Noor Rachmayani 2015). The feasibility of black tea pulp extract as an ingredient in the preparation of hand wash preparations can be seen from several formulation parameters that have been tested including organoleptic test, pH test, homogeneity test, foam height test, specific gravity test and viscosity test using Brookfield viscometer.

Organoleptical Test

Organoleptical examination aims to determine the appearance of the mouthwash in the form of shape, color and smell which is done visually. This test needs to be done because it is related to the comfort of use. The data can be seen in the table as follows:

Table 1. Organoleptic Test Results

Preparation	Form	Color	Scent
	F1	F2	F3
Form	Liquid	Liquid	Liquid
Texture	Soft	Soft	Soft
Scent	Distinctive aroma	Distinctive aroma	Distinctive aroma

Preparation	Form	Color	Scent
	F1	F2	F3
Color	Shiny brown	Clear brown	Clear brown

*) Data processed by researchers (2025)

Based on the organoleptic test results above, it can be concluded that the three formulations have a liquid form, which shows that these three products are designed to be liquid, so they are easy to use as hand wash or other similar products. This liquid form makes it easier to distribute the ingredients on the skin and provides a more comfortable use experience. All formulations show a smooth texture, this shows that the product has a soft consistency so it is comfortable to use on the skin. A smooth texture also usually indicates that the ingredients in the product have been mixed well and do not contain gauze particles that can irritate the skin. The aroma may come from the active ingredients used in the product, such as black tea which has a quite distinctive aroma, which can provide a pleasant sensory experience and can influence the user's comfort in using the product. Meanwhile, the color of the hand wash is shiny brown. The F1 product, which has a shiny brown color, can indicate that the formulation contains natural components from black tea extract and other ingredients which give a natural shine to the hand wash. The shiny brown color can also indicate a higher concentration of active ingredients and natural dyes used in the product. Formulation 2 has a clearer brown color, which means this product is more transparent compared to F1. This can happen if there is further purification or filtering to remove unwanted impurities. Just like F2, F3 has a clear brown color, this clear color can indicate a finer formulation and may have lower levels of substances in terms of components that provide color. These products may also be easier to digest for consumers who prefer products with a cleaner, less viscous appearance.

So based on the three formulas it has a liquid form and smooth texture, providing user comfort and convenience. All products have a distinctive aroma originating from active ingredients such as black tea dregs which provides a more pleasant experience. And the color difference shows differences in the concentration of active ingredients and processing stages. F1 products with a shiny brown color tend to be richer or more intense, while F2 and F3 with a clear brown color show hand wash that is lighter and cleaner.

Test pH

In general, normal pH has a value of 7, but if the pH value is less than 7, it will indicate that the substance has alkaline properties, whereas if the pH value is less than 7, it will indicate acidity. pH 0 will indicate a high degree of acidity and pH 14 will indicate a high degree of alkalinity. The data produced after testing is as follows:

Table 2. pH Test Results

Formulation	pH
F1	6
F2	6
F3	6

*) Data processed by researchers (2025)

Based on the data above, it can be explained that the pH test results show that the three formulas have the same pH value, namely pH 6. This pH value is classified as neutral, which is in the pH range of 5.5 to 7.5 and is safe to use on the skin. Products with a pH that is close to the natural pH for the skin, namely around 5.5, will be safer and more comfortable to use and will not cause skin irritation. So, the pH of these formulas will show that black tea dregs extract is well accepted as an ingredient in making hand wash.

Homogeneity Test

The homogeneity test is carried out by smearing it on each surface of the glass object and spreading it using another glass object, this is done to ensure that the distribution of the active ingredient and the texture are consistent. Based on this test, the homogeneity of the preparations in the three formulas shows that all formulas were successfully distributed well and evenly, which will indicate that the formulas have good distribution of active ingredients. So it is important to ensure the effectiveness of the product when used.

