LAMPIRAN

Lampiran 1. Hasil determinasi tanamanan seledri

UNIVERSITAS SETIA BUDI

UPT-LABORATORIUM

Jl. Letjen Sutoyo, Mojosongo-Solo 57127 Telp. 0271-852518, Fax. 0271-853275

Nomor : 226/DET/UPT-LAB/26.05.2021
Hal : Hasil determinasi tumbuhan
Lamp. : -

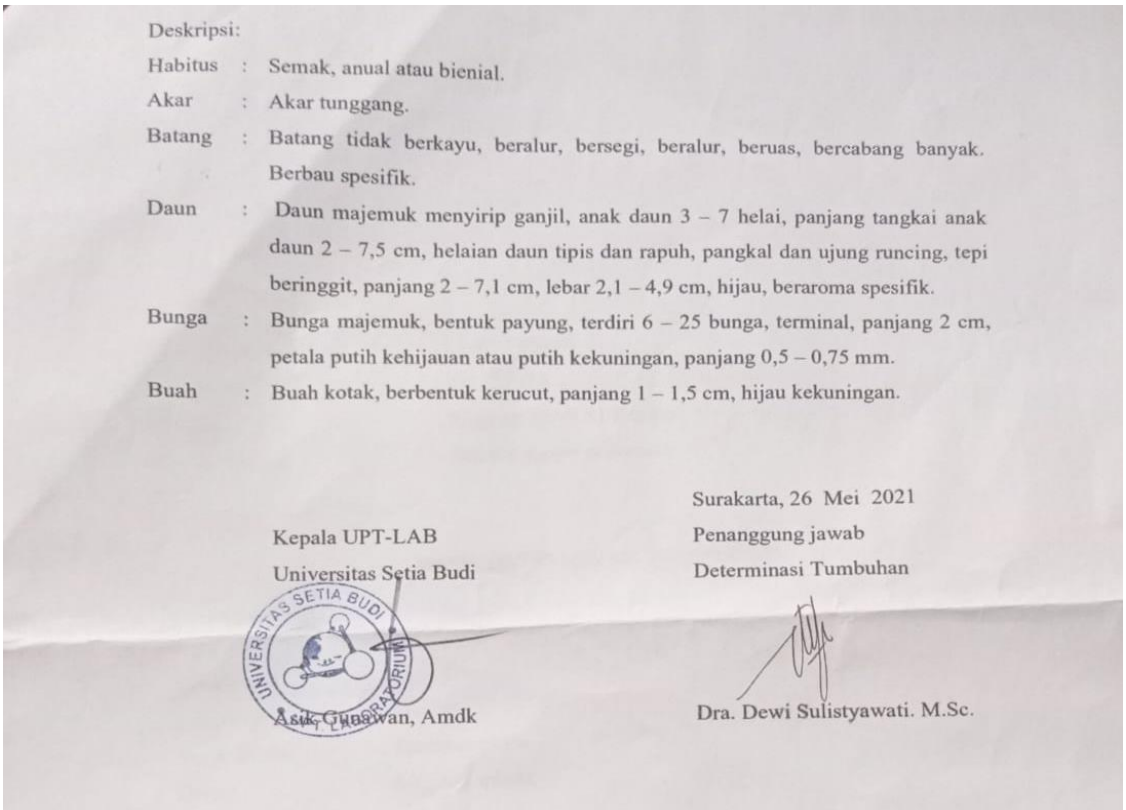
Nama Pemesan : Linda Yulianti
NIM : 23175232A
Alamat : Program Studi S1 Farmasi, Universitas Setia Budi, Surakarta
Nama sampel : Seledri/*Apium graveolens* L.

HASIL DETERMINASI TUMBUHAN

Klasifikasi

Kingdom : Plantae
Super Divisi : Spermatophyta
Divisi : Magnoliophyta
Kelas : Magnoliopsida
Ordo : Apiales
Famili : Apiaceae
Genus : Apium
Species : *Apium graveolens* L

Hasil Determinasi menurut C.A. Backer & R.C. Bakhuizen van den Brink Jr. (1963) :
1b – 2b – 3b – 4b – 12b – 13b – 14b – 17b – 18b – 19b – 20b – 21b – 22b – 23b – 24b – 25b – 26b – 27a – 28b – 29b – 30b – 31a – 32a – 33c – 631a. familia 148. Apiaceae. 1b – 18b – 19b – 20a – 21a. 10. Apium. *Apium graveolens* L.



Deskripsi:

Habitus : Semak, anual atau bienial.

Akar : Akar tunggang.

Batang : Batang tidak berkayu, beralur, bersegi, beralur, beruas, bercabang banyak. Berbau spesifik.

Daun : Daun majemuk menyirip ganjil, anak daun 3 – 7 helai, panjang tangkai anak daun 2 – 7,5 cm, helaian daun tipis dan rapuh, pangkal dan ujung runcing, tepi beringgit, panjang 2 – 7,1 cm, lebar 2,1 – 4,9 cm, hijau, beraroma spesifik.

Bunga : Bunga majemuk, bentuk payung, terdiri 6 – 25 bunga, terminal, panjang 2 cm, petala putih kehijauan atau putih kekuningan, panjang 0,5 – 0,75 mm.

Buah : Buah kotak, berbentuk kerucut, panjang 1 – 1,5 cm, hijau kekuningan.

