DAFTAR PUSTAKA

AOAC, 1995, *Official Methods of Analysis of Association of Official Analytical Chemist*, AOAC International, Virginia, USA.

Al Amin, N.Y., Naspiah, N., dan Rusli, R., 2018, Formulasi Sediaan Krim Anti Aging Berbahan Aktif Ekstrak Buah Libo (*Ficus variegata*, blume), *Proceeding of the 8th Mulawarman Pharmaceuticals Conferences*, ISSN 2614-4778: 301-307.

Agustini, N.W.S., dan Setnyaningrum, M., 2018, Screening Fitokimia, Uji Aktivitas Antimikroba dan Antioksidan, serta Identifikasi Senyawa dari Ekstrak Biomassa Chlorella vulgaris, *Journal of Agro-based Industry*, **35**(1): 29-37.

Alissya, S., Mufrod, dan Purwanto, 2013, Antioxidant Activity of Cream Dosage Form of Tomato Extract (Solanum Lycopersicum L.), *Trad.Med.J.*, **3**(18): 132-140.

Asgarpanah, J., dan Kazemivash, M., 2012, Phytochemistry, Pharmacology, and Medical Properties of *Coriandum sativum L.*, *African Journal of Pharmacy and Pharmacology*, **10**(1): 14-23.

Arinardi, O,H., 1997, *Status Pengetahuan Plankton di Indonesia*, Pusat Penelitian dan Pengembangan Oseanologi-LIPI, (30): 63-64.

Aryani, R., 2015, Formulasi dan Uji Stabilitas Krim Kombinasi Alfa Tokoferol Asetat dan Etil Vitamin C Sebagai Pelembab Kulit, *Jurnal Kesehatan Bakti Tunas Husada*, **14**(1): 23-31.

BPOM, 2016, *Deteksi Cemaran Logam Berat dalam Kosmetika*, Lampiran Public Warning No. Hm.03.04.1.43.11.16.8233.

Chapkin, R.S., Ziboh, V.A., Marcelo, C.L., dan Voorhees, J.J., 1986, Metabolism Of Essential Fatty Acids by Human Epidermal Enzyme Preparation : Evidence of Chain Elongation, *J. Lipid Res.*, 27: 945-954.

DHA, 2011, *The Biology of Brassica napus L.*(Canola), Australian Government, Australia.

Dewan Standarisasi Nasional, 1996, *Standar Mutu Sediaan Tabir Surya SNI.16.4399.1996*, Badan Standarisasi Nasional, Jakarta.

Dirjen POM, 1995, *Farmakope Indonesia*, Edisi IV, Depatemen Kesehatan RI, Jakarta, Hal: 175-186.

Fabricant, S.M., dan Gould S., 1993, Women's Make Up Careers: An Interpretive Study of Color Cosmetic Use and "Face Value", *Psychology and Marketing*, **10**(6): 531-548.

Garcia-Inza, G.P., Castro, D.N., dan Hall, A.J., 2016, Opposite Oleic Acid Responses to Temperature in Oils From The Seed And Mesocarp of The Dire Fruit, *Europe Journal Agronomy*, **76**(8): 138-147

Gorpinath A, Puhan S, dan Nagarajan G. 2009. Relating The Cetane Number of Biodiesel Fuels to Their Fatty Acid Composition : A Critical Study. *J. Automob Engginer*, **44**: 223-265.

Graft, E., dan Empson, K.L., 1987, Phytic Acid A Natural Antioxidant, *Journal of Biological Chemistry*, **262**(24): 11647-11650.

Hans, L., 2003, Active Agents-the Effective Skin Care: Lipids, the Basic Elements, *Kosmetische Praxis*, **6**(1): 6-8.

Herawati, V.E., 2003, *Biologi Dan Ekologi Fitoplankton*, Fakultas Perikanan Universitas Brawijaya, Malang.

Hyun-Ah, Bao-Ning, S., Keller W.J., dan Dauglas, A.K., 2006, Antioksidant Xanthan from the Pericarp of Garcinia Mangostana (Mangosteen), *Journal of Agricultural And Food Chemical*, **56**(6): 2077-2087.

ISFI, 1971, *Formularium Medicamentorum Selectum*, Panitia Formularium, Surabaya.

Idris, N.A., 2017, Uji *Aktivitas Antioksidan Ekstrak Sarang Lebah dan Madu Hutan Dari Luwu Utara dengan Metode DPPH (1,1-Difenil-2-Pikrilhidrazil)*, Skripsi tidak diterbitkan, Jurusan Kimia, Fakultas Sains dan Teknologi, UIN Alauddin, Makassar.

Ita, N.S.N.B.M., 2017, *Karakteristik Penggunaan Antioksidan Oral Dibidang Dermatologi pada Pasien di Balai Penyakit Kulit, Kelamin, dan Kosmetika Di JL Veteran*, Departemen Ilmu Kesehatan Farmakologi Fakultas Kedokteran Universitas Hasanuddin, Makassar, skripsi tidak diterbitkan.

Jawetz, Melnick, dan Adelbergs, 2005, *Mikrobiologi Kedokteran*, Salemba Medika, Jakarta.

Jusuf, N.K., 2005, Kulit Menua, *Majalah Kedokteran Nusantara*, **2**(38): 184-188.

Karadag, A., Ozcelik, B., and Saner, S., 2009, Review of Methods to Determine Antioxidant Capacities, *Food Analytical Methods*, **2**(1): 41-60.

Kumar, C.S., dan Prabu, V.A., 2014, Culture of the phytoplankton Skeletonema costatum, *Int.J.Curr.Microbiol.App.Sci*, **3**(11): 129-136.

Kochar, S.P., dan Rossel, B, 1990, *Detection Estimation and Evaluation of Antioxidant in Food System dalam Hudson, B., J., F., Food Antioxidant*, Elvisier Applied Science, London.

Kwangdinata, R., Raya, I., dan Zakir, M, 2014, Production of Biodiesel from Lipid of Phytoplankton Chaetoceros calcitrans through Ultrasonic Method, *The Scientific World Journal*, 2014, Article ID 231361.

Lamid, A., Mulyati, S., Karyadi, L., Komari, Prastowo S.M., dan Budiyanto, S., 1999, Profll Asam Lemak Omega-3. Omega-6. Perkembangan Mental Dan Psikomotor Anak Kep Berat Dan Glzl Balk, *PGM*, 22: 21-28.

Leyden, J.J., 2002, *Skin Moisturization*, Marcel Dekker Inc, New York.

Liwun, R.R., Yulianti, L.I.M., dan Sidharta, B.R., 2020, Potensi *Skeletonema costatum* (Greville) Sebagai Fikoremediator Logam Timbal (Pb) Limbah Batik, *Jurnal Ilmiah Ilmu-Ilmu Hayati*, **5**(1): 16-24.

Lutman, P.J.W., 1993, The occurrence and persistence of volunteer oilseed rape (*Brassica napus*). Aspects of Applied Biology 35: 29-35.