Foam Height Test

A foam test is carried out to assess the formula's ability to produce sufficient foam when used. The test results that the author obtained are as follows:

Table 3. Foam Height Test

Formulation	Foam Height
F1	5 cm
F2	7,7 cm
F3	9 cm

*) Data processed by researchers (2025)

Based on the data from the average foam height test results above, it can be concluded that formula 3 has the highest foam, formula 2 produces a foam height of 7.7 cm while formula 1 produces the least foam height, namely 5 cm. So the high level of foam will show the potential of the formula to clean hands more effectively, because the foam will function to help clean dirt and oil stuck to the hands.

The foam in hand wash is very important in improving the user experience and ensuring effectiveness in cleaning hands. By adding black tea dregs extract, the properties of the foam used for hand washing will be different, according to the other active ingredients used. If high foam is desired, the formulation can be adjusted with the right surfactant so that the black tea extract does not affect the effectiveness of the foam.

Based on research conducted by Tenri, it states that the foam height test aims to see how much foam is produced. Soap with excessive foam will cause skin irritation, because too much foaming agent is used. The height of foam in soap set by the Indonesian national standard (SNI) is 13-220 mm. From the results of observations of the foam height obtained from paper soap, it can be seen that all concentrations meet soap standards in accordance with SNI (Coleus et al. 2023) .So it can be concluded that the foam height test shows that formula 3 produces the highest foam, namely 9cm, while formula 1 produces the lowest foam, namely 5 cm.

Specific Gravity Test and Viscosity Test using a Brookfield viscometer

Viscosity becomes mainly due to the connections between fluid molecules. The results of the specific gravity test in determining the mass per volume of the preparation, which gives an indication of the density of the formula, can be seen in the following table:

Table 4. Specific Gravity Test Results

Formulation	Replication 1	Replication 2	Replication 3
F1	47,18 gr	47,17 gr	47,17 gr
F2	49,87 gr	49,26 gr	49,27 gr
F3	48,19 gr	47,82 gr	47,78 gr

*) Data processed by researchers (2025)

Based on the data above, it can be explained that the results of this specific weight test are quite consistent, with slight differences between replications in each formula. Formula 2 is slightly denser than formulations 1 and 3, which can affect the texture and viscosity of the final product. Consistent specific gravity indicates that the hand wash formulation is quite stable in terms of density, which is also important in user experience. Meanwhile, the Brookfield viscometer test was carried out to determine the viscosity of the formula for each rotation speed (RPM). The results of the Brookfield viscometer test at each RPM are as follows:

Table 4. Specific Gravity Test Results

	Formulation 1	Formulation 2	Formulation 3
6 rpm	654 cP	924 cP	924 cP
12 rpm	461 cP	462 cP	462 cP
30 rpm	184 cP	184 cP	184 cP
60 rpm	92 cP	100 cP	92 cP

*) Data processed by researchers (2025)

Based on the test data results above, it can be explained that formulas 2 and 3 have a higher viscometer compared to formula 1, which means the formula is thicker and easier to use as a hand wash which produces more foam. Formula with a higher viscometer will usually provide a softer sensation on the skin for longer after use and provide better control when used.

So based on the tests above, it can be concluded that black tea dregs extract is acceptable as an ingredient in making hand wash formulations. The four parameters that have been tested show that black tea extract can have a good effect in making hand wash preparations. The formulas tested showed a safe pH, good homogeneity, effective foaming ability, stable specific gravity and a viscometer that supports comfortable use of the product. So black tea dregs extract can be considered as an active ingredient for making hand wash.

Which Formula Has the Best Physical Properties According to Hand Wash Preparation Standards

In determining which formula has the best physical properties according to hand wash preparation standards, the factors must first be considered and seen from the results of tests that have been carried out previously, such as testing pH, homogeneity, foam height, specific

gravity and viscosity. All parameters have an influence on the comfort and effectiveness of the hand wash preparation.

Organoleptic Test

The organoleptic test of the three formulations has a liquid form, which shows that these three products are designed to be liquid, so they are easy to use as hand wash or other similar products. This liquid form makes it easier to distribute the ingredients on the skin and provides a more comfortable use experience. All formulations show a smooth texture, this shows that the product has a soft consistency so it is comfortable to use on the skin. A smooth texture also usually indicates that the ingredients in the product have been mixed well and do not contain gauze particles that can irritate the skin.

