Journal of Midwifery and Nursing, 7 (2) (2025) pp. 232-240

Published by: IOCSCIENCE

Journal of Midwifery and Nursing

Journal homepage: www.iocscience.org/ejournal/index.php/JMN

Optimization of lotion formulation 70 % ethanol extract longan leaves (dimocarpus logan l.)

Rony Setianto[1], Atia Fitriyawati[2], Belinda Arbitya Dewi[3]

[1,2,3]Program Studi S1 Farmasi, Sekolah Tinggi Ilmu Kesehatan Rajekwesi Bojonegoro, Indonesia

ARTICLE INFO

Article history:

Received Mar 19, 2025
Revised Mar 23, 2025
Accepted Apr 8, 2025

Keywords:

Formulatoin;
Leaves;
Lotion.

ABSTRACT

Longan (Dimocarpus longan L.) is a plant from Southeast Asia. One of the health benefits of the longan plant is that it can improve skin health. The aim of the research is optimization in selecting the formulation of the lotion dosage form from 70% ethanol extract from longan leaves. Making longan leaf extract by maceration. Three different concentration formulas of emulsifier span 80 and tween 80 are used to make the lotion. For four weeks, the performance of the lotion was tested organoleptically, in terms of homogeneity, acidity/pH, viscosity, spreadability and specific gravity. Research findings on longan leaf extract can be used as a lotion formulation. FII lotion is the best preparation and is quite stable. The conclusion of this research is that 70% ethanol extract of longan leaves can be made into a stable lotion preparation at varying concentrations of Span 80 and Tween 80 emulsifiers. The best formulation is formulation II.

Corresponding Author:

Rony Setianto,
S1 Farmasi,
Sekolah Tinggi Ilmu Kesehatan Rajekwesi Bojonegoro,
Jalan Raya Dander, Ngumpak Dalem, Dander, Griya Rajekwesi Indah, Ngumpak Dalem, Kec. Bojonegoro,
Kabupaten Bojonegoro, Jawa Timur 62171, Indonesia
Email: ronysetianto04@gmail.com

1. Introduction

Herbal cosmetics contain natural ingredients that provide benefits for the skin, which are safe and effective (Andi Permana, Nisa Nur Azizah, Shofia Difa Aulia 2022). Herbal cosmetics are safer than synthetic cosmetics because they have a gentler effect without harmful chemicals (Yuniarsih, Indriyati, and Munjiani 2010). The skin protects the body from the environment and skin damage can affect health and appearance, characterized by wrinkles and dryness (Tarigan and Panggabean 2020). The human body produces free radicals as a result of cellular metabolism, poor diet, unhealthy lifestyle choices, smoking, UV radiation, and environmental pollution (Wariyah and Candra Dewi 2013).

The benefits of antioxidants for the skin are to protect against UV, anti-aging, and neutralize free radicals (Sugiharto and Safitri 2020). Antioxidants protect body cells from damage by free radicals, prevent premature aging & health problems by neutralizing free radicals, preventing cell damage, and inflammation. The use of antioxidants helps maintain health & is effective in preventing chronic diseases (Pujiastuti and Kristiani 2019). Longan leaf extract has a strong antioxidant effect based on research. The effective dose is 400mg/kgbb with a power of 30.44%. Ethanol extract of longan leaves (*Dimocarpus longan* L.) has the potential to be an antioxidant due to its very strong activity (Narasukma Anggraeny and Setyopuspito Pramitaningastuti 2016).

Longan, a plant native to Southeast Asia, belongs to the sapindaceae family. It tastes delicious and has health benefits, including improving skin health (Hidayati, Styawan, and Khotimah 2020). Zhang

et al. conducted research that longan fruit extract produces quercetin compounds (3.1 mg/kg) and proanthocyanidins C1 (9.77 mg/kg) in pure form (Zhang et al., 2020).

The factors that have become the main obstacles in the production of lotion formulations based on longan leaf extract on an industrial scale are the availability and consistency of raw materials with good standards or that meet the requirements of physical and chemical stability, emulsifier selection, pH adjustment and skin irritation testing (Dominica et al., 2019).