Surakarta, 26 Mei 2021

Kepala UPT-LAB
Universitas Setia Budi

Penanggung jawab
Determinasi Tumbuhan

UNIVERSITAS SETIA BUDI
UPT. LABORATORIUM

Asik Gunawan, Amdk

Dra. Dewi Sulistyawati. M.Sc.

Lampiran 2. Gambar bahan penelitian

Tanaman seledri **Seledri segar** **Tanaman seledri kering Dan alat blender**

Serbuk tanaman seledri

Lampiran 3. Gambar proses maserasi

Botol maserasi

Alat penyaring

Ayakan No 40

Rotary evaporator

Ektrak kental seledri

Moisture Balance

Lampiran 4 Alat pengujian masker rambut ektrak etanol seledri

Alat uji daya lekat

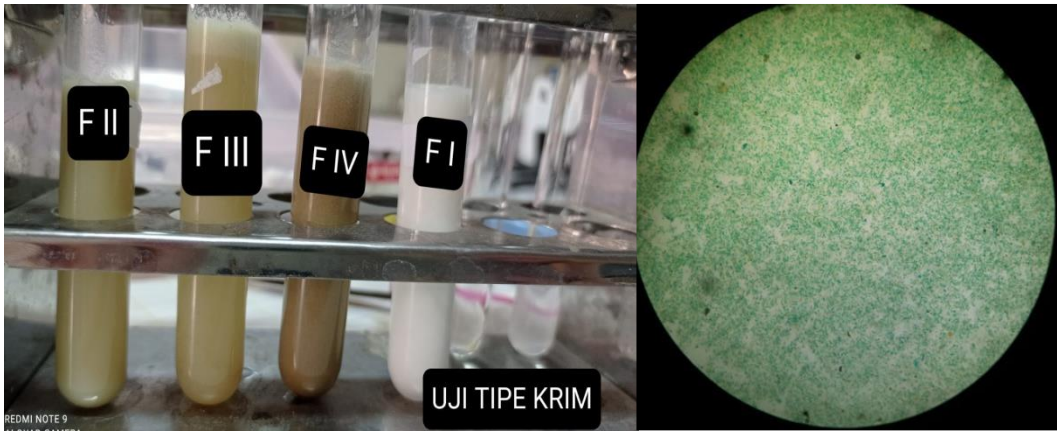
Alat uji daya sebar

Alat uji viskositas

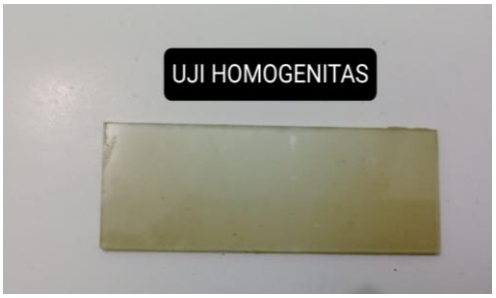
Alat uji pH

Masker rambut ekstrak etanol seledri

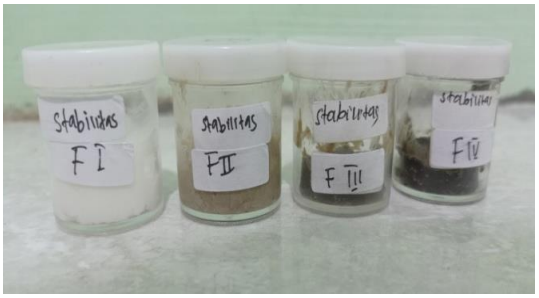
Uji tipe krim



Uji homogenitas



Uji stabilitas *Freeze and thaw*



Lampiran 5 Uji bebas etanol

Lampiran 6 Uji kandungan kimia

1. **Alkaloid**
   - **Alkaloid ragendroff**

Serbuk seledri **Ekstrak seledri**

   - **Alkaloid mayer**

Sebuk seledri **ekstrak seledri**

2. **Saponin**

Saponin serbuk seledri **saponin ekstrak seledri**

3. **Tanin**

Tanin serbuk seledri **Tanin ekstrak seledri**

4. **Flavonoid**

Flavonoid serbuk seledri **Flavonoid ekstrak seledri**

Lampiran 7 Jurnal formulasi shampo ekstrak seledri Pytirosporum ovale

PHARMACY, Vol.09 No. **02** Agustus 2012 ISSN 1693-3591

FORMULASI SHAMPO ANTIKETOMBE EKSTRAK ETANOL SELEDRI (*Apium graveolens* L) DAN AKTIVITASNYA TERHADAP JAMUR *Pityrosporum ovale*

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ABSTRAK

Penelitian menggunakan 4 formula shampo, dengan variasi konsentrasi ekstrak etanol seledri sebesar 0,1% (formula I), 1% (formula II), 10% (formula III), dan 0% (kontrol negatif). Uji sifat fisik sediaan meliputi uji organoleptis, pengukuran pH, uji tinggi busa, uji viskositas, uji aktivitas antiketombe. Data diuji secara statistik menggunakan anava. Pengaruh konsentrasi ekstrak terhadap masing-masing sifat fisik keempat formula shampo antiketombe menunjukan stabilitas yang baik dilihat dari parameter organoleptis dan pH. Sedangkan pengaruh terhadap tinggi busa dan viskositas menunjukan semakin tinggi konsentrasi ekstrak maka hasilnya semakin baik. Uji aktivitas antiketombe menunjukan bahwa sediaan shampo antiketombe ekstrak seledri 10% mempunyai daya antiketombe yang baik. Shampo formulasi III dengan konsentrasi ekstrak etanol 10% mempunyai aktivitas antifungi paling baik dibandingkan dengan formula I dengan konsentrasi ekstrak 0,1% dan formula II dengan konsentrasi ekstrak 1%,

Kata kunci : shampo antiketombe, seledri (*Apium graveolens* L), jamur *Pityrosporum ovale*.