The aroma may come from the acrylic material used in the product, such as black tea which has a quite distinctive aroma, which can provide a pleasant sensory experience and can influence the user's comfort in using the product. Meanwhile, the color of the hand wash is shiny brown. The F1 product which has a shiny brown color can indicate that the formulation contains natural components from black tea extract and other ingredients which give a natural shine to the hand wash. The shiny brown color can also indicate a higher concentration of active ingredients and natural dyes used in the product. Formulation 2 has a clearer brown color, which means this product is more transparent compared to F1. This can happen if there is further purification or filtering to remove unwanted impurities. Just like F2, F3 has a clear brown color, this clear color can indicate a finer formulation and may have lower levels of substances in terms of components that provide color. These products may also be easier to digest for consumers who prefer products with a cleaner, less viscous appearance.

Test pH

Based on SNI, the foam height requirements for hand wash are 13-220 mm and the stability of the foam for 5 minutes must last 60-70%. (Fatkhil Haque, Mulyani, and Hendick 2022). Meanwhile, the pH value of soap is not produced and does not fall within the pH range required by SNI for hand wash, namely between pH 4-10, so it is less safe to apply to the skin because at this pH it is hoped that irritation will not occur on the skin of the hands. (Luketsi, Wicaksono, and Rohmah 2022). Based on the pH test results for each formula 1, formula 2 and formula 3, the pH is the same, meaning that the taste is in the neutral pH range of around 5.5-7. It can be seen that formulation 1, formulation 2 and formulation 3 have a safe pH and will not pose a risk of causing irritation to the skin. So there is no significant difference based on the pH test that was carried out previously. The pH adjustment treatment to make it safe for the skin can be done by means of a strong acid-strong base titration. Titration can be done by adding a few drops of citric acid, both natural and synthetic.

Homogeneity Test

Furthermore, based on the homogeneity test, formula 1, formula 2 and formula 3 showed good results, which were in preparation and could be distributed well and evenly. So it can be said that the active ingredients in the formula are well distributed throughout the preparation which is important in ensuring cleaning effectiveness. There is no formula that has a clear advantage in the homogeneity test.

Foam Height Test

Based on the highest foam height test, it is ideal in hand wash products because foam can help to clean dirt and oil more effectively. However, very high foam levels must also be considered carefully, because they can result in excessive use of the product. Formula 2 produces quite high foam, namely 7.7 cm, which shows that there is a balance between cleaning efficiency and product use.

Specific Gravity

Specific gravity is a measure of the density of a material, which is mass per unit volume. Specific gravity is often used to show how dense and light a substance is in a product. The higher the specific gravity, the denser a substance will be in a certain space. The types in the three specific gravity formulas include:

Table 5. Specific Gravity

	Result Specific Gravity
Formulation 1	Formula 1, which is 47.17-47.18 grams, indicates that the product has a relatively lower density compared to other formulas, so a specific gravity of around 47 grams per volume indicates that the product is lighter and tends to be more liquid.
Formulation 2	Formula 2 is 49.26-49.87 grams, this formula has a higher weight compared to formula 1 and formula 3. It can be seen that formula 2 is denser, in other words the amount of material in the volume is of course more. Products with a high specific gravity tend to be more stable and provide a longer viscosity effect when used.
Formulation 3	Formula 3 is 47.78-48.18 grams, where formula 3 is slightly higher than formula 1, but still lower compared to formula 2. This means that hand wash has a slightly greater density compared to formula 1, but still lighter than formula 2.

*) Data processed by researchers (2025)

Based on the three formulas above, it can be concluded that formula 2 has a higher specific gravity and shows that hand wash is denser. This situation will affect product stability. Hand wash with a higher specific gravity tends to be more stable and spills easily. Meanwhile, a longer viscosity in a formula with a higher specific gravity can also provide a thicker sensation of use. So overall a stable specific gravity is an important factor in improving product quality.

