BAB V
KESIMPULAN DAN SARAN

A. Kesimpulan

Berdasarkan dari hasil penelitian yang telah dilakukan dapat diperoleh kesimpulan bahwa:

Pertama, askorbil palmitat dapat dibuat sediaan serum yang memenuhi karakteristik fisik serum meliputi uji organoleptis, uji *p*H dan uji viskositas.

Kedua, formula serum askorbil palmitat dengan variasi *sodium gluconate* yang stabil secara fisik selama proses penyimpanan adalah Formula 3 dengan konsentrasi *sodium gluconate* 0,3%.

B. Saran

Penelitian ini masih banyak kekurangan, maka perlu dilakukan penelitian lebih lanjut mengenai :

Pertama, perlu dilakukan uji difusi sel menggunakan menggunakan membran biologis untuk mengetahui serum askorbil palmitat yang dapat berpenetrasi ke dalam kulit.

Kedua, perlu dilakukan uji DPPH sediaan serum askorbil palmitat untuk mengetahui serum askorbil palmitat mempunyai aktivitas antioksidan.

Ketiga, pengembangan sediaan serum askorbil palmitat dalam bentuk krim, gel, maupun *lotion.*

DAFTAR PUSTAKA

Akhmetov M M et al. 2016. NMR Investigation of Conformational Changes in Calcium Gluconate 114-5.

Amelia N.D. 2016. Pengaruh Konsentrasi Xanthan Gum Pada Krim Antibakteri Tipe O/W Ekstrak Daun Pandan Wangi (*Pandanus Amaryllifolius* Roxb.) Terhadap Sifat Fisik Dan Kimianya. *KTI*. Universitas Sebelas Maret. Surakarta.

Aminah *et al*. 2016. Perbandingan Aktivitas Antioksidan Ekstrak Etanol Daun Sirsak (*Annona muricata* L.) Berdasarkan Tempat Tumbuh dengan Metode Peredaman DPPH. *Jurnal Fitofarmaka Indonesia*. Vol. 3 No.1

Andersen, Klaus E. 2012. Ethylhexylglycerin a contact allergen in cosmetic products.*American Contact Dermatitis Society*. 291.

Anief M. 2007. *Farmasetika*. Cetakan Keempat. Yogyakarta: Gadjah Mada University Press. Hal. 156-181.

Ansel, H. C., 1989. *Introduction to Pharmaceutical Dosage Forms*. Diterjemahkan oleh Farida Ibrahim. Edisi IV. 313. Universitas Indonesia Press. Jakarta.

Ariyanti *et al*. 2010. Otomatisasi Pengukuran Koefisien Viskosistas Zat Cair Menggunakan Gelombang Ultrasonik. *Jurnal Neutrino*. Vol.2. No.2 April 2010. Jurusan Fisika UIN Maulana Malik Ibrahim Malang.

Ariyanto. 2006. Uji Aktivitas Antioksidan, Penentuan Kandungan Fenolik dan Fraksi Air Ekstrak Metanolik Pegagan (*Centella asiatica* L. Urban), *Skripsi*. Fakultas Farmasi Universitas Gadjah Mada. Yogyakarta.

Austria, R., Semenzato, A., Bettero, A., 1997. Stability of vitamin C derivates in solution and topical formulations. *J. Pharm. Biomed*. Anal. 15, 795–801.

Aquilina, G., Bach, A, Bampidis, V., Bastos, M.D.L., Flachowsky, G., Gasa-Gaso, J., *et al*., 2013. Scientific Opinion on the safety and efficacy of vitamin C (ascorbic acid, sodium ascorbate, calcium ascorbate, ascorbyl palmitate, sodium calcium ascorbyl phosphate and sodium ascorbyl phospate) as a freed additive for all animal species submitted by DSM Nutritional Products Ltd, *EFSA Journal*, 11(2), 19.

Baines, Z. V. dan Morris, F. R., 1987. Flavour Tastes Perception in Thickened System; The Effect of Guar Gum Above and Below. Food Hydrocolloids. 1(3): 197-205.

Baumann, L. (Ed), 2009. *Cosmetic Dermatology : Principles and Practice*, second edition, Mc Graw Hill Medical, New York, pp. 293-299.

Betageri, G. dan Prabhu, S., 2002. Semisolid Preparation. Dalam Swarbrick. J. dan Boyland. J. C., (Eds.). Encyclopedia of Pharmaceutical Technology. 2nd Ed. 3: 2452-2456. Marcel Dekker. Inc., New York.

Budiman, M.H. 2008. Uji stabilitas dan aktivitas antioksidan sediaan krim yang mengandung ekstrak kering tomat. *Skripsi*. Universitas Indonesia.

Colven R.M, Pinnel S.R. 1996. *Topical Vitamin C in Aging*. Clin. Dermatol (4): 227-234.

Cui. 2000. Polysaccharide Gums from Agricultural Products: Processing, Structures and Functionality. CRC Press.

Chen Y, Wu Q, Zhang Z, Yuan L, Liu X, Zhou L. 2012. *Preparation of curcumin-loaded liposomes and evaluation of their skin permeation and pharmacodynamics.* Molecules. 17:5972-87.

Devi Nur I.S. 2019. Formulasi dan Karakterisasi Nanofitosom Askorbil Palmitat dengan Metode Hidrasi Lapis Tipis-Sonikasi. *Skripsi*. Fakultas Farmasi Universitas Setia Budi. Surakarta.

Draelos Z.D. 2006. *Skin Care For the Sensitive Skin and Rosacae Patient: The Biofilm and New Skin Cleansing Technology*. Cos Derm.