Pendahuluan

Rambut yang berketombe hingga kini masih menjadi salah satu penyebab berkurangnya kepercayaan diri yang dapat menghambat kenyamanan beraktivitas. Ketombe adalah suatu gangguan berupa pengelupasan kulit mati secara berlebihan di kulit kepala, kadang disertai pula dengan *pruritus* (gatal-gatal) dan peradangan (Toruan, I989). Penyebab ketombe dapat berupa sekresi kelenjar keringat yang berlebihan atau adanya peranan mikroorganisme di kulit kepala yang menghasilkan suatu metabolit yang dapat menginduksi terbentuknya ketombe di kulit kepala (Harahap, 1990).

Mikroorganisme yang diduga sebagai penyebab utama ketombe adalah *Pityrosporum ovale*. Jamur ini sebenarnya merupakan flora normal di kulit kepala, namun pada kondisi rambut dengan kelenjar minyak berlebih, jamur ini dapat tumbuh dengan subur (Figueras

Lampiran 8 Jurnal bagian seledri berefek antijamur Pytirosporum ovale (minyak atsiri)

CELERY HERB ESSENTIAL OIL IN THE FORMULATION OF ANTIDANDRUFF HAIR TONIC AGAINST *PITYROSPORUM OVALE*

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Abstract

Essential oil from *Apium graveolens* (celery), a species belonged to *Apiceae*, was isolated, identified, and tested its activity against fungi *Pityrosporum ovale*, fungi that cause dandruff problem. Essential oil isolation was conducted by steam distillation. The identification with GC-MS showed that the major compound of celery essential oil was 3-isobutylidenphalide. The anti-fungal activity test was performed using pure celery oil and celery oil added with virgin coconut oil (VCO) and paraffin oil that are usually used as components in hair tonic formulation. The bioactivity test showed that celery oil, whether in pure form or in hair tonic formulation exhibited excellent growth inhibition activity of *Pityrosporum ovale*

Keywords: *essential oil, celery, Apium graveolens, Pityrosporum ovale*

Introduction

Celery belongs to Apiaceae, is aromatic herb growing on lowland or highland, and is well known of its essential oil. According to the history, celery has been used as a vegetable since 1640, but it was only recognized as a medicinal plant in 1942. As a medicinal plant, celery is able to stimulate digestive enzymes in increasing the appetite, use as diuretic agent, to maintain blood vessel flexibility, to lower blood pressure and wide peripheral blood vessels (Sudarsono, 1996). A study showed that celery can used as hypocholesterolemia and hypolipidemia agents even though the dosages used in that study not decrease the total cholesterol and lipid significantly (Juheini, 2002). In addition, celery is also efficacious to nourish hair. The juice of celery herb showed an activity in promoting hair growth and increasing hair thickness (Kuncari, 2015). Previous studies mentioned that the ethanol extract of celery herb showed inhibitory activity against *Pityrosporum ovale*, a fungi causing dandruff (Sukandar, 2006), *Streptococcus mutans*, the most important bacteria in the process of dental caries (Majidah, 2014), and *Candida albicans*, one microorganism that causes candidiasis (Rachmawati, 2014). Meanwhile, the essential oils of celery can inhibit the growth of *Staphylococcus aureus, Listeria monocytogenes* and *L. ivanovii* (Misic, 2008).

In this study we tested the antifungal activity of the essential oil of celery against *Pityrosporum ovale*, a fungus that causes dandruff. This fungus is a naturally occurring yeast-like organism found on the scalp and other parts of human skin. It's mostly found on skin areas with plenty of sebaceous glands, such as on scalp, face, and upper part of the body (Niharika, 2010). Several synthetic fungicide have been produced to fight dandruff problems, besides the herbal ingredients which assumed to have good anti-dandruff activity. This research is a study on the

Lampiran 9 Jurnal aktivitas formulasi sabun cair ekstrak seledri sebagai antibakteri Staphylococcus aureus

PHARMACONJurnal Ilmiah Farmasi – UNSRAT Vol. 9 No. 1 FEBRUARI 2020 ISSN 2302 - 2493

FORMULASI DAN UJI AKTIVITAS SABUN CAIR EKSTRAK ETANOL HERBA SELEDRI (*Apium graveolens L*) TERHADAP BAKTERI *Staphylococcus aureus*

Hamido Persada Hutauruk[1)], Paulina V. Y. Yamlean[1)], Weny Wiyono[1)]
[1)]Program Studi Farmasi FMIPA UNSRAT Manado, 95115