Ma'mun, 2013, Karakteristik Minyak Dan Isolasi Trimiristin Biji Pala Papua (*Myristica argentea*), *Jurnal Littri*, **19**(2): 72-77.

Majelis Ulama Indonesia, 2013, *Fatwa MUI Nomor 26 Tahun 2013 Tentang: Standar Kehalalan Produk Kosmetika Dan Penggunaannya*, Jakarta.

Maleki, Morteza, dan Anand, D., 2008, Antibacterial Activity of The Fluid of Iranian Torilis Leptophylla Against Some Clinical Pathogen, *Pakistan Journal of Biologycal Science*, **11**(9): 1286-1289.

Mitsui, T., 1997, *New Cosmetic Science Edisi I*, Elsevier Science, Amsterdam.

Molyneux, P., 2004, The Use of The Stable Free Radical Dyhenylpicrylhydrazil (DPPH) For Estimating Antioxidant Activity, *Journals science and technology*, **7**(26); 211-219.

Mora, E., Emrizah, dan Selpas, N., 2013, Isolasi dan Karakterisasi Asam Oleat Dari Kulit Buah Kelapa Sawit (*Elais Guinensis Jacq*), *Jurnal Penelitian Farmasi Indonesia*, **1**(2): 47-51.

Muliyawan, D., dan Suriana, N., 2013, *A-Z Tentang Kosmetik*, PT. Elex Media Komputindo, Jakarta.

Mulyazmi, 2008, Pengambilan Asam Oleat Dari Minyak Kelapa, *Journal Teknos-2k*, **8**(2): 60-66.

Murray R.K., Granner D.K., dan Rodwell V.W., 2009, *Biokimia Harper Edisi 7*, diterjemahkan oleh Andri Hartono, Buku Kedokteran, EGC, Jakarta.

Norazahar, N., Yusup, S., Ahmad, M.M., Abu Bakar, S., dan Ahmad, J., 2012, Parametric Optimization of Kapok (Ceiba Pentandra) Oil Methyl Ester Production Using Taguchi Approach, *Int. J. of Energy and Env.*, **6**(6): 541-548.

Perez-Garcia, O., Escalante, F. M.E., Luz, de-Bashan, dan Bashan, Y., 2011, Heterotrophic Cultures of Microalgae: Metabolism and Potential Products, *Water Research*, (45): 11-36.

Pierre, J., 2001 The role of honeybees (Apis mellifera) and other insect pollinators ingene flow between oilseed rape (Brassica napus) and wild radish (Raphanus raphanistrum). Acta Horticulturae 561: 47-51.

Porra, R.J., dan Stumpf, P.K., 1976, Lipid Biosynthesis in Developing and Germinating Soybean Cotyledons The Formation of Palmitate and Stearate by Chopped Tissue and Supernatant Preparations, *Archives of Biochemistry and Biophysics*, **176**: 53-62.

Pratiwi, A.R., Syah, B., Hardjito, L., Pangabean, L.M.G., dan Suhartono, M.T., 2009, Fatty Acids Synthesis by Indonesian Marine Diatom, *Chaetoceros gracilis*, *Hayati J. Boisaci*, **16**(4): 151-156.

Pratoomyot, J., Srivilas, P., dan Noiraksar, T., 2005. Fatty Acids Composition of 10 Microalgal Species. Songklanakarin, *J. Sci. Technol.*, **27**(6): 1179-1187.

Putri, T.W., Raya, I., Natsir, H., dan Mayasari, E., 2017, Fatty Acid Extraction of Skeletonema costatum by Using Avocado Oil as Solvent and Its Application as an Anti-Aging Cream, *Oriental Jurnal Of Chemistry*, **33**(6): 2848-2857.

Raya, I., Anshar, A.M., Mayasari, E., Dwiyana, Z., dan Asdar, M., 2016, Chorella vulgaris and Spirulina Platensis: Concentration of Protein, Docosahexaenoic Acid Chorella (DHA), Eicosapentaenoic Acid (EPA) and Variation Concentration of Maltodextrin via Microencapsulation Method, *International Journal of Applied Chemistry*, **12**(4): 539-548.

Rieger, M.A., Lamond, M., Perston, C., dan Powles S.B., 2002, Roush RT Pollen-medicated movement of herbicide resistance between commercial canola fileds, *Journal Science*, **296**(5577): 2386-2388.

Rita, W.S., 2010, Isolasi Identifikasi dan Uji Aktivitas Antibakteri Senyawa Golongan Triterpenoid pada Rimpang Temu Putih (Curcuma zedoaria (Berg) Roscoe), *Jurnal Kimia*, (4): 20-26.

SNI, 1996, *Standar Mutu Sediaan Tabir Surya*, No. 16-4399-1996.

Santikunaporn, M., dan Danphitak, S., 2010, Hydrodeoxygenation of Linoleic Acid on Ni-Mo Catalyst, *Thammasat Int. J. Sc. Tech.*, **15**: 144-149.

Sartika, R.A.D., 2008, Pengaruh Asam Lemak Jenuh, Tidak Jenuh dan Asam Lemak Trans Terhadap Kesehatan, *Jurnal Kesehatan Masyarakat Nasional*, **4**(2):154-160.

Sharma, B., dan Sharma, A., 2012, Future Prospect of Nanotechnology in Development of Anti-Ageing Formulation, Review Artikel, *International Journal of Pharmacy and Pharmaceutiocal Sciences*, **4**(3): 57-66.

Sheehan, J., Duhanay, T., Benemann, J., dan Roessler, P., 1998, *A Look Back at the U.S., Biodiesel from Algae,* Departemen Of Energy Saquatic Spesies Program, Colorado, USA.

Suhery, W.N., Fernando, A., dan Has, N., 2016, Uji Aktivitas Antioksidan Dari Esktrak Bekatul Padi Ketan Merah Dan Hitam (*Oryza sativa* L. var. glutinosa) Dan Formulasinya Dalam Sediaan Krim, *Pharmacy*, 13(1): 101-115.

Sun, R., Gao, L., Xiaoping Yu, Zheng, Y., Dongdong Li, dan Wang, X., 2016, Identification of a Δ12 fatty acid desaturase from oil palm (Elaeis guineensis Jacq.) involved in the biosynthesis of linoleic acid by heterologous expression in Saccharomyces cerevisiae, *Gene*, **591**: 21–26.

Supardan, M. D., 2011, Penggunaan Ultrasonik untuk Transesterifikasi Minyak Goreng Bekas, Jurnal Rekayasa Kimia dan Lingkungan, **8**(1): 11-16**.**

Susanti, V., 2014, Uji Aktivitas Antioksidan Minyak Dan Asam Lemak Mikroalga *Chlorella sp.* Terhadap Radikal DPPH, UIN Maulana Malik Ibrahim, Malang, **skripsi belum diterbitkan**.

Swastika, A., Mufrod, dan Purwanto, 2013, Antioxidant Activity Of Cream Dosage Form Of Tomato Extract (Solanum Lycoperrsicum L.), *Traditional Medicine Journal*, **18**(3): 132-140.