Draelos Z.D. 2010. *Cosmetic Dermatology Products and Procedures*. USA: Blackwell Publishing, Ltd.

Djerassi, D., 1997. The role of the corrective vitamins A. B5 and C in the new. High performance cosmetics. Drug Cosmet Ind. 160. 60-62.

El-Gawad AH, Soliman OA, Shams MEE, Maria DN. 2014. Formulation and In Vitro Evaluation of Loratadine Gels for Ophthalmic Use. RGUHS *J Pharm Sci* 4.

Elizabeth Sita P.S.S.P. 2014. Pengaruh Perbandingan Surfaktan Tween 80 dan Kosurfaktan PEG 400 dalam Formulasi Sediaan Mikroemulsi Askorbil Palmitat dan Alfa Tokoferol untuk Antiaging. *Skripsi*. Fakultas Farmasi Universitas Sanata Dharma Yogyakarta.

Elmastas *et al*. 2006. Radical scavenging activity and antioxidant capacity of bay leaf extracts. *Journal of Iranian Chemical Society* 3(3): 258–266.

Ery A.L. 2013. Uji Aktivitas Antioksidan Ekstrak Metanol Buah Lakum (*Cayratia trifolia*) dengan Metode Dpph (2,2-Difenil-1-Pikrilhidrazil). Universitas Tanjungpura. Pontianak.

Ghersetich I, Lotti T, Campanile G. 1994. Hyaluronic acid in cutaneous intrinsic aging. *Int J Dermatol*. 33:119-122.

Harmita. 2004. Petunjuk Pelaksanaan Validasi Metode dan Cara Perhitungaannya. Majalah Ilmu Kefarmasian 1 : 117-135.

Isnindar, Wahyuono S, Setyowati E.P. 2011. *Isolasi dan identifikasi senyawa antioksidan daun kesemek (diospyros kaki Thunb) dengan metode DPPH (2,2-Difenil-1 Pikrilhidrazil)*. Majalah Obat Tradisional 16 (3), 157-164.

Irnawati *et al.* 2017. Penetapan kadar vitamin C dan aktivitas antioksidan sari buah songi (Dillenia serrata Thunb.) terhadap radikal DPPH (diphenylpicrylhydrazyl). *Jurnal Ilmiah Farmasi.* Vol 6 (2).

Juniarti, Osmeli, D., & Yuhernita. 2009. Kandungan senyawa kimia, uji toksisitas (*Brine shrimp lethality test*) dan antioksidan (1,1-diphenyl-2-pikrilhydrazyl) dari ekstrak daun saga (*Abrus precatorius* L.). Makara Sains, 13(1), 50-54.

Junqueira, LC., 2007. Persiapan jaringan untuk pemeriksaan mikroskopik. Histology Dasar: teks dan atlas. Edisi 10. Jakarta: EGC. 3-5.

Kattappagari K K, CS, Teja, RK, Kommalapati, C, Poosaria, SR, Gontu, BVR, Redyy. 2015. Rple Of Antioxidant in Facilitating the Body Functions. *Journal of Orofacial Sciences*. Vol 7 (2). 71-75.

Kogan A, Garti N. 2006. Microemulsions As Trasdermal Drug Delivery Vehicles Adv. *Colloid Interface Sci*. 123-126. 369-385.

Kumalaningsih S. 2006. Antioksidan Alami. Trubus Agrisarana, Surabaya.

Lulu A. 2017. Formulasi dan Uji Stabilitas Fisika-Kimia Srdiaan Gel Etil *P*-Metoksisinamat dari Rimpang Kencur (*KAEMPFERIA GALANGA Linn.).* Skripsi. Jurusan Farmasi. FKK. UIN Syarif Hidayatullah Jakarta.

Maulida, R. H., 2010. Analisis Karakteristik Pengaruh Suhu dan Kontaminan terhadap Viskositas Oli Menggunakan Rotary Viscometer. *Jurnal Neutrino*.

Mappa T, Edy HJ, Kojong N. Formulasi gel ekstrak daun sasaladahan (Peperomia pellucida (L.) H.B.K) dan uji efektivitasnya terhadap luka bakar pada kelinci (Oryctolagus cuniculus). *Jurnal Ilmiah Farmasi*. 2013;2(2):49-55.

Mardhiani *et al.* (2018). Formulasi dan Stabilitas Sediaan Serum dari Ekstrak Kopi Hijau (Coffea canephora var. Robusta) Sebagai Antioksidan. *Indonesia Natural Research Pharmaceutical Journal.* Vol. 2, No. 2.

Marinda, Wenny S. 2012. Formulasi dan Uji Stabilitas Fisik Gel Liposom yang Mengandung Fraksinasi Ekstrak Metanol Kulit Manggis (*Garcinia mangostana L.*) sebagai Antioksidan. Universitas Indonesia. Depok.

Mescher A. Junqueira's., 2010. Basic Histology Text & Atlas. New York: McGraw Hill Medical.

Molyneux, P. 2004. *The use of the stable free radikal diphenylpicrylhydrazyl (DPPH) for estimating antioxidant activity*. *Journal Science of Technology*.*Volume 26.Number 2.*Songklanakarin J. Sci. Technol. Inggris.

Moravkova, T. and Filip, P. (2014). The Influence of Thickeners on the Rheological and Sensory Properties of Cosmetic Lotions. Acta Polytechnica Hungarica. 11(6), 173-186.

Mulhaquddin. 2014. Validation Method. Dipresentasikan pada Diklat Validasi Metode, Baristand Industri Ambon 10 - 13 Juni 2014.