Ethanol extract of 70% of longan leaves was formulated into lotion with three different formulas, Formulation 1 (0.5% extract), Formulation 2 (1.5% extract), and Formulation 3 (2.5% extract). The result was a thick, light green lotion with a homogeneous lemon aroma (Dwi Dominica***** 2019).
The high antioxidant and phenolic content in longan leaf extract shows strong antioxidant activity which has been tested in methanol, ethyl acetate, butanol and water fractions (Wijayanti, 2022). Longan leaves prevent premature skin aging thanks to antioxidants. Bioactive compounds act as antioxidants in research with IC50 values of less than 50 ppm, FI: 29.806 ppm, FII: 11.807 ppm, and FIII: 26.249 ppm, very strong antioxidant category (Trisnaputri et al., 2023).

As a natural antioxidant, longan leaf extract (Dimocarpus longan L.) contains flavonoids. These flavonoids can neutralize free radicals and protect the skin from oxidative damage. Studies show longan leaf extract has strong antioxidant properties. A study showed an IC50 value of 42.52 ppm of ethanol extract of fresh longan leaves, which indicates strong antioxidant properties. However, the effect of longan leaf extract may be different from that of synthetic antioxidants such as vitamin C. Another study showed that the ethanol extract of longan fruit pulp had an IC50 value of 255.94 mg/mL, while vitamin C had an IC50 value of 16.66 mg/mL, indicating that the antioxidant activity of the extract was lower than that of vitamin C (Syarifa Thursina et al., 2022; Trisnaputri et al., 2023).

Quercetin is ready to be used in research in the form of lotion or hand and body. Lotion is a cosmetic product to increase body appeal, protect the skin, and give fragrance. Usually, lotion is in the form of emulsion because it looks attractive (Sayuti, AS, and Suhendriyo 2016). Skin lotion consists of 10-15% oil, 5-10% moisturizer, and 75-85% water. Emulsifiers are added to prevent separation of the oil and water phases (Mardikasari et al., 2017). Liquid lotion with active ingredients, stable due to emulsifier, makes it easy to apply evenly to the skin (Megantara et al., 2017)

From the description above, the researcher is interested in formulating longan leaf lotion (Dimocarpus longan L.) and then the title is "Formulation of 70% Ethanol Extract Lotion Preparation of Longan Leaves (Dimocarpus longan L.)". This study aims to optimize the best formulation in terms of physical stability of longan leaves and is expected to increase the use of natural ingredient-based lotions.

2. Methods

The research method was conducted experimentally in the laboratory of Rajekwesi Bojonegoro Health Sciences College. The tools in the experiment were maceration set, blender, spatula, analytical balance (Mettler Toledo), rotary evaporator, porcelain cup, stirring rod, glass funnel, glassware (Pyrex® Iwaki Glass), hot plate (Heidolph), dropper pipette, test tube, pH meter (Jenway), and NDJ-85 Viscometer. This study used longan leaves, 70% ethanol, distilled water, carbomer, stearic acid, methyl paraben, propyl paraben, cera alba, methyl paraben, tween 80, span 80, glycerin, and oleum rosae.

To obtain bioactive compounds from plants, including longan (Dimocarpus longan) leaves, the maceration method is commonly used. In this process, the plant material is soaked in a solvent at room temperature for a period of time, allowing the bioactive compounds to dissolve in the solvent. The following are some examples of how factors such as extraction duration and solvent type impact the levels of bioactive compounds in longan leaf extracts: First, maceration duration and antioxidant activity. A study conducted by Widodo, S. et al. (2021) on mundu (Garcinia dulcis) leaves, although not specifically on longan leaves, showed that longer maceration times can reduce the antioxidant activity of the extract. This is due to the oxidation of bioactive compounds during the long extraction process. Therefore, to maintain the levels of bioactive compounds, it is crucial to determine the ideal maceration duration.

According to research conducted by Trisnaputri, D. R. (2023), the type and amount of bioactive compounds extracted are strongly influenced by the choice of solvent. Research conducted on longan leaf extract with 96% ethanol solvent shows that longan leaf extract contains phenols and flavonoids, which contribute to antioxidant activity.

Research Design

The design of this research is the creation of lotion formulation, organoleptic testing, homogeneity, acidity/pH, viscosity/thickness, spreadability, and specific gravity.

Sample Preparation

The determination of longan leaves (Dimocarpus longan L.) was carried out, then the simplicity formula was carried out by weighing 5 kilograms, washing it thoroughly with running water, and finally drying it. Grind the dry simplicia with a blender until it becomes a powder weighing 500 grams.