Brockfield Viscometer Test

The test results from formula 1 show that the viscosity is relatively lower when compared to other formulas, for low RPM (6 RPM) the viscosity is 654 cP, which shows that the flow speed is slow, this product is quite thick but starts to decrease when the RPM speed

increases. Meanwhile, for higher RPM (60 RPM) the viscosity drops to 92 cP, where the product tested tends to flow more easily at high speeds. The test results on formula 2 show that the viscosity is higher when compared to formula 1 at 6 RPM with a value of 924 cP where the product is thicker at low flow speeds. Furthermore, the test results for formula 3 show the same viscosity pattern as formula 2, but slightly lower at 60 RPM, with a viscosity of 92 cP which flows more easily at high RPM compared to formula 2. At RPM 6 the viscosity is 924 cP which is the same as formula 2 shows higher elasticity than formula 1 at low speeds.

So it can be concluded that formula 2 and formula 3 have a higher viscosity when compared to formula 1 which looks both thicker. Higher viscosity provides a better experience when using hand wash because the product will come out of the packaging more easily and provide a soft sensation for the skin. Formula 2 is slightly thicker than formula 3 with a lower RPM speed (6 RPM) which provides a slightly better advantage in terms of softness.

Based on the test results above, it can be concluded that which formula has the best physical properties according to hand wash preparation standards, namely formula 2 which is considered the formula that has the best physical properties, because formula 2 produces quite high foam, namely (7.7 cm) which shows that it is effective in cleaning hands without producing excessive foam, and the slightly higher specific gravity when compared to other formulas shows that formula 2 has better stability in terms of texture related to viscosity and good user control and viscosity of formula 2 than various RPM also shows that the product is not too thick or too liquid which provides softness to the skin and comfort when using it. So all of these formulas have a safe pH and good homogeneity and formula 2 is superior in terms of foam height, specific gravity, viscosity which makes it the best formula for hand wash based on the expected physical standards.

CONCLUSION

Black tea pulp extract is acceptable to be used as an ingredient in the preparation of hand wash formulations. The four parameters that have been tested show that black tea extract can have a good effect in making hand wash preparations. The tested formulas show that the safe pH, good homogeneity, effective foamability, stable specific gravity and viscometer support the comfortable use of the product. So black tea pulp extract can be considered to be an active ingredient for making hand wash. The best physical properties according to the standards of hand wash preparations are formula 2 which is considered the formula that has the best physical properties, because formula 2 produces a high enough foam (7.7 cm) which shows that it is effective in cleaning hands without producing excessive foam, and a slightly higher specific gravity when compared to other formulas shows that formula 2 has better stability in terms of texture related to viscosity and good user control and the viscosity of formula 2 from various RPMs also shows that the product is not too thick or too liquid which gives softness to the skin and comfort when using it. So all these formulas have a safe pH and good homogeneity and formula 2 is superior in terms of foam height, specific gravity, viscosity which makes the best formula to be used as a hand wash based on the expected physical standards.