Ndhlala AR, Moyo M, Staden JV. 2010. Natural Antioxidants: Fascinating or Mythical Biomolecules 15, 6905-6930.

Ochiai Y *et. al*. 2006. A new lipophilic pro vitamin C, tetraisopalmitoyl, ascorbic acid (VC-IP), prevents UV- induced skin pigmentation though its anti-oxidative properties. *Dermatol Sci* (44):37-44.

Padayatty SJ *et al*. 2003. Vitamin C as an antioxidant: Evaluation of its role in disease prevention. *Journal of American College of Nutrition* 22:18-35.

Panjaitan, E. N., Saragih, A., Purba, D. 2012. Formulasi Gel Dari Ekstrak Rimpang Jahe Merah (Zingiber officinale Roscoe). *Journal of Pharmaceutics and Pharmacology*. Vol.1(1):9-20

Prakash, A., Rigelhof, F., and Miller, E., 2001. Antioxidant Activity: Medallion Laboratories. Analithycal Progress. 19(2). 1-4.

Prayoga G. 2013. Fraksinasi. Uji Aktivitas Antioksidan dengan Metode DPPH dan Identifikasi Golongan Senyawa Kimia dari Ekstrak Teraktif Daun Sambang Darah (Excoecaria cochinchinensis Lour). Fakultas Farmasi Program Studi Sarjana Ekstensi Universitas Indonesia.

Price, J. C., 2006. Glycerin. Dalam Rowe, R.C., Sheskhey, P. J., Owen, S. C., (Eds.). Handbook of Pharmaceutical Exipients. 5th Ed. 301-303. Pharmaceutical Press. London.

Putra M.M. 2014. Pengaruh Lamanya Penyimpanan Terhadap pH sediaan *Cold Cream* Kombinasi Ekstrak Kulit Buah Manggis, Herba Pegagan dan Daun Gaharu. *Udayana.* 16-21.

Rabeta, M.S., dan Faraniza N., 2013, Total Phenolic Content and Ferric Reducing Antioxidant Power of The Leaves and Fruits of Garcinia atrovirdis and Cynometra cauliflora. *International Food Research Journal* 20(4): 1691-1696

Raza R, Minttal A, Kumar P, Alam S, Prakash S, Chauhan N. 2015. Approaches and evaluation of Transdermal drug delivery system. *International Journal of Drug Development & Research.* Vol 7 (1): 222-233.

Riadi E. 2016. *Statistika Penelitian (Analisis Manual dan IBM SPSS).* Yogyakarta: ANDI Yogyakarta.

Rieger, M.M., 2000. Harry's Cosmetology 8th Ed. 641-643. Chemical Publishing Co. Inc., New York.

Rizki, FM. 2002. Mempelajari Pengaruh Penambahan Hidrokoloid dan Lama Penyimpanan Terhadap Sifat Fisiko Kimiawi dan Daya Terima Selai Rendah Kalori Buah Mengkudu (*Morinda citrifolia*). *Skripsi*. Jurusan Gizi masyarakat dan Sumber daya Keluarga. Fakultas Pertanian. IPB.

Rohman, A., Riyanto S., Yuniarti N., Saputra W.R., Utami R., Mulatsih W. 2010. Antioxidant Activity. Total Phenolic and Total Flavonoid of Extracts and Fractions of Red Fruit (Padanus conoideus Lam).

Rowe, R. C., Sheskey, P. J., and Quinn, M. E., 2009. *Handbook of Pharmaceutical Excipient*. Pharmaceutical Press and American Pharmaceutical Association 2009.USA. pp. 118-121, 283-285.

Samira T. 2012. Pengaruh Peptida Tembaga-Glisil-L-Lisin (CU-GHK) terhadap Penetrasi In Vitro serta Stabilitas Fisik dan Kimia Vitamin C dalam Sediaan Serum. *Skripsi*. Universitas Indonesia.

Sasidharan, S., Joseph, P. and Junise. (2014). Formulation and evaluation of Fairness Serum using Polyherbal Extracts, *International Journal of Pharmacy*. 4(3), 105112.

Schreml, S., Kemper, M. and Abels, C. (2014). Skin pH in the Elderly and Appropriate Skin Care. EMJ Dermatol. 86-94.

Segall and Mayano. 2008. Stability of vitamin C derivatives in topical formulations containing lipoic acid, vitamins A and E. *International Journal of Cosmetic Science.* 30, 453–458.

Silva, G.M., Maia Campos, P.M., 2000. Ascorbic acid and its derivatives in cosmetic formulations. Cosmet. Toil 115, 59–62.

Simon, Patricia (2012). Formulasi dan Uji penetrasi mikroemulsi natrium diklofenak dengan metode sel difusi Franz dan metode Tape stripping. *Skripsi*. Depok : Prodi Farmasi FMIPA Universitas Indonesia.

Sinaga, A.A., Luliana, S. dan Fahrurroji, A. 2015. Losio Antioksidan Buah Naga Merah (Hylocereus polyrhizus Britton and Rose). *Journal Pharmaceutical Sciences and Research*. 2(1).

Singh, K.K., 2006. Xanthan Gum. Dalam Rowe, R.C., Sheskhey, P.J., Owen, S.C., (Eds.). *Handbook of Pharmaceutical Exipients*. 5 th Ed. 821-823. Pharmaceutical Press. London.

Sinko, P.J., 2006. Martin's Physical Pharmacy and Pharmaceutical Sciences. 5 th Ed. 561-565. Lippincott Williams and Wilkins. Philadelphia.