Making 70% Ethanol Extract from Longan Leaves

Weighing 500 grams of longan leaves, then adding 3 liters of 70% ethanol, and maceration for 5 days while stirring for a certain period. Using a vacuum rotary evaporator at a temperature between 500C - 600C, the filtrate is concentrated to obtain a thick 70% ethanol extract of longan leaves.

Lotion Formulation

Table 1 shows the formulation of 70% ethanol extract lotion of longan leaves. The composition of the ingredients containing the oil phase, namely stearic acid, Cera alba, Span 80, and propyl paraben is put in a cup and then heated on a water bath until melted with stirring. The composition of the ingredients containing the water phase, namely Tween 80, methyl paraben is put in a beaker and then heated with stirring. The process of stirring while adding the water phase slowly to the oil phase until a homogeneous cream base is formed with stirring until cold. Furthermore, the addition of longan leaf extract, carbomer, and glycerin with stirring until homogeneous. Finally, add the aroma and stir the mixture until it forms a homogeneous lotion.

The combination of Span 80 and Tween 80 in lotion formulations is essential to achieve optimal physical stability and absorbency. Span 80 (Sorbitan Monooleate) has an HLB of 4.3, which will form a water-in-oil (W/O) emulsion, while Tween 80 (Polysorbate 80) has an HLB of 15, which will form oil-in-water (O/W). Research conducted by Putri and Ariyanto (2022) showed that the appropriate HLB value ensures optimal emulsion particle size to increase the penetration and absorption of active ingredients into the skin. Adjustment of the ratio and concentration between Span 80 and Tween 80 in lotion formulations is essential to achieve good physical stability and optimal absorption. In addition, it can affect the texture and comfort in the use of lotion on the skin.

Preparation Testing

1. Organoleptic Test, organoleptic testing of lotion/products using human senses. Sensory testing is a testing method that uses human senses to measure product acceptance. Organoleptic testing uses the senses of sight or eyes, smell or nose, taste or tongue, and touch or hands (Gusnadi et al., 2021).
2. Homogeneity Test, homogeneity check to see if there are any coarse particles in the preparation, with the aim of ensuring that it is mixed evenly.
3. pH test, acidity or alkalinity of a formulation is determined by pH measurement to prevent skin irritation. Testing the degree of acidity/pH can use a pH meter. The appropriate pH value for a lotion is between 4.5-8.0, this value is the standard of SNI-16-3499-1996(SNI 16-4399-1996 Standar 1996).
4. Viscosity Test, Brookfield viscometer with four spindles and six rpm is used to measure viscosity. The viscosity test results can be said to meet the requirements if they are between 2,000 and 50,000 cps. This figure is a standard requirement of SNI-16-3499-1996(SNI 16-4399-1996 Standar 1996).

5. Spreadability Test, spreadability test by placing a 0.5 gram lotion sample in the middle of the watch glass. Then take another round glass and place it on the lotion preparation and let it sit for 1 minute, then record the diameter of the spread. Then take another round glass and place it on the lotion preparation and let it sit for another minute, then record the diameter of the spread (Mardikasari et al., 2017).
6. Specific Gravity Test, empty and filled pycnometers are used for specific gravity tests. The requirement for specific gravity test results is at 0.95-1.05. This figure is a standard requirement of SNI-16-3499-1996(SNI 16-4399-1996 Standar 1996).

3. Results and Discussion

Table 1.
Formulation of 70% ethanol extract lotion from longan leaves (Dimocarpus longan L.)

Material	Material function	Concentration (%b/b)		
		F1	F2	F3
Longan Leaf Extract	Active substance	0,5	0,5	0,5
Carbomer	Viscosity enhancer	0,5	0,5	0,5
Stearic acid	Viscosity enhancer	5	5	5
Methyl paraben	Preservative	0,18	0,18	0,18
Propyl paraben	Preservative	0,02	0,02	0,02
Cera alba	Emulgator	2	2	2
Tween 80	Emulgator	8,9	9,5	10
Span 80	Emulgator	1,1	2	2,5
Gliserin	Humectant	0,5	0,5	0,5
Oleum citri	Fragrance	0,5	0,5	0,5
Aquadest	Carrier	ad 100	ad 100	ad 100