ABSTRACT

Celery plants (Apium graveolens L.) contain flavonoids, saponins, 1% tannins, 0.033% essential oils, apiin, apigenin, choline, lipase, asparagine. which can inhibit bacterial activity. This study aims to formulate, and test the antibacterial activity of liquid celery herbal soap (Apium graveolens L) liquid soap preparations at concentrations of 1%, 2%, 4% and 8%. This study uses an experimental method by testing the parameters of the physical evaluation requirements of liquid soap preparations. Physical evaluation of the preparation includes organoleptic test, pH test, high test and foam stability, water content test, free alkali test, specific gravity test and irritation test. The results of the study on the quality test or physical evaluation of celery herbal liquid soap liquid with a concentration of 1%, 2%, 4% and 8% meet the requirements set by SNI. Antibacterial testing of celery herbal liquid soap preparations against Staphylococcus aureus bacteria observed on UV-Vis spectrophotometer produced a minimum inhibitory level of 1.267 for a concentration of 1%, 0.45 for a concentration of 2%, -0.037 for a concentration of 4%, and -0.124 for a concentration of 8 %. It can be concluded that liquid soap concentrations of 1%, 2%, 4% and 8% of celery herbal extract can be formulated as liquid soap preparations and have antibacterial activity at concentrations of 1%, 2%, 4%, and 8%.

***Keywords**: Celery (Apium graveolens L), Liquid soap, Staphylococcus aureus, Antibacterial*

ABSTRAK

Tanaman Seledri (*Apium graveolens* L.) mengandung flavonoid, saponin, tannin 1%, minyak atsiri 0,033 %, apiin, apigenin, kolin, lipase, asparagine. yang mampu menghambat aktivitas bakteri. Penelitian ini bertujuan untuk memformulasi, serta menguji aktivitas antibakteri sediaan sabun cair ekstrak etanol herba Seledri (*Apium graveolens* L) pada kosentrasi 1%, 2%, 4% dan 8%. Penelitian ini menggunakan metode ekperimental dengan melakukan pengujian parameter persyaratan evaluasi fisik sediaan sabun cair. Evaluasi fisik sediaan meliputi uji organoleptik, uji pH, uji tinggi dan kestabilan busa, uji kadar air, uji alkali bebas, uji bobot jenis dan uji iritasi. Hasil penelitian pada uji kualitas atau evaluasi fisik dari sabun cair Ekstrak Etanol Herba Seledri dengan konsentrasi 1%, 2%, 4% dan 8% memenuhi syarat yang telah ditetapkan oleh SNI. Pengujian antibakteri sediaan sabun cair Ekstrak Etanol Herba Seledri pada bakteri *staphylococcus aureus* yang diamati pada spektrofotometer UV-Vis menghasilkan kadar hambat minimum 1,267 untuk konsentrasi 1%, 0,45 untuk konsentrasi 2%, -0,037 untuk konsentrasi 4%, dan -0,124 untuk konsentrasi 8%. Dapat disimpulkan bahwa sabun cair kosentrasi 1%, 2%, 4% dan 8% Ekstrak Etanol Herba Seledri dapat diformulasi sebagai sediaan sabun cair yang stabil dan memiliki aktivitas antibakteri pada konsentrasi 1%, 2%, 4%, dan 8%.

Kata kunci : Seledri (*Apium graveolens* L), Sabun cair, *Staphylococcus aureus*, Antibakteri

Lampiran 10 Formulasi krim ekstrak seledri dan aktivitasnya pada bakteri Staphylococcus aureus

PHARMACON– PROGRAM STUDI FARMASI, FMIPA, UNIVERSITAS SAM RATULANGI,
Volume 9 Nomor 2 Mei 2020

FORMULASI DAN UJI AKTIVITAS ANTIBAKTERI KRIM EKSTRAK ETANOL HERBA SELEDRI (*Apium graveolens* L.) TERHADAP BAKTERI *Staphylococcus aureus*

Garry Clements[1)], Paulina V. Y. Yamlean[1)], Widya Astuty Lolo[1)]
[1)]Program Studi Farmasi FMIPA UNSRAT Manado, 95115

ABSTRACT

Celery herbs (Apium graveolens L.) have content flavonoid, saponin and tannin. Flavonoids have anti-inflammatory properties, antioxidants and antibacterials. This study aims to determine whether the ethanol extract of celery herbs can be formulated into cream preparations, test the quality of preparations at concentrations of 5%, 10% and 15%. These methods of research are experimental laboratories by making the supply of self-sustaining herbal celery ethanol extract cream and testing the quality of the cream preparation, as well as testing of antibacterial activity was carried out using the liquid dilution method and measuring value of Minimum Inhibitory Concentration and Minimum Bactericidal Concentration using a UV-Vis Spectrophotometer. This research shows that celery herbs ethanol extract can be formulated into cream preparations, fulfilling quality test of organoleptic, scatter power, adhesion and cycling test, but that doesn't meet the requirements for homogeneity tests and pH tests and has antibacterial activity which not only inhibits but kills bacteria in preparations of 5% and 15%