REFERENCE

- Akabata, Katharina Sienaputri, Mutia Firdaus Zr, Satrio Kuntolaksono, and Sri Handayani. 2023. "Proses Scale Up Pembuatan Sabun Mandi Sekali Pakai Dari Palm Cooking Oil (PCO) Dengan Penambahan Berbagai Jenis Parfum Scale Up Production Process of Single Use Soap from Palm Cooking Oil (PCO) with the Addition of Various Types of Perfume." *Jurnal IPTEK* 7(2): 41–46.
- Angraini, D. (2017). Pentingnya Pemberian Fluorida dalam Mencegah Karies Gigi pada Anak Sekolah Dasar. *Jurnal Kesehatan Gigi dan Mulut*, 30 (1).
- Asiva Noor Rachmayani. 2015. "PEMBUATAN DAN UJI STABILITAS FISIK SEDIAAN TONER AMPAS TEH HITAM (BLACK TEA)." : 6.
- Aulton, Michael E., dan Kevin M.G. Taylor. (2017). *Farmasi Aulton: Desain dan Pembuatan Obat*. Elsevier.
- Barua, D. N. (2018). *Tanaman Teh: Morfologi dan Anatomi* - Page 47
- Coleus, Miana, L Scutellarioides, Tenri Ayu Adri, Kivon Dince, and Enjeli Lololuan. (2023). "Formulasi Dan Evaluasi Sediaan Paper Soap Kombinasi Ekstrak Etanol Daun Trembesi (Samanea Saman (Jacq .) Merr) Dan Ekstrak Etanol Daun." 2(1): 30–42.
- Dandekar, N., & Lokhande, R. (2020). Consumer perception and preference for natural and organic skincare products: An exploratory study. *International Journal of Cosmetic Science*, 42(1), 25-32.
- Dhrik, Mahadri, and Repining Tiyas Sawji. (2023). Optimasi Sodium Lauryl Sulfat (SLS) Dan Asam Stearat Pada Formula Sediaan Sabun Cair Ekstrak Etanol Daun Sirih Hijau (Piper Betle L.). *Jurnal Ilmiah Mahaganesha* 2(1): 01–10.
- Dutta, S., *et al.* (2021). Flavonoid: Metabolit Sekunder Alami dengan Potensi Menjanjikan dalam Terapi.
- Fatkhil haque, Aina, Elly Mulyani, and Jimmy Hendick. (2022). Formulasi Sabun Cair Cuci Tangan Antibakteri Ekstrak Etanol Daun Cabe Rawit (*Solanum Frutescens*.L). *Indonesian Journal of Pharmaceutical Education* 2(2): 152–60. doi:10.37311/ijpe.v2i2.15510.
- Franz, R.M. (2015). Relevansi pH dalam Pengujian Stabilitas Sediaan Dermatologis. *Jurnal Ilmu Dermatologi*, 78(2), 72-79.
- Gupta, S. (2020). Pemanfaatan Berkelanjutan Sisa dan Limbah The. *Jurnal Produksi Bersih*, 258, 120609. Halaman: 5-9.
- Holkar, C.R., Jadhav, A.J., Pinjari, D.V., Pandit, A.B., & Muthia, P.S. (2016). Tinjauan kritis tentang pengolahan limbah tekstil: Pendekatan yang mungkin. *Teknologi Sumber Daya Hayati*.
- Iranawati, F., & Kartikaningsih, H. (2022). Introduction of appropriate technology for SMEs of fish cracker in Gresik City. *Abdimas Jurnal Pengabdian Masyarakat Universitas Merdeka Malang*, 7(1), 117–127. <https://doi.org/10.26905/abdimas.v7i1.5897>