Valko, M., Izakovic, M., Mazur, M., Rhodes, C.J., dan Telser, J., 2006, Free Radical, Metal and Antioxidant In Oxidative Stress Inducced Cancer, *J.Chem-BioI*, **160**:1-40.

Waluyo, L., 2004, *Mikrobiologi Umum*, Universitas Muhammadiyah Malang, Malang.

Wasitaatmadja, S.M., 1997, *Penuntun Ilmu Kosmetik Medik*, Universitas Indonesia, Jakarta.

Wati, R.Y., 2018, Pengaruh Pemanasan Media Plate Count Agar (PCA) Berulang Terhadap Uji Total Plate Count (TPC) di Laboratorium Mikrobiologi Teknologi Hasil Pertanian Unand, *ISSN 2621-0878*, **1**(2): 44-47.

Wibowo, P., 2008, Penentuan Bilangan Peroksida Asam Miristat, Universitas Sumatera Utama, Medan.

Widianingsih, dan Endrawati, H., 2008, *Buku Ajar Planktonologi*, Fakultas Perikanan dan Ilmu Kelautan Universitas Diponegoro, Semarang.

Wille, J.J., dan Kydonieus, A., 2003, Palmitoleic Acid Isomer (C16:1 delta 6) in Human Skin Sebum is Effective Against Gram-Positive Bacteria, *Skin Pharmacol Appl Skin Physiol*, **16**(3): 176-87.

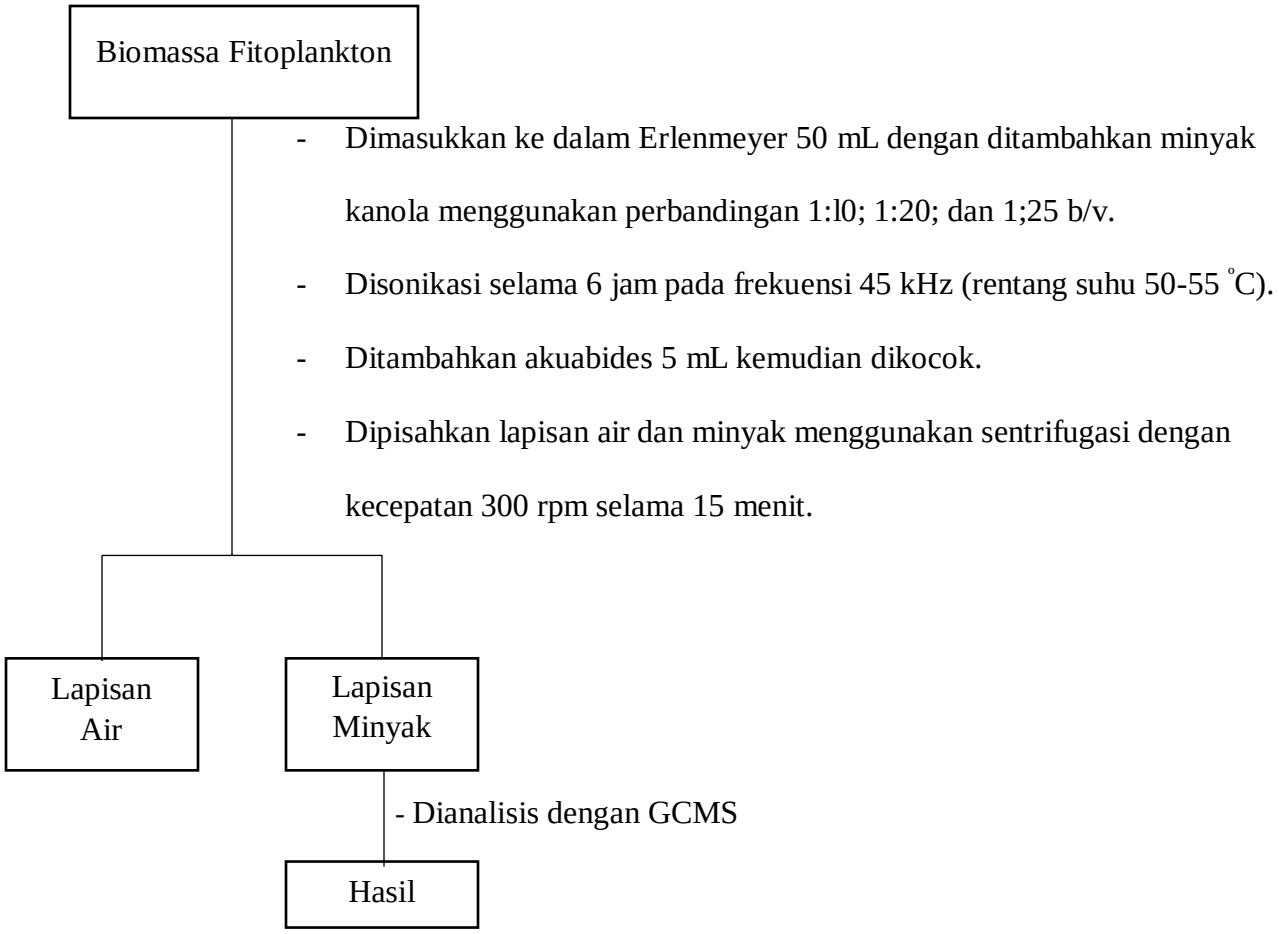
Wood, R, Kubena, K., O"Brien, B., Tseng, S., dan Martin, G., 1993, Effect of butter, monoand polysaturated fatty acid-enriched butter, trans fatty acid margarine, and zero trans fatty acid margarine on serum lipids and lipoproteins in healty men. *J. Lipid Res*. **34**(1): 1-11.

Yassir, M., A., Arifah, A.K., Zuraini, A., Yaakub, H., Zakaria, Z., A., dan Somchit, M., N., 2009, Antioxidant Activity of Conjugated Linoleic Acid Isomers, *Conference On Animal Health And Human Safety*, 294-296.