***Keywords**: Cream Celery herb extract, Antibacterial, Staphylococcus aureus, UV-Vis spectrophotometer*

ABSTRAK

Herba Seledri (*Apium graveolens* L.) memiliki kandungan flavonoid, saponin dan tannin. Flavonoid memiliki khasiat sebagai antiinflamasi, antioksidan dan antibakteri. Penelitian ini bertujuan untuk mengetahui apakah ekstrak etanol herba Seledri dapat diformulasikan menjadi sediaan krim, menguji mutu sediaan pada konsentrasi 5%, 10% dan 15%. Metode penelitian ini experimental laboratorium dengan membuat Sediaan Krim Ekstrak Etanol Herba Seledri dan menguji mutu sediaan krim, serta menguji aktivitas antibakteri menggunakan metode dilusi cair dan mengukur nilai KBM dan KHM menggunakan Spektrofotometer UV-Vis. Hasil penelitian menujukkan bahwa ekstrak etanol herba Seledri dapat diformulasikan menjadi sediaan krim, memenuhi uji mutu sediaan organoleptik, daya, sebar, daya hambat dan stabilitas namun tidak memenuhi persyaratan untuk uji homogenitas dan uji pH serta mempunyai aktivitas antibakteri yang membunuh bakteri pada sediaan berkonsentrasi 5% dan 15%.

Kata Kunci : Krim Ekstrak herba Seledri, Antibakteri, *Staphylococcus aureus*, Spektrofotometer UV-Vis

Lampiran 11 Formulasi gel ektrak daun seledri pada bakteri Staphylococcus aureus

Media Farmasi Indonesia Vol 13 No 1

GEL *HAND SANITIZER* OF CELERY LEAVES *Apium graveolens Linn.* AS ANTIBACTERIAL

Ida Kristianingsih*, Ulvia Nurmalia, Newi Solika Pratama, Nofi Ria Kustiani,
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ABSTRACT

In this research, gel hand sanitizer formulation using celery leaves of Apium graveolens Linn has been formated. This leave is reported to have antibacterial activities due to flavonoids and tannins contained. The method used physical characteristion and antibacterial inhibition test with diffusion method. It was made from three evaluation formulas with concentration of the extract 12,5, 15 dan 20% and CMC 2% respectives. The characteristic results showed that gel hand sanitizer are semi-solid, blackish brown, celery peculiar smell, pH 5.8, distribution test 2,9 cm, load 50 gram 3 cm, 100 gram 3 cm and 150 gram 3,1 cm, homogeneous and comfortable in the skin. The results showed that gel hand sanitizer formulations 1, 2 and 3 were able to provide antibacterial inhibition. Gel with 20% extract and 2% CMC Na could reduce the number of bacteria E coli and Staphylococcus aureus. It can be concluded that gel hand sanitizer using Leaf Celery Extract Apium graveolens Linn. had antibacterial activities.

Keywords: apium graveolens Linn., gel hand sanitizer, antibacterial activity.

PENDAHULUAN

Memelihara kebersihan tangan merupakan salah satu upaya dalam menjaga kesehatan tubuh. Tangan merupakan media utama penyebaran suatu penyakit, karena tangan yang secara langsung kontak dengan lingkungan serta kontak dengan organ organ sehingga mudah sebagai jalan masuknya infeksi bakteri. Kebersihan tangan yang terjaga adalah salah satu hal yang penting dalam langkah pencegahan penyakit yang disebabkan oleh infeksi mikroorganisme dan penyakit menular (WHO, 2005). Cara yang dilakukan oleh masyarakat untuk menjaga kebersihan biasanya dengan mencuci tangan sebelum makan dan minum. Namun cara ini dianggap sudah konvensional sehingga masyarakat beralih pada *hand sanitizer* atau antiseptik. *Hand sanitizer* merupakan sediaan antiseptik yang dapat digunakan untuk membersihkan tangan dalam keadaan tidak mungkin mencuci tangan (Simone, 2005). Penelitian bertujuan untuk membuat suatu formula sediaan gel *hand sanitizer* dengan bahan aktif daun seledri *Apium graveolens Linn*. yang memiliki aktivitas sebagai antibakteri. Formula sediaan yang akan digunakan dalam penelitian ini adalah ekstrak daun seledri, CMC Na, Methyl Paraben, Glicerin, *Oleum citri* dan Aquadest. Tujuan pembuatan sediaan gel *hand sanitizer* daun seledri *Apium graveolens Linn.* adalah untuk menciptakan suatu inovasi baru dengan memanfaatkan daya antibakteri daun seledri yang diharapkan menjadi solusi membersihkan tangan tanpa perlu mencuci tangan.

METODE PENELITIAN

Persiapan Bahan

Seledri (*Apium graveolens* L.) diperoleh dari petani seledri yang ada di kota Kediri, Jawa Timur, Indonesia.

Lampiran 12 Perhitungan rendemen simplisia seledri, bobot kering terhadap bobot basah.

sample	Bobot basah (g)	Bobot kering (g)	Rendemen (%)
Tanaman Seledri	11.000	2.800	25,45 %

% rendemen $= \frac{Bobot\ kering}{bobor\ basah} \times 100\%$

$= \frac{2.800\ g}{11.000\ g} \times 100\%$

= 25,45 %

Lampiran 13 Perhitungan rendemen serbuk simplisia seledri

sample	Bobot kering (g)	Bobot serbuk (g)	Rendemen (%)
Tanaman seledri	2.800	1.600	57,14 %

% rendemen $= \frac{Bobotserbuk}{bobotkering} \times 100\%$

$= \frac{1.600\ g}{2.800\ g} \times 100\%$

= 57,14 %

Lampiran 14 Perhitungan kadar lembab serbuk dan ekstrak etanol seledri

Replikasi	Serbuk seledri (%)	Ekstrak etanol seledri (%)
1	6,1	10,0
2	6,1	10,0
3	6,3	9,4
Rata-rata	6,2	9,8