Sinko, Patrick J. 2011. *Martin's physical pharmacy and pharmaceutical sciences (6th ed). Cina: Lippincot williams & Wilkins*. 355-367, 469-473.

Sukamto. 2010. Sifat Fungsional Produk Interaksi Fraksi Globulin 7s Komak (*Dolichos Lablab*) dan Gum Xantan. *Jurnal Teknologi dan Industri Pangan*. Vol 20 117-123.

Srie *et al.* 2018. *Production and Characterization Xanthan Gum From Tofu Dregs As A Thickener In Textile Process.* Arena Tekstil Vol. 32 No. 2, 2017: 51-58.

Stanley B, Levy, Anthony M, Dulichan & Michael Helman. 2009. Safety of a preservative system containing 1,2-hexanediol and caprylyl glycol. *Cutaneous and Ocular Toxicology.* 28:1, 23-24.

Stiyawan Dedhi. 2018. Formulasi Serum Gel Anti Jerawat Ektrak Etanol Kulit Buah Nanas serta Uji Aktivitas terhadap Bakteri *Staphylococcus Aureus* ATCC 25923. Stikes Muhamadiyah. Pekalongan.

Swastika, A., Mufrod & Purwanto. 2013. Aktivitas Antioksidan Krim Ekstrak Sari Tomat (*Solanum lycopersicum L.). Trad Med Journal*. 18(3). 132-140.

Tranggono, R.I. dan Latifah, F. 2007. *Buku Pedoman Ilmu Pengetahuan Kosmetik*. Jakarta: Penerbit Gramedia Pustaka Utama. Hal 98-105.

Trommer H, Wartewig S, Bottacher R. 2003. The effects of hyaluronan and its fragments on lipid models exposed to UV irradiation. *Int J Pharm*. 254: 223-234.

Utomo, A. B., Suprijono, A., & Risdianto, A. 2008. Uji aktivitas antioksidan kombinasi ekstrak sarang semut (*Myrmecodia pendans)* dan ekstrak teh hitam dengan metode DPPH (1,1-difenil-2-pikrilhidrazil). Diunduh kembali dari http://journal.stifar.ac.id/ojs/ index.php/js/article/viewFile/6/7

Widyastuti, N. 2010. Pengukuran aktivitas antioksidan dengan metode CUPRAC, DPPH, dan FRAP serta kolerasinya dengan fenol dan flavonoid pada enam tanaman. Institut Pertanian Bogor. Bogor

Wijayanti, C.A., Faizatun. (2011). Formulasi Sediaan Serum Gel Vitamin C dan Vitamin E Menggunakan HPMC (Hydroxy Propyl Methyl Cellulosa) sebagai Gelling Agent. Jakarta: Universitas Pancasila.

Winarsi, H. 2007. Antioksidan Alami dan Radikal Bebas. Kanisius, Yogyakarta.

Windono T. 2004. Studi Hubungan Struktur-Aktivitas Kapasitas Peredaman Radikal Bebas Senyawa Flavonoid terhadap 1,1-Difenil-2- Pikrilhidrazil (DPPH). Artocarpus 4:42-52.

Witt, Krista & Bucks, Daniel. (2003). *Studying In Vitro : Skin Penetration and Drug Reselase to Optimize Dermatological Formulations. Dalam: Pharmaceutical Technology*. USA : Advanstar Communication.

Young, Anne. 2002. Practical Cosmetic Science. Mills and Boon Limited: London. 39-40.

Youngson, R. 2005.*Antioksidan: Manfaat Vitamin C dan E Bagi Kesehatan*, alih bahasa Susi Purwoko. Arcan Jakarta.

L A M P I R A N

Lampiran 1. Sertifikat analisis askorbil palmitat

parchem
fine & specialty chemicals

Safety Data Sheet
(Ascorbyl Palmitate)
DATE PREPARED: 1/3/2012
REVISION NUMBER: 1/3/2012

Section 1 – Company Information

Parchem - fine & specialty chemicals
415 Huguenot Street
New Rochelle, NY 10801
(914) 654-6800 **(914) 654-6899**
parchem.com **info@parchem.com**

EMERGENCY RESPONSE NUMBER:
CHEMTEL - Parchem CCN# M1S0007152
Toll Free US & Canada: (800)255-3924
All other Origins: (813) 248-0585
Collect Calls Accepted

Section 2 – Product Identification/ Information on Ingredients

PRODUCT NAME	Ascorbyl Palmitate
CAS NUMBER	137-66-6
SYNONYM	L-Ascorbic Acid, 6-Hexadecanoate
FORMULA	$C_{22}H_{38}O$

PRODUCT	CAS NUMBER	% BY WEIGHT
Ascorbyl palmitate	137-66-6	100%

Section 3 – Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (irritant), of ingestion.
Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4 – First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.
Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.
Serious Skin Contact: Not available.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Serious Inhalation: Not available.

Ingestion: Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.
Serious Ingestion: Not available.

Section 5 – Fire Fighting Measures

Flammability of the Product: May be combustible at high temperature.
Auto-Ignition Temperature: Not available.
Flash Points: CLOSED CUP: Higher than 93.3°C (200°F).
Flammable Limits: Not available.
Products of Combustion: These products are carbon oxides (CO, CO2).
Fire Hazards in Presence of Various Substances: Slightly flammable to flammable in presence of heat.
Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.
Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.
Special Remarks on Fire Hazards: Not available.
Special Remarks on Explosion Hazards: Not available.

Section 6 – Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.
Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7 – Handling & Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label.
Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8 – Exposure Controls & Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Personal Protection: Safety glasses. Synthetic apron. Gloves (impervious).
Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Exposure Limits: Not available.