Table 2.
Organoleptic Test Results

2nd week	Organoleptic	Formulation		
		F1	F2	F3
I	Shape	Thick	Thick	Thick
	Color	Cream	Cream	Cream
	Smell	Oleum Roseae	Oleum Rosae	Oleum Rosae
II	Shape	Thick	Thick	Thick
	Color	Cream	Cream	Cream
	Smell	Oleum Rosae	Oleum Rosae	Oleum Rosae
III	Shape	Thick	Thick	Thick
	Color	Cream	Cream	Cream
	Smell	Oleum Rosae	Oleum Rosae	Oleum Rosae
IV	Shape	Thick	Thick	Thick
	Color	Cream	Cream	Cream
	Smell	Oleum Rosae	Oleum Rosae	Oleum Rosae

Table 3.
Homogeneity Test Results

2nd week	Formulation		
	F1	F2	F3
I	Homogeneous	Homogeneous	Homogeneous
II	Homogeneous	Homogeneous	Homogeneous
III	Homogeneous	Homogeneous	Homogeneous
IV	Homogeneous	Homogeneous	Homogeneous

Table 4.
pH Test Results

2nd week	Formulation		
	F1	F2	F3
I	5.2	5,8	6.1
II	5.3	6	6.4
III	5.3	6,3	6.5
IV	6.8	7.7	7.9

Table 5.
Viscosity Test Results

2nd week	Formulation		
	F1	F2	F3
I	32045 cps	¦1447 cps	47635 cps
II	30362 cps	¦8191 cps	46965 cps
III	29559 cps	¦7526 cps	45833 cps
IV	13644 cps	4908 cps	15414 cps

Table 6.
Spread Power Test Results

2nd week	Load weight (g)	Formulation		
		F1 (cm)	F2 (cm)	F3 (cm)
I	50	4,7	5,1	5,2
	100	4,8	5,1	5,3
	200	4,9	5,2	5,5
II	50	5,0	5,2	5,4
	100	5,2	5,4	5,6
	200	5,4	5,5	5,7
III	50	5,5	5,6	5,8
	100	5,7	5,8	5,9
	200	5,9	6	6,2
IV	50	6,2	6,4	6,5
	100	6,3	6,5	6,7
	200	6,4	6,6	6,8

Table 7.
Specific Gravity Test Results

2nd week	Results	Formulation		
		F1(g/ml)	F2(g/ml)	F3(g/ml)
I	Empty picno(g)	18,55	18,55	18,55
	Pikno+ lotion(g)	40,52	42,12	42,35
	Pycno volume(ml)	25	25	25
	Amount	0,8788	0,9508	0,952
	Empty picno(g)	18,55	18,55	18,55
	Pikno+ lotion(g)	40,95	42.33	42,48
	Pycno volume(ml)	25	25	25
II	Amount	0,896	0,9512	0,9732
	Empty picno(g)	18,55	18,55	18,55
	Pikno + lotion(g)	42,96	43,12	43,53
	Pycno volume(ml)	25	25	25
	Amount	0,9764	0,9828	0.9992
III	Empty picno(g)	18,55	18,55	18,55
	Pikno + lotion(g)	44,86	45,02	46,13
	Pycno volume(ml)	25	25	25
	Amount	1,0524	1,0588	1,1032

2nd week	Results	Formulation		
		F1(g/ml)	F2(g/ml)	F3(g/ml)
	Empty picno(g)	18,55	18,55	18,55
	Pikno+ lotion(g)	40,52	42,12	42,35
	Pycno volume(ml)	25	25	25
IV	Amount	0,8788	0,9508	0,9520
	Empty picno(g)	18,55	18,55	18,55
	Pikno+ lotion(g)	40,95	42.33	42,48
	Pycno volume(ml)	25	25	25
	Amount	0,896	0,9512	0,9732

Lotion is an emulsion with or without medication for topical use, easily absorbed by the skin, dries quickly, and leaves a thin layer of medication (Tsabitah et al., 2020). In this study, the lotion used longan leaves with variations in emulsifying ingredients between Tween 80 - Span 80.

In the organoleptic test in F1, F2 and F3 the making of longan leaf extract lotion was observed directly to achieve this. The parameters examined were the appearance, color and aroma of the formulation of longan leaf extract lotion. In all three formulations, it produced a cream color and was in the form of a lotion base. In all three formulations, it had a distinctive odor of oleum rosae. Observations in this study on the organoleptic test of the three formulas were carried out for 4 weeks of testing.