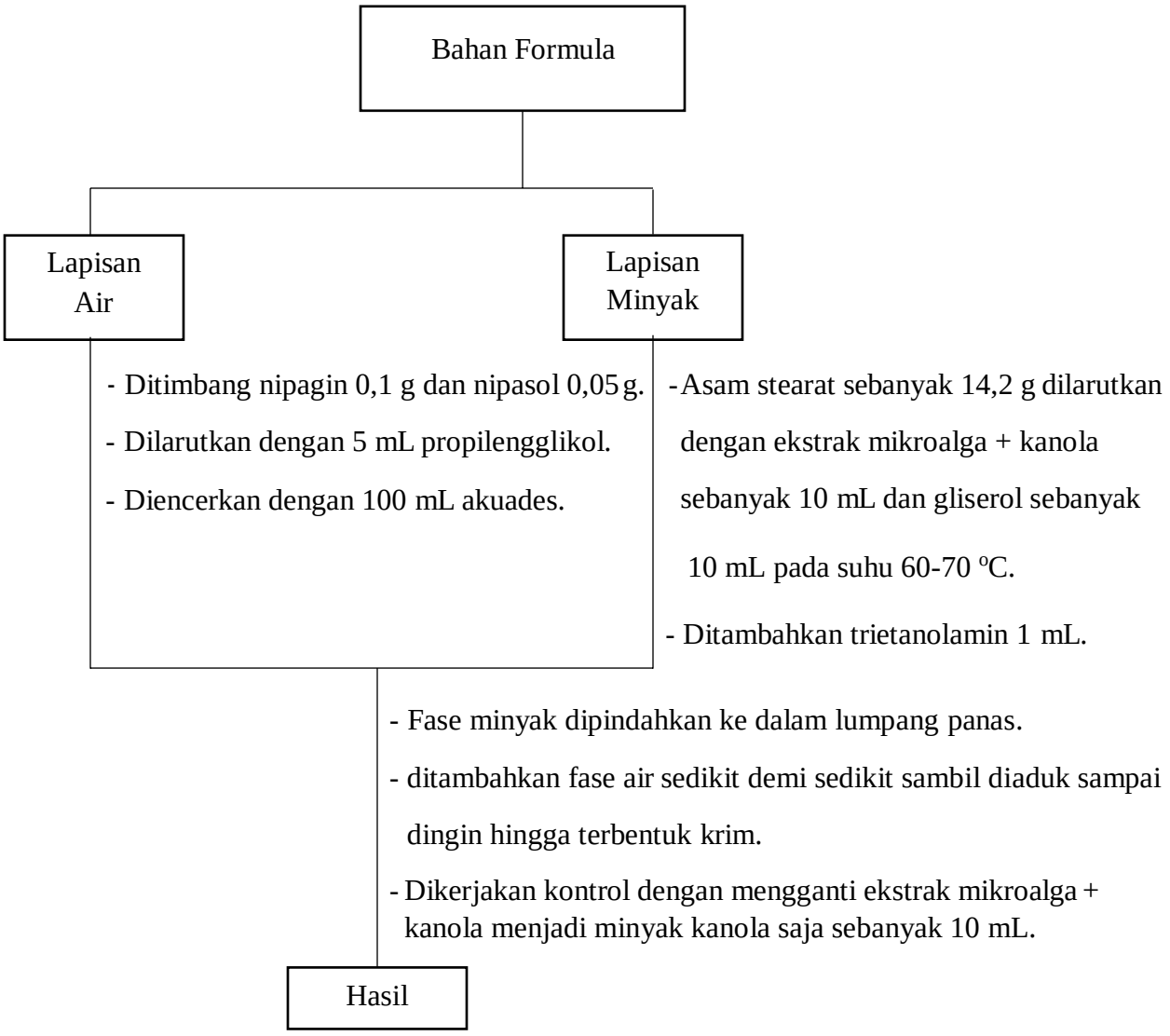
Yulianti, H., Natsir, dan Wahab, A.W., 2015, Analisis Kadar Betakaroten dalam Ekstrak Petroleum Eter Daun Kelor dari Daerah Pesisir dan Pegunungan Serta Potensinya Sebagai Antioksidan, *Jurnal Repository Universitas Hasanuddin Makassar*, 1-10.

Lampiran 1. Bagan Kerja

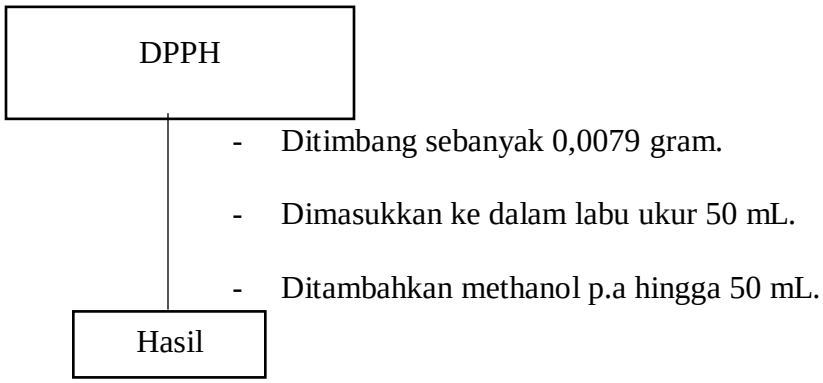
1. **Ekstraksi Mikroalga *Skeletonema sp.***