Section 9 – Physical & Chemical Properties

Physical state and appearance: Solid. (Powdered solid.)
Odor: Citrus-like
Taste: Not available.
Molecular Weight: 414.54 g/mole
Color: White to yellowish.
pH (1% soln/water): Not available.
Boiling Point: Not available.
Melting Point: 116°C (240.8°F)
Critical Temperature: Not available.
Specific Gravity: Not available.
Vapor Pressure: Not applicable.
Vapor Density: Not available.
Volatility: Not available.
Odor Threshold: Not available.
Water/Oil Dist. Coeff.: Not available.
Ionicity (in Water): Not available.
Dispersion Properties: Not available.
Solubility: Very slightly soluble in cold water.

Section 10 – Stability & Reactivity Data

Stability: The product is stable.
Instability Temperature: Not available.
Conditions of Instability: Excess heat, incompatible materials
Incompatibility with various substances: Not available.
Corrosivity: Not available.
Special Remarks on Reactivity: Not available.
Special Remarks on Corrosivity: Not available.
Polymerization: Will not occur.

Section 11 – Toxicological Information

Routes of Entry: Inhalation. Ingestion.
Toxicity to Animals:
Acute oral toxicity (LD50): 25000 mg/kg [Mouse].
Acute dermal toxicity (LD50): >3000 mg/kg [Guinea pig].
Chronic Effects on Humans: Not available.
Other Toxic Effects on Humans:
Hazardous in case of inhalation.
Slightly hazardous in case of skin contact (irritant), of ingestion.
Special Remarks on Toxicity to Animals: Not available.
Special Remarks on Chronic Effects on Humans: Not available.
Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: May cause skin irritation.
Eyes: May cause eye irritation.
Inhalation: May cause respiratory tract irritation.
Ingestion: May cause gastrointestinal (digestive) tract irritation. May affect metabolism and urinary system.
Chronic Potential Health Effects: no information found

Section 12 – Ecological Information

Ecotoxicity: Not available.
BOD5 and COD: Not available.
Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.
Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.
Special Remarks on the Products of Biodegradation: Not available.

Section 13 – Disposal Consideration

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14 – Transportation Data

DOT Classification: Not a DOT controlled material (United States).
Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15 – Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Ascorbyl palmitate
Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.
Other Classifications:
WHMIS (Canada): Not controlled under WHMIS (Canada).
DSCL (EEC):
R36- Irritating to eyes.
S2- Keep out of the reach of children.
S46- If swallowed, seek medical advice immediately and show this container or label.
HMIS (U.S.A.):
Health Hazard: 2
Fire Hazard: 1
Reactivity: 0
Personal Protection: C
National Fire Protection Association (U.S.A.):
Health: 2
Flammability: 1
Reactivity: 0
Specific hazard:
Protective Equipment:
Gloves (impervious).
Synthetic apron.
Not applicable.
Safety glasses.

Section 16 – Other Information

Disclaimer
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product.

Lampiran 2. Gambar bahan dan alat penelitian

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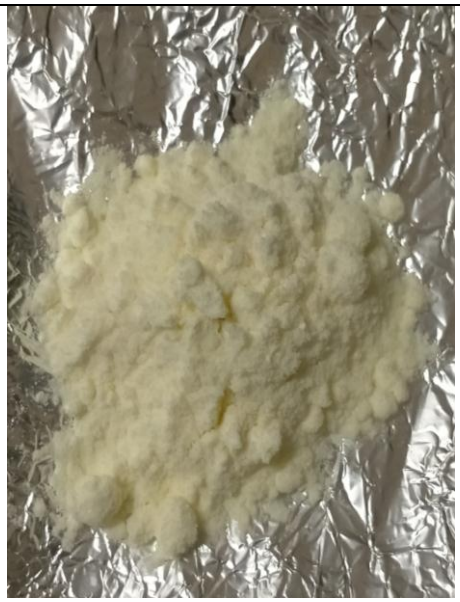
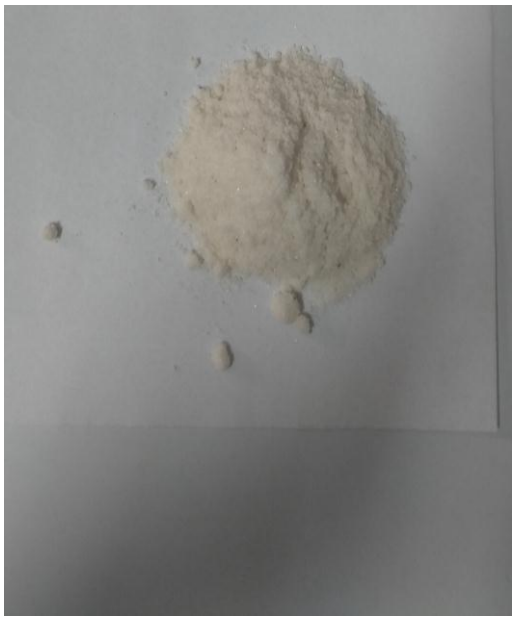
<tr><td> 
Askorbil palmitat</td><td> 
Glycerin</td></tr>
<tr><td> 
Sodium glukonat</td><td> 