The uniformity of the composition is determined by the homogeneity test. There are no visible coarse grains even though there are differences in the concentration of emulsifiers in each formula, according to the results.

The pH value of seabuckthorn nanoemulsion is influenced by the concentration of Tween 80 ($p < 0.05$), with the higher concentration of Tween 80 addition, the higher the pH acidity value of the preparation. The pH value of Tween 80 is in the range of 6.0-8.0. After 90 days of storage, the pH of nanoemulsions in all formulas remained constant ($p = 0.43$) increasing the amount of surfactant can cause nanoemulsions using variations of Tween 80 to produce higher pH values than other formulas (Singh, Kaur, and Singh 2023). The pH value of the preparation is influenced by the concentration of Tween 80, causing an increase in pH in each test. Because Tween 80 has a pH of 6.0-8.0.

The reduction in viscosity results from the higher ratio of Tween 80 which is hydrophilic, meaning that the polar heads will face the water phase to attract more water and reduce viscosity (Devi, Mulyani, and Suhendra 2019). Longer storage time and decreased viscosity are caused by a decrease in testing on the next day and a significant decrease in testing on the fourth week. The concentration of water decreases as the concentration increases. Tween 80 is hydrophilic so it tends to enter the liquid phase. The more water molecules enter, and if the concentration increases, the viscosity of the water is low.

The statistical test value at a load of 50 g, 100 g, 200 g, 500 g produced a maximum dispersion force of 0.00026, 0.00000349 and 0.000000894 smaller than the significance level of 0.05 ($\alpha = 5\%$). The lotion's spreadability was significantly affected by changing the Tween 80 ratio. The spreadability was very low so that water had difficulty reaching the skin and causing skin irritation. Currently the spreadability is too large or higher than 7 cm, and the lotion cannot be absorbed freely because the spreadability is too large or higher than 7 cm (Saryanti, Setiawan, and Safitri 2019). Because it results that the treatment with the addition of Tween 80 has a real effect on the spreadability of the lotion. The nature of Tween 80 which likes water makes it prefer liquid form. This is also because the longer the storage time, the longer the environmental influence on the preparation. The volume of water in the preparation can increase if the packaging is not tight enough so that it can absorb water from the outside.

Different specific gravity values result in an increase in the specific gravity of liquid water. The higher specific gravity of Tween 80, which is hydrophilic, makes the polar head more attracted to the water phase, absorbing more water and reducing the viscosity, and the density of water is greater (Devi et al., 2019). The test results showed that the specific gravity increased due to variations in the specific

gravity value caused by water tension. The higher relative density of Tween 80, indicated by its hydrophilicity, shows this, when the polar head moves to the water phase and the more water, the lower the viscosity, making the lotion more liquid. The longer the storage time, the longer the preparation is affected by the environment. It can also be caused by the use of packaging that is not tight enough so that it can absorb water from the outside or a loose closure can cause the volume of water in the preparation to increase. And the more concentration is added, the higher the resulting specific gravity.

4. Conclusion

It can be concluded that the best formulation in this study is formulation II. In formulas I, II, and III which have been evaluated for organoleptic testing, homogeneity testing, acidity/pH testing, viscosity testing, spreadability testing and specific gravity testing. Fulfilling the physical test parameter standards contained in the specified SNI and FII, the best formulation.

There are many antioxidants in longan leaf extract, including flavonoids, polyphenols, and quercetin. These compounds serve to neutralize free radicals and protect the skin from oxidative damage. Lotions with a concentration of 0.5% longan leaf extract in a study conducted by Dominica, D., & Handayani, D. (2019) had physical characteristics of slightly thick texture, light green color, lemon smell, good homogeneity, pH around 6, and spreadability of 5-7 cm and were liked by the panelists. This lotion remained stable during the four-week test. This study provides a solid foundation for the development of safe and effective natural ingredient-based cosmetics. To provide natural antioxidant benefits, longan leaf extract can be incorporated into various skincare products, such as lotions, creams, or serums.

Lime peel can be an alternative to the addition of active ingredients in longan leaf extract body lotion. Lime peel (Citrus aurantiifolia (Christm.) Swingle) contains flavonoids, phenols, tannins and vitamin C compounds. The highest content in lime peel is flavonoids because it acts as an antioxidant that has activity in capturing the bad effects of free radicals that cause damage to the skin, such as wrinkles, dryness, scaling and cracking.