Rata-rata susut pengering :

1. Serbuk seledri $= \frac{6,1\% + 6,1\% + 6,3\%}{3}$

   = 6,167 = 6,2 %

2. Ekstrak seledri$= \frac{10,0\% + 10,0\% + 9,4\%}{3}$

   = = 9,8 %

Lampiran 15 Perhitungan rendemen ekstrak seledri

	Berat serbuk (g)	Bobot ektrak (g)	Rendemen (%)
Serbuk Seledri	1000	267	26,7

% rendemen $= \frac{Bobotekstrak\ seledri}{bobot\ serbuk\ seledri} \times 100\ \%$

$= \frac{267\ g}{1000\ 9} \times 100\ \%$

= 26,7 %

Lampiran 16 Hasil perhitungan HLB

R/ Paraffin cair 25 HLB 12
Cera alba 5 HLB 12
Asam stearat 6 HLB 15
TEA 2 HLB 12
Metil paraben 0,16
Propil paraben 0,05
Aquadest ad 100

Perhitungan HLB :

Paraffin cair 25 HLB 12
Cera alba 5 HLB 12
Asam stearat 6 HLB 15
TEA 2 HLB 12

Jumlah fase minyak : 25 + 5 + 6 + 2 = 38

Nilai HLB yang diperlukan (karena disini tidak ada variasi basis maka, semua formula nilai HLB nya sama.

Paraffin cair : 25/38 × 12 = 7,89
Cera alba : 5/38 × 12 = 1,58
Asam stearat : 6/38 ×15 = 2,37

TEA : 2/38 ×12 = 0,63

Nilai HLB yang didapatkan adalah 7,89 + 1,58 + 2,37 + 0,63 = 12,47 > 7 yang artinya tepi sediaan merupakan krim dengan fase minyak dalam air.

Lampiran 17 Analisis uji SPSS pada sediaan masker rambut

Viskositas hari ke 0 dan ke 28

1. Uji Normalitas

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	FORMULA	Statistic	df	Sig.	Statistic	df	Sig.
VISKOSITAS_0	FI	.385	3	.	.750	3	.000
	FII	.175	3	.	1.000	3	1.000
	FIII	.385	3	.	.750	3	.000
	FIV	.253	3	.	.964	3	.637
VISKOSITAS_28	FI	.385	3	.	.750	3	.000
	FII	.253	3	.	.964	3	.637
	FIII	.175	3	.	1.000	3	1.000
	FIV	.292	3	.	.923	3	.463

a. Lilliefors Significance Correction

2. Uji Homogenitas

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
VISKOSITAS_0	.618	3	8	.623
VISKOSITAS_28	1.082	3	8	.410

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
VISKOSITAS_0	Between Groups	1406.917	3	468.972	10.307	.004
	Within Groups	364.000	8	45.500		
	Total	1770.917	11			
VISKOSITAS_28	Between Groups	1222.917	3	407.639	5.929	.020
	Within Groups	550.000	8	68.750		
	Total	1772.917	11			

3. Uji Kruskal-wallis

Kruskal-Wallis

Ranks

	FO...	N	Mean Rank
VISKOSITAS_0	FI	3	8.00
	FII	3	10.67
	FIII	3	4.67
	FIV	3	2.67
	Total	12	
VISKOSITAS_28	FI	3	10.00
	FII	3	8.17
	FIII	3	5.33
	FIV	3	2.50
	Total	12	

Test Statistics[a,b]

	VISKOSITAS_0	VISKOSITAS_28
Chi-Square	8.847	7.745
df	3	3
Asymp. Sig.	.031	.052

a. Kruskal Wallis Test

b. Grouping Variable: FORMULA

4. Uji Wilcoxon

Wilcoxon Signed Ranks

Ranks

		N	Mean Rank	Sum of Ranks
VISKOSITAS_28 - VISKOSITAS_0	Negative Ranks	1[a]	6.00	6.00
	Positive Ranks	11[b]	6.55	72.00
	Ties	0[c]		
	Total	12		

a. VISKOSITAS_28 < VISKOSITAS_0

b. VISKOSITAS_28 > VISKOSITAS_0

c. VISKOSITAS_28 = VISKOSITAS_0

Test Statistics[b]

	VISKOSITAS_28 - VISKOSITAS_0
Z	-2.598[a]
Asymp. Sig. (2-tailed)	.009

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

UJI pH

1. Normalitas

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	FORMULA	Statistic	df	Sig.	Statistic	df	Sig.
pH_0	FI	.385	3	.	.750	3	.000
	FII	.331	3	.	.865	3	.281
	FIII	.385	3	.	.750	3	.000
	FIV	.385	3	.	.750	3	.000
pH_28	FI	.292	3	.	.923	3	.463
	FII	.253	3	.	.964	3	.637
	FIII	.385	3	.	.750	3	.000
	FIV	.385	3	.	.750	3	.000

a. Lilliefors Significance Correction

2. Homogenitas

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
pH_0	4.938	3	8	.032
pH_28	1.026	3	8	.431