Optipen</td></tr>
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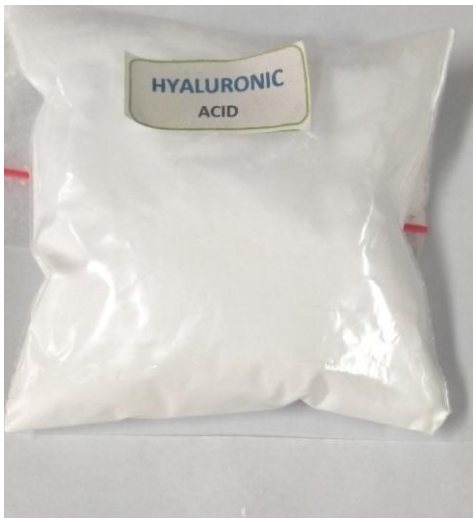
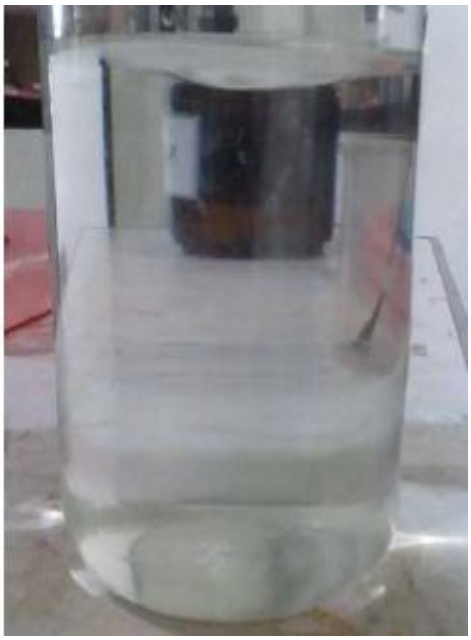
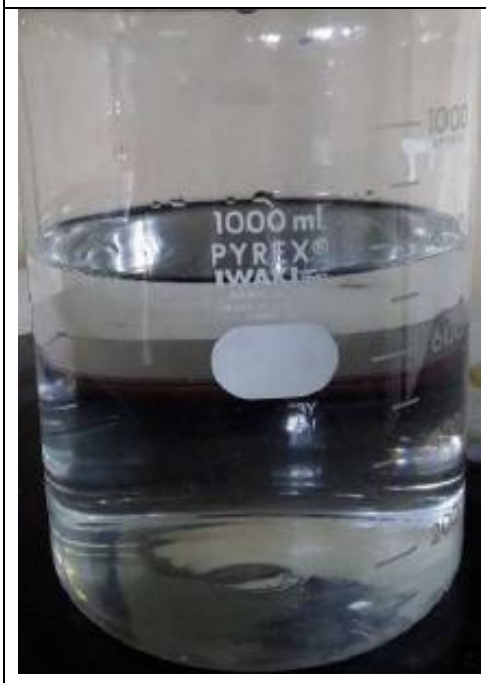
Bahan	
 Hyaluronic acid	 Xanthan gum
 Asam glikolat	 Aquadest

Alat	
 Gelas ukur	 Botol serum
 Beker glass	 Labu takar

	
Timbangan Analitik	Oven
	
Mortir dan stamfer	Spektro UV-VIS

pH meter

Viskometer

stirer

Lampiran 3. Data pengujian *p*H

Formula	Replikasi	Hari ke-1	Hari ke-7	Hari ke-14	Hari ke-21
1	1	5.91	5.98	5.99	6.04
		5.91	5.97	5.97	6.01
		5.94	5.98	5.99	6.02
	Rata-rata	5.92	5.98	5.98	6.02
	SD	0.02	0.01	0.01	0.02
2	2	6.10	6.18	6.23	6.27
		6.13	6.15	6.25	6.29
		6.08	6.19	6.22	6.25
	Rata-rata	6.10	6.17	6.23	6.27
	SD	0.03	0.02	0.02	0.02
3	3	6.17	6.24	6.26	6.34
		6.2	6.22	6.24	6.34
		6.25	6.3	6.32	6.33
	Rata-rata	6.21	6.25	6.27	6.34
	SD	0.04	0.04	0.04	0.01

Lampiran 4. Data analisis One Way ANOVA pengujian *p*H

Hari ke-1

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Hari	9	1.0000	.00000	1.00	1.00
Formula	9	2.0000	.86603	1.00	3.00
Replikasi	9	2.0000	.86603	1.00	3.00

One-Sample Kolmogorov-Smirnov Test

		Hari	Formula	Replikasi
N		9	9	9
Normal Parameters[a,b]	Mean	1.0000	2.0000	2.0000
	Std. Deviation	.00000[c]	.86603	.86603
Most Extreme Differences	Absolute		.209	.209
	Positive		.209	.209
	Negative		-.209	-.209
Kolmogorov-Smirnov Z			.628	.628
Asymp. Sig. (2-tailed)			.826	.826

a. Test distribution is Normal.

b. Calculated from data.

c. The distribution has no variance for this variable. One-Sample Kolmogorov-Smirnov Test cannot be performed.

Test of Homogeneity of Variances

pH

Levene Statistic	df1	df2	Sig.
1.006	2	6	.420

ANOVA

pH

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.126	2	.063	73.909	.000
Within Groups	.005	6	.001		
Total	.132	8			

Hari ke-1 dan 21

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Hari	18	1.5000	.51450	1.00	2.00
Formula	18	2.0000	.84017	1.00	3.00
Replikasi	18	2.0000	.84017	1.00	3.00

One-Sample Kolmogorov-Smirnov Test

		Hari	Formula	Replikasi
N		18	18	18
Normal Parameters[a,b]	Mean	1.5000	2.0000	2.0000
	Std. Deviation	.51450	.84017	.84017
Most Extreme Differences	Absolute	.334	.216	.216
	Positive	.334	.216	.216
	Negative	-.334	-.216	-.216
Kolmogorov-Smirnov Z		1.419	.918	.918
Asymp. Sig. (2-tailed)		.036	.368	.368

a. Test distribution is Normal.

b. Calculated from data.