References

Hidayati, Nurul, Anita Agustina Styawan, and Anggit Khusnul Khotimah. 2020. "Formulasi Dan Uji Sifat Fisis Sirup Ekstrak Etanol Daun Sukun (Artocarpus Altilis) (Parkinson Ex F.A.Zorn) Fosberg." *The 12th University Research Colloqium 2020* 438–44.

Mardikasari, Sandra Aulia, Andi Nafisah Tendri Adjeng Mallarangeng Mallarangeng, Wa Ode Sitti Zubaydah, and Endeng Juswita2 Juswita. 2017. "Uji Stabilitas Lotion Dari Ekstrak Etanol Daun Jambu Biji (*Psidium Guajava* L.)." *Jurnal Farmasi, Sains, Dan Kesehatan* 3(2):28–32.

Megantara, I. N. A. P., K. Megayanti, R. Wirayanti, I. B. D. Esa, N. P. A. D. Wijayanti, and P.Yustiantara. 2017. "Formulasi Lotion Ekstrak Buah Raspberry (Rubus rosifolius) Dengan Variasi Konsentrasi Trietanolamin Sebagai Emulgator Serta Uji Hedonik Terhadap Lotion." *Jurnal Farmasi Udayana* 1. doi: 10.24843/jfu.2017.v06.i01.p01.

Narasukma Anggraeny, Ebta, and Anastasia Setyopuspito Pramitaningastuti. 2016. "Uji Daya Antiinflamasi Dan Antipiretik Ekstrak Etanol Daun Lengkeng (Dimocarpus Longan Lour) Pada Tikus Putih Jantan (Rattus Norvegicus) Galur Wistar." *Jurnal Ilmiah Farmasi* 12(2):1–14. doi: 10.20885/jif.vol12.iss2.art1.

Pujiastuti, Anasthasia, and Monica Kristiani. 2019. "Formulasi Dan Uji Stabilitas Mekanik Hand and Body Lotion Sari Buah Tomat (Licopersicon Esculentum Mill.) Sebagai Antioksidan." *Jurnal Farmasi Indonesia* 16(1):42–55. doi: 10.31001/jfi.v16i1.468.

Saryanti, Dwi, Iwan Setiawan, and Romadona Ayu Safitri. 2019. "Optimasi Formula Sediaan Krim M/A Dari Ekstrak Kulit Pisang Kepok (Musa Acuminata L.)." *Jurnal Riset Kefarmasian Indonesia* 1(3):225–37.

Sayuti, Nutrisia Aquariushinta, Indarto AS, and Suhendriyo Suhendriyo. 2016. "Formulasi Hand & Body Lotion Antioksidan Ekstrak Lulur Tradisional." *Interest : Jurnal Ilmu Kesehatan* 5(2):174–81. doi: 10.37341/interest.v5i2.51.

Singh, Prastuty, Gurkirat Kaur, and Arashdeep Singh. 2023. "Physical, Morphological and Storage Stability of Clove Oil Nanoemulsion Based Delivery System." *Food Science and Technology International* 29(2):156–67. doi: 10.1177/10820132211069470.

SNI 16-4399-1996 Standar. 1996.

Sugiharto, Resita, and Cikra Ikhda Nur Hamida Safitri. 2020. "Formulasi Dan Uji Mutu Fisik Lotion Ekstrak Kunyit (

Curcuma Domestica Val .)." *Artikel Pemakalah Paralel* 296–305.

Tarigan, Jacub, and Lewinda Panggabean. 2020. "Formulasi Sediaan Lotion Dari Ekstrak Etanol Biji Buah Salak (Salacca zalacca (gaertn.) voss.) Formulation Of Lotion From Ethanol Extract Of Zalacca Seeds (Salacca Zalacca(Gaertn.) Voss.)." *Jurnal Dunia Farmasi* 4(2):82–89.

Trisnaputri, Dian Rahmaniar, Citra Dewi, Siti Nur Anisa, Muhammad Isrul, and Wa Ode Ida Fitriah. 2023. "Formulasi Dan Uji Aktivitas Antioksidan Sediaan Masker Gel Peel-Off Ekstrak Etanol Daun Kelengkeng (Dimocarpus Longan L.)." *Jurnal Mandala Pharmacon Indonesia* 9(2):432–49. doi: 10.35311/jmpi.v9i2.402.