- Kelebek, H., Selli, S., Canbas, A., & Cabaroglu, T. (2016). "Penentuan HPLC komposisi fenolik dan aktivitas antioksidan dari varietas pir, quince, dan apel yang ditanam di Turki." *Kimia Pangan*, 203, 500-507.
- Khan, M.I., Asha, M.R., Ravikumar, R., & Nagabhushan, S. (2016). Teknik ekstraksi ramah lingkungan untuk polifenol dari daun teh: sebuah tinjauan. *Kimia Pangan*, 212, 944-950.
- Kumar, A., *et al.* (2021). Studi Stabilitas Busa dari Larutan Sabun dan Deterjen. *Jurnal Penelitian Surfaktan dan Deterjen*, 23(3), hal. 112-117
- Lamusu, D. (2018). Uji organoleptik jalangkote ubi jalar ungu (*ipomoea batatas* l) sebagai upaya diversifikasi pangan. *Jurnal Pengolahan Pangan*, 3(1), 9-15.
- Luketsi, Wendianing Putri, Akbar Harun Wicaksono, and Devi Urianty Miftahul Rohmah. 2022. "FORMULASI SEDIAAN SABUN CUCI TANGAN CAIR ANTISEPTIK DENGAN KOMBINASI EKSTRAK KOPI ROBUSTA (*Coffea Canephora*) NGBEL PONOROGO." *Agroindustrial Technology Journal* 6(1): 14. doi:10.21111/atj.v6i1.6729.
- Makino, T., *et al.* (2017). Standar dan Peraturan di Bidang Produk Kosmetik. *Jurnal Internasional Ilmu Kosmetik*, 39(5), 448-456.
- Mondal, T. K. (2014). Teh *Camellia sinensis*. Dalam *Kemajuan dalam Agronomi Teh* (pp. 1-10). Springer, Cham.
- Morrison, George. (2016). *An Introduction to Physical Chemistry*. American Journal of Chemistry, Vol. 301, pp. 72-75.
- Pandian, R., *et al.* (2020). Penilaian Kapasitas Pembentukan Busa dan Stabilitas Formulasi Pembersih Cair Berbasis Surfaktan. *Jurnal Internasional Farmasi dan Ilmu Farmasi*, 12(1), hlm. 34-38.
- Puspitasari, R., & Prayogo, D. (2017). Penggunaan Metode Maserasi dalam Ekstraksi Bahan Aktif dari Rumput Laut. *Jurnal Teknologi dan Industri Pertanian*, Vol. 7, No. 2.
- Puspitasari, Anita Dwi, and Lean Syam Prayogo. (2017). Perbandingan Metode Ekstraksi Maserasi Dan Sokletasi Terhadap Kadar Fenolik Total Ekstrak Etanol Daun Kersen (*Muntingia Calabura*). *Jurnal Ilmiah Cendekia Eksakta* 1(2): 1-8.
- Putri, A. F. (2024). Pengembangan Formulasi Dan Evaluasi Sediaan Sunscreen Spray Ekstrak Etanol Rimpang Kencur (*Kaempferia galanga*) Sebagai Moisturizer. *Indonesian Journal of Health Science*, 4(2), 146-167. <https://doi.org/10.54957/ijhs.v4i2.561>
- Steffe, J. F. (2017). Metode Reologi dalam Rekayasa Proses Pangan. - Halaman: 182-183
- Smith, R. M. (2018). Metode Ekstraksi dalam Produksi Bahan Fungsional. Tinjauan Komprehensif dalam Ilmu Pangan dan Keamanan Pangan, 17(5), 1014-1036.
- Suyasa, Ida bagus. (2023). Optimasi Formulasi Sabun Cair Antibakteri Variasi Kombinasi Ekstrak Daun Legundi Dan Sirih. *Meditory: The Journal of Medical Laboratory* 11(1): 45-53. doi:10.33992/meditory.v11i1.2456.
- Wasillah, Asiah, Aulia Putri, Cindy Octavia Putri, and Esther Angelita Gurning. (2023). Peningkatan Keterampilan Pengolahan Sabun Cuci Piring Sederhana Untuk Masyarakat Di Desa Rambah Baru Improving Skills To Make Simple Dish Washer Soap For Communities In Rambah Baru Village Desa Rambah Baru Berada Di Kecamatan Rambah Samo , Kabupaten Rokan. 2(3).

- Wilson, C., Barber, T., (2018). "Formulasi Aroma dalam Produk Pembersih". *Jurnal Internasional Ilmu Kosmetik* , 40(5), hlm. 452-458.
- Wrolstad, R. E., *et al.* (2016). Protokol Terkini dalam Kimia Analitik Pangan.
- Yang, C.S., *et al.* (2020). Manfaat Kesehatan Teh: Hijau dan Hitam. [Ulasan Kritis dalam Ilmu Pangan dan Nutrisi], [Volume 60, Edisi 1]
- Zamrodah, Yuhanin. (2016). Formulasi Dan Uji Aktivitas Liquid Soap Ekstrak Daun Teh (*Camellia Sinensis L.*) Terhadap Bakteri *Staphylococcus Epidermidis* Dan *Propionibacterium Acne* Sebagai Antiacne." 15(2): 1–23.