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
pH_0	Between Groups	2.936	3	.979	269.979	.000
	Within Groups	.029	8	.004		
	Total	2.965	11			
pH_28	Between Groups	3.598	3	1.199	3.598E3	.000
	Within Groups	.003	8	.000		
	Total	3.600	11			

3. Uji Kruskal-wallis

Kruskal-Wallis

Ranks

	FO...	N	Mean Rank
pH_0	FI	3	10.83
	FII	3	8.17
	FIII	3	4.83
	FIV	3	2.17
	Total	12	
pH_28	FI	3	11.00
	FII	3	8.00
	FIII	3	5.00
	FIV	3	2.00
	Total	12	

Test Statistics[a,b]

	pH_0	pH_28
Chi-Square	10.126	10.458
df	3	3
Asymp. Sig.	.018	.015

a. Kruskal Wallis Test

b. Grouping Variable: FORMULA

4. Uji Wilcoxon

Wilcoxon Signed Ranks

Ranks

		N	Mean Rank	Sum of Ranks
pH_28 - pH_0	Negative Ranks	12[a]	6.50	78.00
	Positive Ranks	0[b]	.00	.00
	Ties	0[c]		
	Total	12		

a. pH_28 < pH_0

b. pH_28 > pH_0

c. pH_28 = pH_0

Test Statistics[b]

	pH_28 - pH_0
Z	-3.061[a]
Asymp. Sig. (2-tailed)	.002

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

UJI DAYA SEBAR

1. Normalitas

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	FORMULA	Statistic	df	Sig.	Statistic	df	Sig.
DAYA_SEBAR_0	FI	.166	4	.	.984	4	.925
	FII	.300	4	.	.915	4	.507
	FIII	.162	4	.	.993	4	.971
	FIV	.190	4	.	.962	4	.792
DAYA_SEBAR_28	FI	.195	4	.	.971	4	.850
	FII	.194	4	.	.965	4	.808
	FIII	.152	4	.	.997	4	.989
	FIV	.236	4	.	.911	4	.488

a. Lilliefors Significance Correction

2. Homogenitas

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
DAYA_SEBAR_0	.160	3	12	.921
DAYA_SEBAR_28	.957	3	12	.444

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
DAYA_SEBAR_0	Between Groups	.127	3	.042	.121	.946
	Within Groups	4.178	12	.348		
	Total	4.304	15			
DAYA_SEBAR_28	Between Groups	.107	3	.036	.201	.894
	Within Groups	2.128	12	.177		
	Total	2.234	15			

3. Uji lanjutan Anova, Pos Hoc Tukey

Homogeneous

DAYA_SEBAR_0

Tukey HSD

FORMULA	N	Subset for alpha = 0.05
		1
FIII	4	5.7500
FII	4	5.8750
FIV	4	5.9000
FI	4	6.0000
Sig.		.930

Means for groups in homogeneous subsets are displayed.

DAYA_SEBAR_28

Tukey HSD

FORMULA	N	Subset for alpha = 0.05
		1
FIII	4	5.6750
FII	4	5.7500
FIV	4	5.7500
FI	4	5.9000
Sig.		.873

Means for groups in homogeneous subsets are displayed.

4. Uji t-test

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	DAYA_SEBAR_0	5.8812	16	.53568	.13392
	DAYA_SEBAR_28	5.7688	16	.38595	.09649

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	DAYA_SEBAR_0 & DAYA_SEBAR_28	16	.910	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	DAYA_SEBAR_0 - DAYA_SEBAR_28	.11250	.24461	.06115	-.01784	.24284	1.840	15	.086

Uji Daya Lekat

1. Normalitas

Tests of Normality

	FORMULA	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
DAYA_LEKAT_0	FI	.333	3	.	.862	3	.274
	FII	.282	3	.	.936	3	.510
	FIII	.179	3	.	.999	3	.948
	FIV	.354	3	.	.822	3	.168
DAYA_LEKAT_28	FI	.371	3	.	.783	3	.075
	FII	.241	3	.	.974	3	.688
	FIII	.179	3	.	.999	3	.948
	FIV	.204	3	.	.993	3	.843

a. Lilliefors Significance Correction

2. Homogenitas

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
DAYA_LEKAT_0	2.327	3	8	.151
DAYA_LEKAT_28	11.602	3	8	.003

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
DAYA_LEKAT_0	Between Groups	.097	3	.032	2.675	.118
	Within Groups	.097	8	.012		
	Total	.194	11			
DAYA_LEKAT_28	Between Groups	.133	3	.044	.425	.741
	Within Groups	.835	8	.104		
	Total	.968	11			

3. Uji Post Hoc Tukey

DAYA_LEKAT_0

Tukey HSD

FORMULA	N	Subset for alpha = 0.05 1
FIV	3	5.2333
FIII	3	5.3267
FI	3	5.4000
FII	3	5.4767
Sig.		.100

Means for groups in homogeneous subsets are

DAYA_LEKAT_28

Tukey HSD

FORMULA	N	Subset for alpha = 0.05 1
FIV	3	5.3267
FIII	3	5.4567
FII	3	5.5067
FI	3	5.6200
Sig.		.693

Means for groups in homogeneous subsets are displayed.