Andi Permana, Nisa Nur Azizah, Shofia Difa Aulia, N. Y. (2022). REKOMENDASI TERBAIK 9 JENIS TANAMAN SEBAGAI BAHAN DASAR ZAT AKTIF PEMBUATAN GEL SERUM ANTI JERAWAT. *Journal of Economic Perspectives*, *2*(1), 1–4.

Devi, I. G. A. S. K., Mulyani, S., & Suhendra, L. (2019). Pengaruh Nilai Hydrophile-Liphophile Balance (HLB) dan Jenis Ekstrak terhadap Karakteristik Krim Kunyit-Lidah Buaya (Curcuma domestica val.-Aloe Vera). *Jurnal Ilmiah Teknologi Pertanian Agrotechno*, *4*(2), 54. https://doi.org/10.24843/jitpa.2019.v04.i02.p01

Dominica, D., Handayani Prodi, D. S., Matematika dan Ilmu Pengetahuan Alam, F., & Bengkulu, U. (2019). Formulasi dan Evaluasi Sediaan Lotion dari Ekstrak Daun Lengkeng (Dimocarpus Longan) sebagai Antioksidan. *Jurnal Farmasi Dan Ilmu Kefarmasian Indonesia*, *6*(1), 1.

Dwi Dominica*, D. H. (2019). Formulasi dan Evaluasi Sediaan Lotion dari Ekstrak Daun Lengkeng (Dimocarpus Longan) sebagai Antioksidan. *Jurnal Farmasi Dan Ilmu Kefarmasian Indonesia Vol.*, *6*(1), 1–7.

Gusnadi, D., Taufiq, R., & Baharta, E. (2021). Uji Organoleptik dan Daya Terima pada Produk Mousse Berbasis Tapai Singkong sebagai Komoditi UMKM di Kabupaten Bandung. *Jurnal Inovasi Penelitian*, *1*(12), 2883–2888.

Hidayati, N., Styawan, A. A., & Khotimah, A. K. (2020). Formulasi dan Uji Sifat Fisis Sirup Ekstrak Etanol Daun Sukun (Artocarpus altilis) (Parkinson ex F.A.Zorn) Fosberg. *The 12th University Research Colloqium 2020*, 438–444.

Mardikasari, S. A., Mallarangeng, A. N. T. A. M., Zubaydah, W. O. S., & Juswita, E. J. (2017). Uji Stabilitas Lotion dari Ekstrak Etanol Daun Jambu Biji (*Psidium guajava* L.). *Jurnal Farmasi, Sains, Dan Kesehatan*, *3*(2), 28–32.

Megantara, I. N. A. P., Megayanti, K., Wirayanti, R., Esa, I. B. D., Wijayanti, N. P. A. D., & Yustiantara, P. S. (2017). FORMULASI LOTION EKSTRAK BUAH RASPBERRY(Rubus rosifolius) DENGAN VARIASI KONSENTRASI TRIETANOLAMIN SEBAGAI EMULGATOR SERTA UJI HEDONIK TERHADAP LOTION. *Jurnal Farmasi Udayana*, 1. https://doi.org/10.24843/jfu.2017.v06.i01.p01

Narasukma Anggraeny, E., & Setyopuspito Pramitaningastuti, A. (2016). Uji Daya Antiinflamasi Dan Antipiretik Ekstrak Etanol Daun Lengkeng (Dimocarpus Longan Lour) Pada Tikus Putih Jantan (Rattus Norvegicus) Galur Wistar. *Jurnal Ilmiah Farmasi*, *12*(2), 1–14. https://doi.org/10.20885/jif.vol12.iss2.art1

Pujiastuti, A., & Kristiani, M. (2019). Formulasi dan Uji Stabilitas Mekanik Hand and Body Lotion Sari Buah Tomat (Licopersicon esculentum Mill.) sebagai Antioksidan. *Jurnal Farmasi Indonesia*, *16*(1), 42–55. https://doi.org/10.31001/jfi.v16i1.468

Saryanti, D., Setiawan, I., & Safitri, R. A. (2019). Optimasi Formula Sediaan Krim M/A Dari Ekstrak Kulit Pisang Kepok (Musa acuminata L.). *Jurnal Riset Kefarmasian Indonesia*, *1*(3), 225–237.