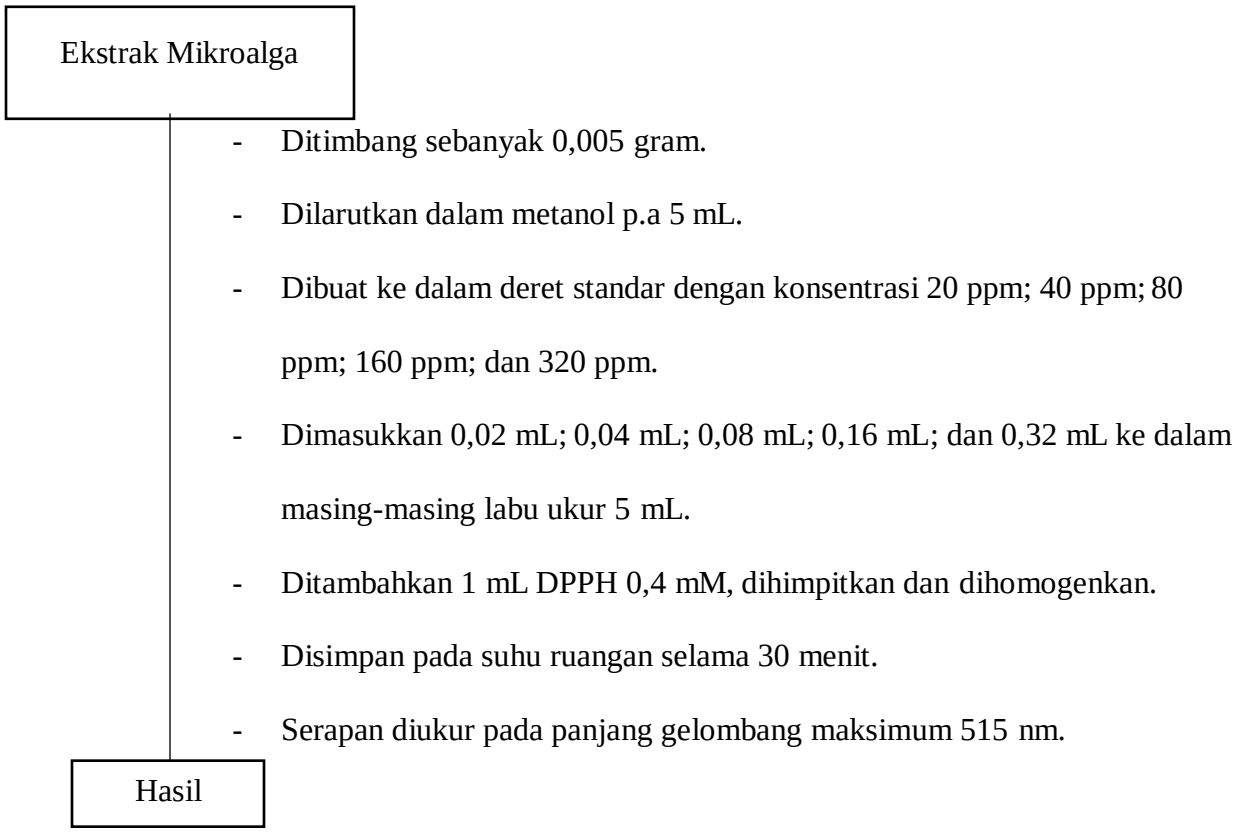
2. Pembuatan Krim Wajah



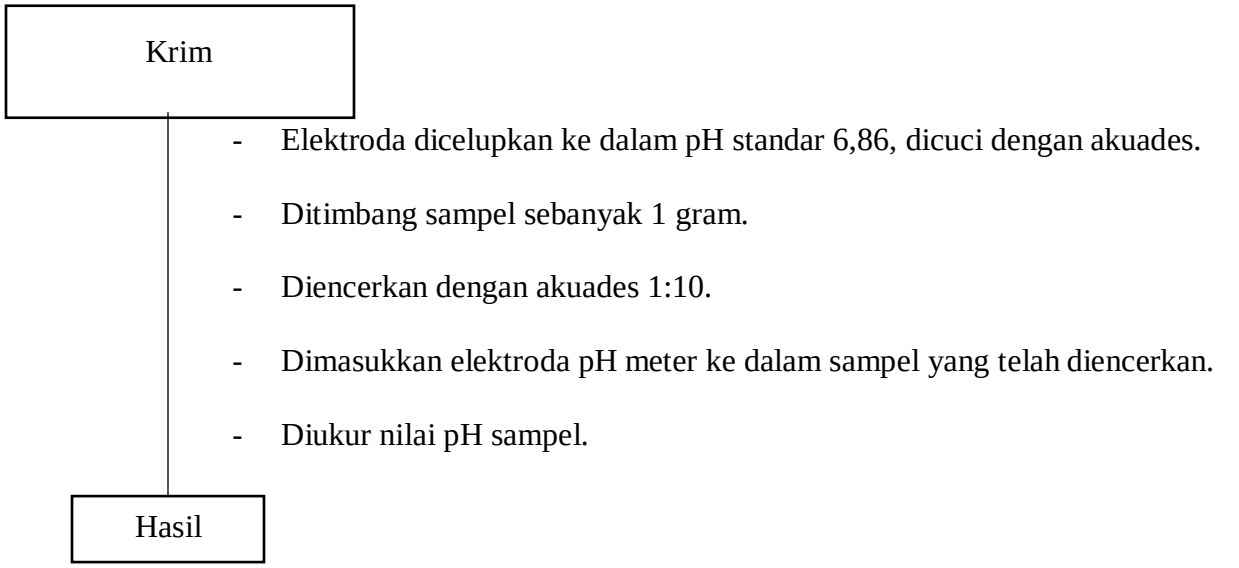
3. Pembuatan Larutan DPPH



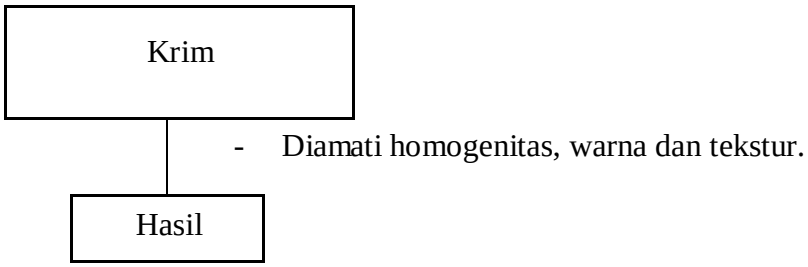
4. Penentuan Konsentrasi Antioksidan Sediaan Krim Ekstrak Mikroalga