Test of Homogeneity of Variances

pH

Levene Statistic	df1	df2	Sig.
3.518	2	15	.056

ANOVA

pH

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.287	2	.143	24.042	.000
Within Groups	.090	15	.006		
Total	.376	17			

Lampiran 5. Data pengujian Viskositas

Formula	Replikasi	Hari ke-1	Hari ke-7	Hari ke-14	Hari ke-21
1	1	1200	1100	950	750
		1200	1100	900	750
		1250	1150	950	850
	Rata-rata	1217	1117	933	783
	SD	29	29	29	58
2	2	1150	900	750	700
		1200	950	800	750
		1200	950	800	750
	Rata-rata	1183	933	783	733
	SD	29	29	29	29
3	3	1100	850	700	550
		1100	850	750	650
		1100	850	750	650
	Rata-rata	1100	850	733	617
	SD	0	0	29	58

Lampiran 6. Data analisis One Way ANOVA pengujian viskositas

Hari ke-1

	N	Mean	Std. Deviation	Minimum	Maximum
Hari	9	1.0000	.00000	1.00	1.00
Formula	9	2.0000	.86603	1.00	3.00
Replikasi	9	2.0000	.86603	1.00	3.00

One-Sample Kolmogorov-Smirnov Test

		Hari	Formula	Replikasi
N		9	9	9
Normal Parameters[a,b]	Mean	1.0000	2.0000	2.0000
	Std. Deviation	.00000[c]	.86603	.86603
Most Extreme Differences	Absolute		.209	.209
	Positive		.209	.209
	Negative		-.209	-.209
Kolmogorov-Smirnov Z			.628	.628
Asymp. Sig. (2-tailed)			.826	.826

a. Test distribution is Normal.

b. Calculated from data.

c. The distribution has no variance for this variable. One-Sample Kolmogorov-Smirnov Test cannot be performed.

Test of Homogeneity of Variances

Viskositas

Levene Statistic	df1	df2	Sig.
8.000	2	6	.020

ANOVA

Viskositas

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	21666.667	2	10833.333	19.500	.002
Within Groups	3333.333	6	555.556		
Total	25000.000	8			

Hari ke-1 dan 21

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Hari	18	1.5000	.51450	1.00	2.00
Formula	18	2.0000	.84017	1.00	3.00
Replikasi	18	2.0000	.84017	1.00	3.00

One-Sample Kolmogorov-Smirnov Test

		Hari	Formula	Replikasi
N		18	18	18
Normal Parameters[a,b]	Mean	1.5000	2.0000	2.0000
	Std. Deviation	.51450	.84017	.84017
Most Extreme Differences	Absolute	.334	.216	.216
	Positive	.334	.216	.216
	Negative	-.334	-.216	-.216
Kolmogorov-Smirnov Z		1.419	.918	.918
Asymp. Sig. (2-tailed)		.036	.368	.368

a. Test distribution is Normal.

b. Calculated from data.

Test of Homogeneity of Variances

Viskositas

Levene Statistic	df1	df2	Sig.
.795	2	15	.470

ANOVA

Viskositas

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	63611.111	2	31805.556	.500	.616
Within Groups	954166.667	15	63611.111		
Total	1017777.778	17			

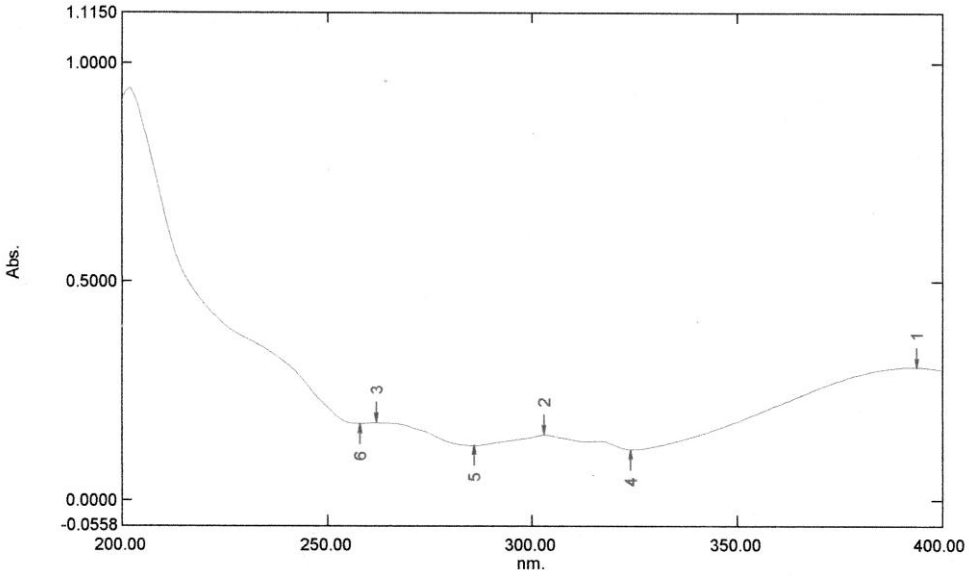
Lampiran 7. Pembuatan kurva kalibrasi dan validasi metode.