Sayuti, N. A., AS, I., & Suhendriyo, S. (2016). Formulasi Hand & Body Lotion Antioksidan Ekstrak Lulur Tradisional. *Interest : Jurnal Ilmu Kesehatan*, *5*(2), 174–181. https://doi.org/10.37341/interest.v5i2.51

Singh, P., Kaur, G., & Singh, A. (2023). Physical, morphological and storage stability of clove oil nanoemulsion based delivery system. *Food Science and Technology International*, *29*(2), 156–167. https://doi.org/10.1177/10820132211069470

SNI 16-4399-1996 Standar. (1996). *SNI 16-4399-1996.pdf*.

Sugiharto, R., & Safitri, C. I. N. H. (2020). Formulasi dan Uji Mutu Fisik Lotion Ekstrak Kunyit (Curcuma domestica Val .). *Artikel Pemakalah Paralel*, 296–305.

Syarifa Thursina, C., Kurniawan Bakri, T., Tinggi Ilmu Kesehatan Assyifa Aceh, S., Aceh, B., Aceh, P., Farmasi, J., Matematika dan Ilmu Pengetahuan Alam, F., & Syiah Kuala, U. (2022). *Uji Aktivitas Antioksidan Ekstrak Etanol Daging Buah Kelengkeng (Dimocarpus longan Lour.) Menggunakan Metode DPPH* (Vol. 4, Issue 2).

Tarigan, J., & Panggabean, L. (2020). FORMULASI SEDIAAN LOTION DARI EKSTRAK ETANOL BIJI BUAH SALAK (Salacca zalacca (Gaertn.) Voss.) FORMULATION OF LOTION FROM ETHANOL EXTRACT OF ZALACCA SEEDS (Salacca zalacca(Gaertn.) Voss.). *Jurnal Dunia Farmasi*, *4*(2), 82–89.

Trisnaputri, D. R., Dewi, C., Anisa, S. N., Isrul, M., & Fitriah, W. O. I. (2023a). Formulasi dan Uji Aktivitas Antioksidan Sediaan Masker Gel Peel-Off Ekstrak Etanol Daun Kelengkeng (Dimocarpus longan L.). *Jurnal Mandala Pharmacon Indonesia*, *9*(2), 432–449. https://doi.org/10.35311/jmpi.v9i2.402

Trisnaputri, D. R., Dewi, C., Anisa, S. N., Isrul, M., & Fitriah, W. O. I. (2023b). Formulasi dan Uji Aktivitas Antioksidan Sediaan Masker Gel Peel-Off Ekstrak Etanol Daun Kelengkeng (Dimocarpus longan L.). *Jurnal Mandala Pharmacon Indonesia*, *9*(2). https://doi.org/10.35311/jmpi.v9i2.402

Tsabitah, A. F., Zulkarnain, A. K., Wahyuningsih, M. S. H., & Nugrahaningsih, D. A. A. (2020). Optimasi Carbomer, Propilen Glikol, dan Trietanolamin Dalam Formulasi Sediaan Gel Ekstrak Etanol Daun Kembang Bulan (Tithonia diversifolia). *Majalah Farmaseutik*, *16*(2), 111. https://doi.org/10.22146/farmaseutik.v16i2.45666

Wariyah, C., & Candra Dewi, S. H. (2013). Penggunaan Pengawet dan Pemanis Buatan pada Pangan Jajanan Anak Sekolah (PJAS) di Wilayah Kabupaten Kulon Progo-DIY. *AgriTECH*, *33*(2), 146–153. https://doi.org/10.22146/agritech.9807

Wijayanti, A. A. T. (2022). Perbandingan Aktivitas Antibakteri Ekstrak Etanol Daun Kelengkeng (Dimocarpus longan L) Terhadap Escherichia coli Menggunakan Metode Disk Diffusion Dan Agar Diffusipn. *Skripsi*, 1–87.

Yuniarsih, N., Indriyati, A., & Munjiani, A. (2010). Review : Masker Wajah Herbal Di Indonesia 1 1 Nia Yuniarsih , 2 Aeni Indriyati , 3 Ani Munjiani. *Buana Farma*, *1*, 17–21.

Zhang, X., Guo, S., Ho, C. T., & Bai, N. (2020). Phytochemical constituents and biological activities of longan (Dimocarpus longan Lour.) fruit: a review. *Food Science and Human Wellness*, *9*(2), 95–102. https://doi.org/10.1016/j.fshw.2020.03.001