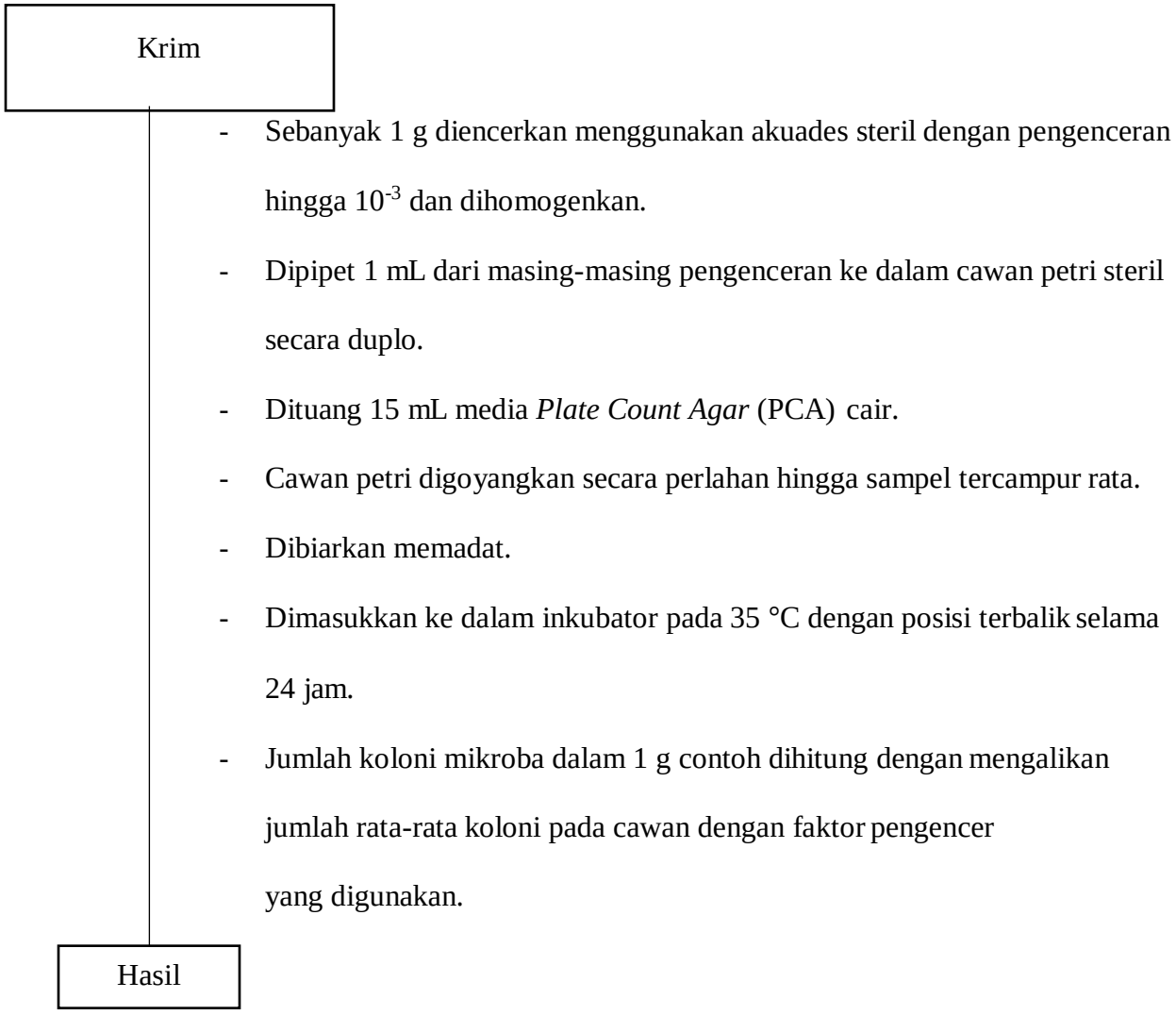
5. Pemeriksaan pH



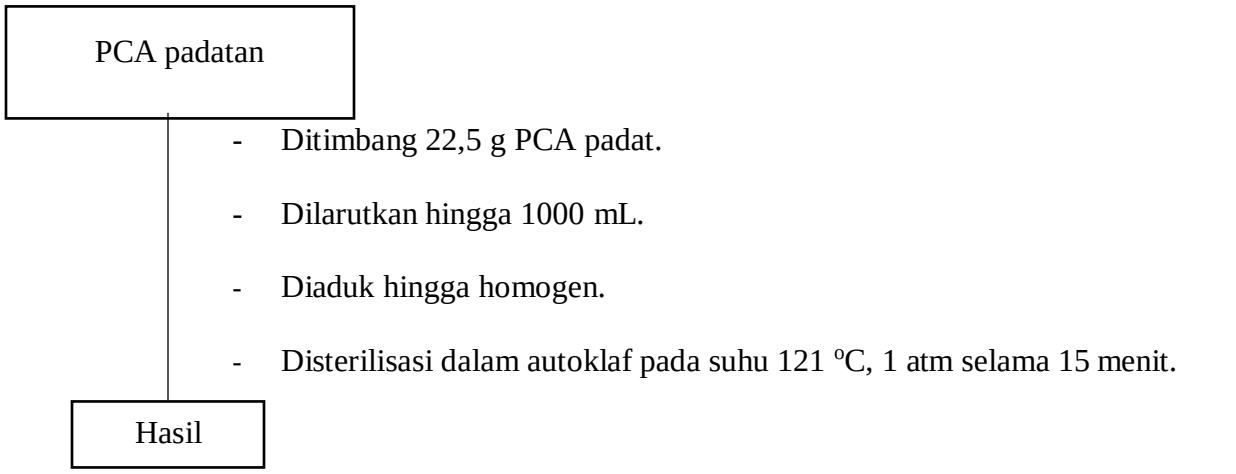
6. Pemeriksaan Organoleptik



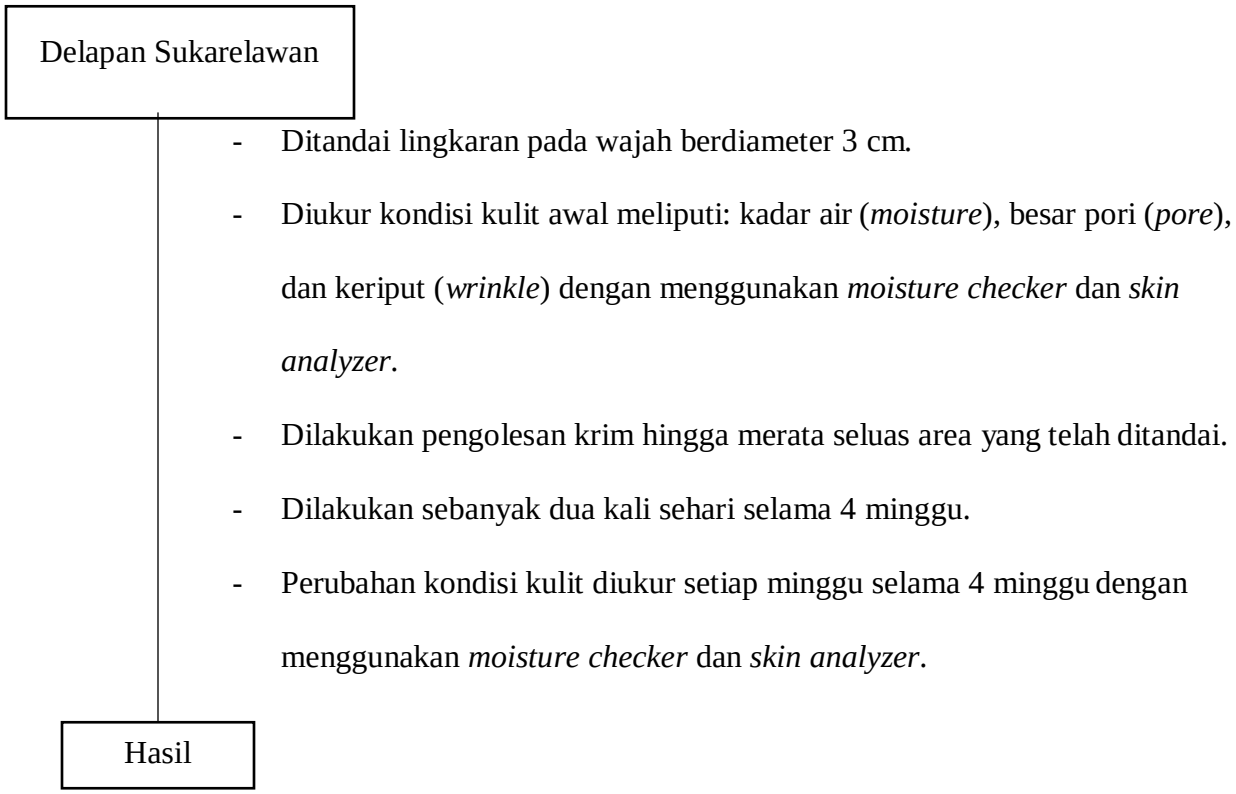
7. Total Cemaran Mikroba



8. Pembuatan Media PCA



9. **Pengujian Aktivitas *Anti Aging***



Lampiran 2. Dokumentasi

Sampel *Skeletonema sp.*

Proses Sonikasi

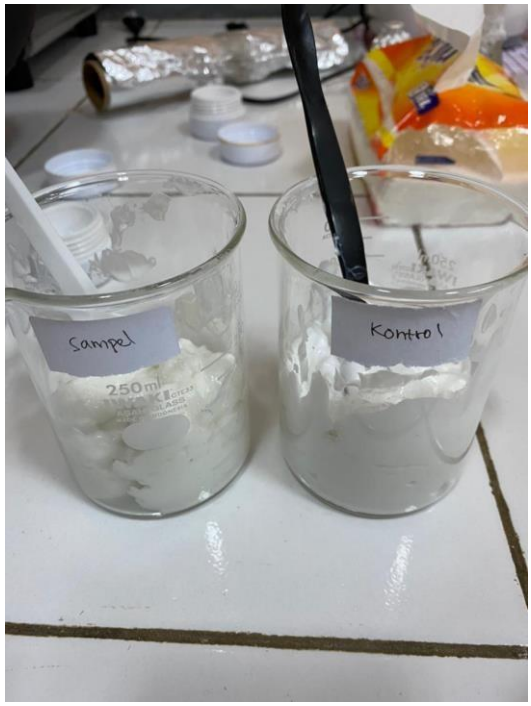
Hasil Sonikasi

Proses Sentrifugasi

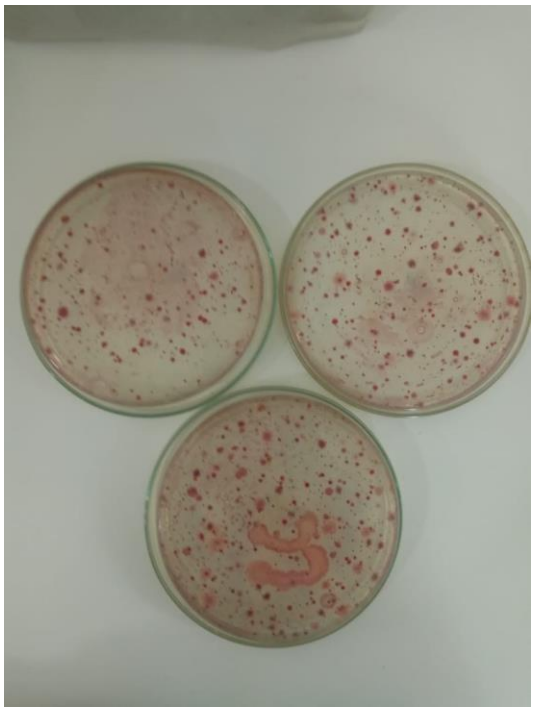
Hasil Sentrifugasi

Ekstrak *Skeletonema sp.* + Minyak Kanola

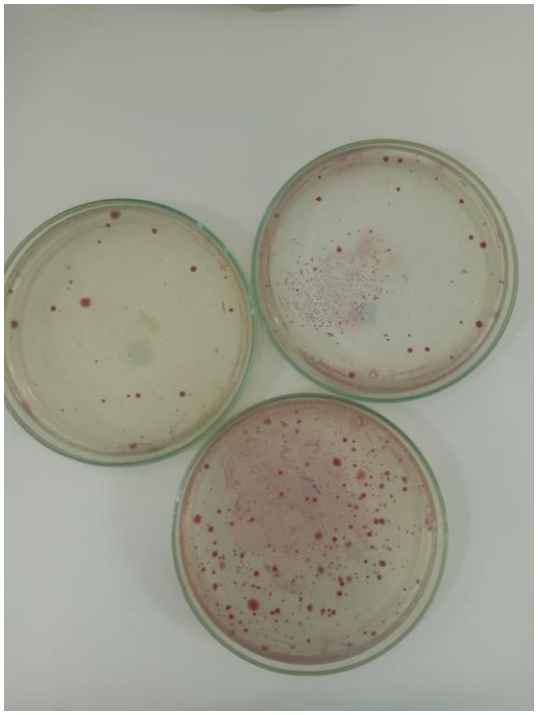