4. Uji t-test

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	DAYA_LEKAT_0	5.3592	12	.13276	.03833
	DAYA_LEKAT_28	5.4775	12	.29668	.08564

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	DAYA_LEKAT_0 & DAYA_LEKAT_28	12	.360	.250

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	DAYA_LEKAT_0 - DAYA_LEKAT_28	-.11833	.27794	.08023	-.29493	.05826	-1.475	11	.168

UJI STABILIAS VISKOSITAS

1. Normalitas

Tests of Normality[b]

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	FORMULA	Statistic	df	Sig.	Statistic	df	Sig.
VISKOSITAS_SEBELUM	FII	.385	3	.	.750	3	.000
	FIII	.175	3	.	1.000	3	1.000
	FIV	.385	3	.	.750	3	.000
VISKOSITAS_SESUDAH	FI	.253	3	.	.964	3	.637
	FII	.175	3	.	1.000	3	1.000
	FIII	.292	3	.	.923	3	.463
	FIV	.253	3	.	.964	3	.637

a. Lilliefors Significance Correction

b. VISKOSITAS_SEBELUM is constant when FORMULA = FI. It has been omitted.

2. Homogenitas

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
VISKOSITAS_SEBELUM	2.303	3	8	.154
VISKOSITAS_SESUDAH	2.631	3	8	.122

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
VISKOSITAS_SEBELUM	Between Groups	1122.917	3	374.306	35.933	.000
	Within Groups	83.333	8	10.417		
	Total	1206.250	11			
VISKOSITAS_SESUDAH	Between Groups	1666.667	3	555.556	2.963	.097
	Within Groups	1500.000	8	187.500		
	Total	3166.667	11			

3. Uji Kruskal-wallis

Kruskal-Wallis

Ranks

	FO...	N	Mean Rank
VISKOSITAS_SEBELUM	FI	3	7.50
	FII	3	11.00
	FIII	3	5.33
	FIV	3	2.17
	Total	12	
VISKOSITAS_SESUDAH	FI	3	8.67
	FII	3	7.00
	FIII	3	8.00
	FIV	3	2.33
	Total	12	

Test Statistics[a,b]

	VISKOSITAS_SEBELUM	VISKOSITAS_SESUDAH
Chi-Square	10.006	5.707
df	3	3
Asymp. Sig.	.019	.127

a. Kruskal Wallis Test

b. Grouping Variable: FORMULA

4. Uji Wilcoxon

Wilcoxon Signed Ranks

Ranks

		N	Mean Rank	Sum of Ranks
VISKOSITAS_SESUDAH - VISKOSITAS_SEBELUM	Negative Ranks	8[a]	5.81	46.50
	Positive Ranks	4[b]	7.88	31.50
	Ties	0[c]		
	Total	12		

a. VISKOSITAS_SESUDAH < VISKOSITAS_SEBELUM

b. VISKOSITAS_SESUDAH > VISKOSITAS_SEBELUM

c. VISKOSITAS_SESUDAH = VISKOSITAS_SEBELUM

Test Statistics[b]

	VISKOSITAS_SESUDAH - VISKOSITAS_SEBELUM
Z	-.592[a]
Asymp. Sig. (2-tailed)	.554

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Uji Stabilitas pH

1. Normalitas

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	FORMULA	Statistic	df	Sig.	Statistic	df	Sig.
pH_SEBELUM	FI	.385	3	.	.750	3	.000
	FII	.385	3	.	.750	3	.000
	FIII	.385	3	.	.750	3	.000
	FIV	.385	3	.	.750	3	.000
pH_SESUDAH	FI	.385	3	.	.750	3	.000
	FII	.385	3	.	.750	3	.000
	FIII	.328	3	.	.871	3	.298
	FIV	.385	3	.	.750	3	.000

a. Lilliefors Significance Correction

2. Homogenitas

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
pH_SEBELUM	1.231	3	8	.360
pH_SESUDAH	7.254	3	8	.011

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
pH_SEBELUM	Between Groups	4.260	3	1.420	1.311E4	.000
	Within Groups	.001	8	.000		
	Total	4.261	11			
pH_SESUDAH	Between Groups	4.391	3	1.464	119.239	.000
	Within Groups	.098	8	.012		
	Total	4.489	11			

3. Uji Kruskal-wallis

Kruskal-Wallis

Ranks

	FO...	N	Mean Rank
pH_SEBELUM	FI	3	11.00
	FII	3	8.00
	FIII	3	5.00
	FIV	3	2.00
	Total	12	
pH_SESUDAH	FI	3	10.33
	FII	3	8.67
	FIII	3	5.00
	FIV	3	2.00
	Total	12	

Test Statistics[a,b]

	pH_SEBELUM	pH_SESUDAH
Chi-Square	10.532	9.769
df	3	3
Asymp. Sig.	.015	.021

a. Kruskal Wallis Test

b. Grouping Variable: FORMULA

4. Uji Wilcoxon

Wilcoxon Signed Ranks

Ranks

		N	Mean Rank	Sum of Ranks
pH_SESUDAH - pH_SEBELUM	Negative Ranks	10[a]	6.50	65.00
	Positive Ranks	1[b]	1.00	1.00
	Ties	1[c]		
	Total	12		

a. pH_SESUDAH < pH_SEBELUM

b. pH_SESUDAH > pH_SEBELUM

c. pH_SESUDAH = pH_SEBELUM

Test Statistics[b]

	pH_SESUDAH - pH_SEBELUM
Z	-2.848[a]
Asymp. Sig. (2-tailed)	.004

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test