Proses Pembuatan Krim (Fase Minyak dan Fase Air Dicampurkan)



Sediaan Krim *Anti Aging*

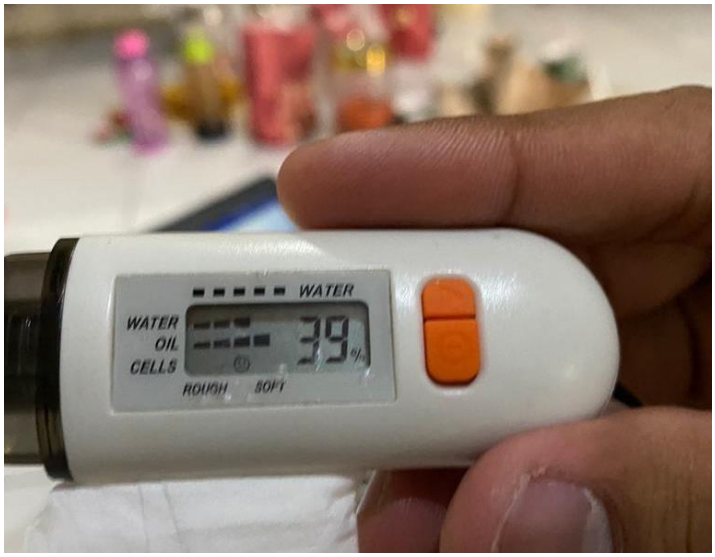


Cemaran Mikroba Kontrol



Cemaran Mikroba Sampel

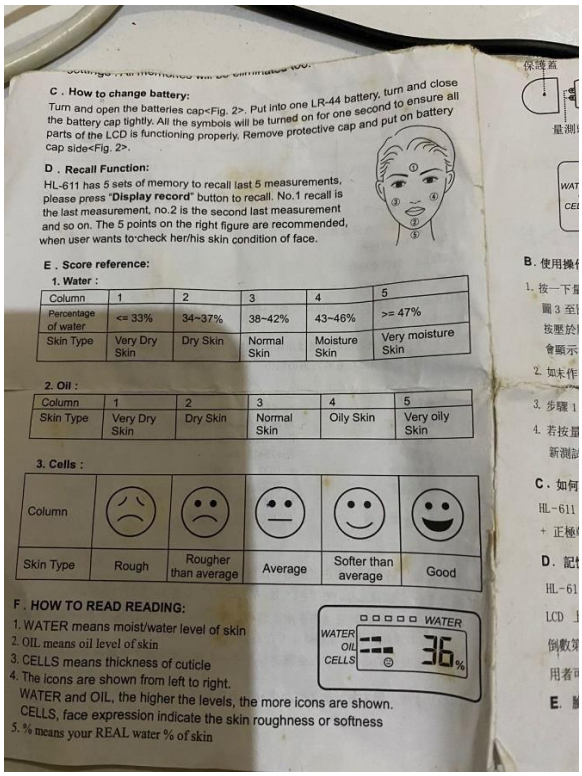
Skin Analyzer



Moisture Checker

Pembesaran 50x hari pertama

Pembesaran 50x minggu keempat



C . How to change battery:
Turn and open the batteries cap<Fig. 2>. Put into one LR-44 battery, turn and close the battery cap tightly. All the symbols will be turned on for one second to ensure all parts of the LCD is functioning properly. Remove protective cap and put on battery cap side<Fig. 2>.

D . Recall Function:
HL-611 has 5 sets of memory to recall last 5 measurements, please press "Display record" button to recall. No.1 recall is the last measurement, no.2 is the second last measurement and so on. The 5 points on the right figure are recommended, when user wants to check her/his skin condition of face.

E . Score reference:

1. Water :

Column	1	2	3	4	5
Percentage of water	<= 33%	34~37%	38~42%	43~46%	>= 47%
Skin Type	Very Dry Skin	Dry Skin	Normal Skin	Moisture Skin	Very moisture Skin

2. Oil :

Column	1	2	3	4	5
Skin Type	Very Dry Skin	Dry Skin	Normal Skin	Oily Skin	Very oily Skin

3. Cells :

Column					
Skin Type	Rough	Rougher than average	Average	Softer than average	Good

F . HOW TO READ READING:
1. WATER means moist/water level of skin
2. OIL means oil level of skin
3. CELLS means thickness of cuticle
4. The icons are shown from left to right.
WATER and OIL, the higher the levels, the more icons are shown.
CELLS, face expression indicate the skin roughness or softness
5. % means your REAL water % of skin

WATER
WATER
OIL
CELLS
36%

Panduan *Moisture Checker*

Penggunaan *Moisture Checker*

Penggunaan *Skin Analyzer*

Lampiran 3. Standar Kandungan Krim *Anti Aging*

Tabel Formulasi Basis Krim Tipe Minyak Dalam Air (m/a)

Bahan	Konsentrasi (%)
Asam stearat	25
Setil alkohol	1
Gliserol	5
Trietanolamin	2
Nipagin	0,1
Nipasol	0,05
Akuades	100

Sumber: ISFI, 1971, *Formularium Medicamentorum Selectum*, Panitia Formularium, Surabaya.

Lampiran 4. Perhitungan Pembuatan Larutan

1. Pembuatan Larutan DPPH

W DPPH = V x M x M_r

W DPPH = 50 mL x 0,0004 mmol/mL x 394,32 mg/mmol

W DPPH = 7,8864 mg

W DPPH = 0,0079 gram

2. Pembuatan Deret Standar

$$\text{ppm induk} = \frac{5 \text{ mg}}{0{,}0001 \text{ mL}} = 5000 \text{ ppm}$$

$$\text{Vinduk} = \frac{V1 \times C1}{\text{Cinduk}} = \frac{5 \text{ mL} \times 20 \text{ ppm}}{5000 \text{ ppm}} = 0{,}02 \text{ mL}$$

$$\text{Vinduk} = \frac{V2 \times C2}{\text{Cinduk}} = \frac{5 \text{ mL} \times 40 \text{ ppm}}{5000 \text{ ppm}} = 0{,}04 \text{ mL}$$

$$\text{Vinduk} = \frac{V3 \times C3}{\text{Cinduk}} = \frac{5 \text{ mL} \times 80 \text{ ppm}}{5000 \text{ ppm}} = 0{,}08 \text{ mL}$$

$$\text{Vinduk} = \frac{V4 \times C4}{\text{Cinduk}} = \frac{5 \text{ mL} \times 160 \text{ ppm}}{5000 \text{ ppm}} = 0{,}16 \text{ mL}$$

$$\text{Vinduk} = \frac{V5 \times C5}{\text{Cinduk}} = \frac{5 \text{ mL} \times 320 \text{ ppm}}{5000 \text{ ppm}} = 0{,}32 \text{ mL}$$

Lampiran 5. Data Analisis Sampel

1. **Tabel Nilai Serapan Ekstrak Mikroalga *Skeletonema sp.***

Konsentrasi Deret	Nilai Serapan
20 ppm	0,560
40 ppm	0,512
80 ppm	0,438
160 ppm	0,323
320 ppm	0,126

$$\text{Daya Antioksidan} = \frac{\text{Absorban Blanko - Absorban Sampel}}{\text{Absorban Blanko}} \text{ x } 100\%$$

a. Daya antioksidan 20 ppm $= \frac{0{,}741 - 0{,}560}{0{,}741} \text{ x } 100\% = 24{,}43\%$

b. Daya antioksidan 40 ppm $= \frac{0{,}741 - 0{,}512}{0{,}741} \text{ x } 100\% = 30{,}90\%$

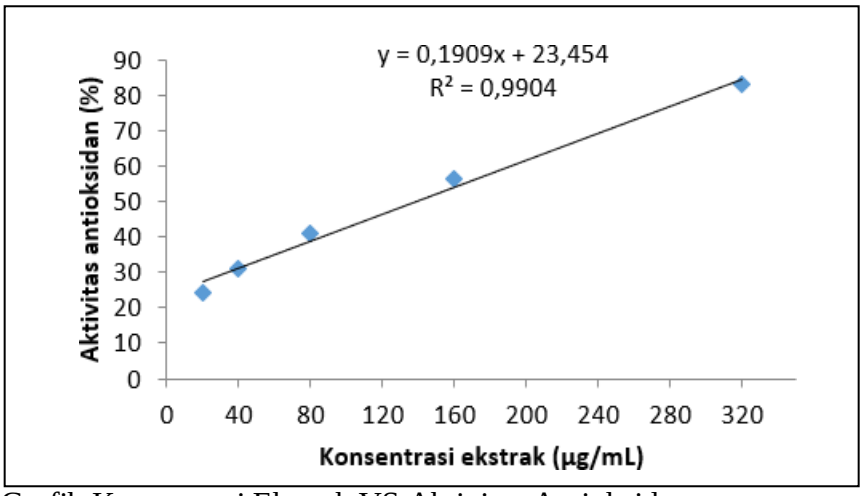
c. Daya antioksidan 80 ppm $= \frac{0{,}741 - 0{,}438}{0{,}741} \text{ x } 100\% = 40{,}89\%$

d. Daya antioksidan 160 ppm $= \frac{0{,}741 - 0{,}323}{0{,}741} \text{ x } 100\% = 56{,}41\%$

e. Daya antioksidan 320 ppm $= \frac{0{,}741 - 0{,}126}{0{,}741} \text{ x } 100\% = 83{,}00\%$

$$\text{Nilai } IC_{50} = \frac{50 - b}{a}$$

$$\text{Nilai } IC_{50} = \frac{50 - 23{,}454}{0{,}1909} = 139{,}0571$$



Grafik Konsentrasi Ekstrak VS Aktivitas Antioksidan

2. Tabel Perhitungan Jumlah Koloni

No	Faktor Pengenceran	Bobot Awal (gram)	Jumlah Koloni	
			Sampel	Kontrol
1	10^{-3}	1	328	416
2	10^{-3}	1	376	576
Jumlah			704	992
Rata-rata			352	496

a. Jumlah Koloni Sampel = $\frac{\text{Simplo + Duplo}}{2}$ x fp = 352 x 10^{-3} (dalam 1 gram)

b. Jumlah Koloni Kontrol = $\frac{\text{Simplo + Duplo}}{2}$ x fp = 496 x 10^{-3} (dalam 1 gram)