1. Penentuan panjang gelombang

Spectrum Peak Pick Report

03/12/2020 02:33:56 PM

Data Set: File_200312_143047 - RawData



No.	P/V	Wavelength	Abs.	Description
1	↑	394.00	0.3050	
2	↑	303.00	0.1495	
3	↑	262.00	0.1770	
4	↓	324.00	0.1160	
5	↓	286.00	0.1252	
6	↓	258.00	0.1757	

[Measurement Properties]
Wavelength Range (nm.): 200.00 to 400.00
Scan Speed: Medium
Sampling Interval: 1.0
Auto Sampling Interval: Disabled
Scan Mode: Single

[Instrument Properties]
Instrument Type: UV-1800 Series
Measuring Mode: Absorbance
Slit Width: 1.0 nm
Light Source Change Wavelength: 340.0 nm
S/R Exchange: Normal

[Attachment Properties]
Attachment: None

[Operation]
Threshold: 0.0010000
Points: 4
InterPolate: Disabled
Average: Disabled

[Sample Preparation Properties]
Weight:
Volume:
Dilution:
Path Length:
Additional Information:

2. OT Askorbil palmitat

Kinetics Data Print Report

03/12/2020 08:17:53 AM

Time (Minute)	RawData ...
0.000	0.305
1.000	0.306
2.000	0.305
3.000	0.306
4.000	0.306
5.000	0.305
6.000	0.305
7.000	0.305
8.000	0.305
9.000	0.305
10.000	0.305
11.000	0.304
12.000	0.305
13.000	0.305
14.000	0.304
15.000	0.305
16.000	0.304
17.000	0.304
18.000	0.306
19.000	0.305
20.000	0.305
21.000	0.305
22.000	0.305
23.000	0.304
24.000	0.304
25.000	0.305
26.000	0.305
27.000	0.304
28.000	0.305
29.000	0.305
30.000	0.305

3. Linieritas

Penimbangan askorbil palmitat :

Kertas kosong + isi : 0,2848 g

Kertas sisa : 0,2741 g _

Zat aktif : 0,0107 g

Membuat larutan induk sebesar 100 ppm dengan menimbang 10,7 mg askorbil palmitat ditambahkan etanol p.a sampai 100 mL, selanjutnya dibuat seri konsentrasi :

1) 7,49 ppm

   C1 x V1 = C2 x V2

   107 ppm x 0,7 = C2 x 10 mL

   C2 = 7,49 ppm

2) 9,63 ppm

   C1 x V1 = C2 x V2

   107 ppm x 0,9 = C2 x 10 mL

   C2 = 9,63 ppm

3) 11,77 ppm

   C1 x V1 = C2 x V2

   107 ppm x 1,1 = C2 x 10 mL

   C2 = 11,77 ppm

4) 13,91 ppm

   C1 x V1 = C2 x V2

   107 ppm x 1,3 = C2 x 10 mL

   C2 = 13,91 ppm

5) 14,7 ppm

   C1 x V1 = C2 x V2

   107 ppm x 1,5 = C2 x 10 mL

   C2 = 16,05 ppm

6) 16,8 ppm

   C1 x V1 = C2 x V2

   107 ppm x 1,7 = C2 x 10 mL

   C2 = 18,19 ppm

Konsentrasi (ppm)	Absorbansi
7,49	0,256
9,63	0,336
11,77	0,431
13,91	0,525
16,05	0,606
18,19	0,718

Persamaan regresi linier antara konsentrasi (ppm) dan serapan diperoleh:

a = -0,0723
b = 0,0429
r = 0,9990
y= -0,0723 + 0,0429 x

keterangan:
x = konsentrasi (ppm)
y = serapan

4. Akurasi

Konsentrasi	Replikasi	ABS	Konsentrasi (ppm)	Sebenarnya (ppm)	%		
80%	1	0.439	11.9156	11.77	101%	101.57%	101.04%
	2	0.441	11.9622	11.77	102%		
	3	0.442	11.9855	11.77	102%		
100%	1	0.529	14.0130	13.91	101%	101.13%	
	2	0.533	14.1062	13.91	101%		
	3	0.532	14.0829	13.91	101%		
120%	1	0.619	16.1104	16.05	100%	100.42%	
	2	0.621	16.1570	16.05	101%		
	3	0.618	16.0871	16.05	100%		

Perhitungan konsentrasi (ppm)

80%

1. (Abs – a) / b = [0,439 - (-0,0723)] / 0,0429
   = 11,9156
2. (Abs – a) / b = [0,441 - (-0,0723)] / 0,0429
   = 11,9622
3. (Abs – a) / b = [0,442 - (-0,0723)] / 0,0429
   = 11,9855

100%

1. (Abs – a) / b = [0,529 - (-0,0723)] / 0,0429
   = 14.0130
2. (Abs – a) / b = [0,533 - (-0,0723)] / 0,0429
   = 14,1062
3. (Abs – a) / b = [0,532 - (-0,0723)] / 0,0429
   = 14,0829

120%

1. (Abs – a) / b = [0,619 - (-0,0723)] / 0,0429
   = 16,1104
2. (Abs – a) / b = [0,621 - (-0,0723)] / 0,0429
   = 16,1570
3. (Abs – a) / b = [0,618 - (-0,0723)] / 0,0429
   = 16,0871

% Recovery
80% Konsentrasi 11,77 ppm

$$\%\ recovery \frac{konsentrasi\ terukur}{konsentrasi\ sebenarnya} \times 100\%$$

1. *% recovery* = $\frac{11,9156}{11,77}$ x 100% = 101%
2. *% recovery* = $\frac{11,9622}{11,77}$ x 100% = 102%
3. *% recovery* = $\frac{11,9855}{11,77}$ x 100% = 102%

100% Konsentrasi 13,91 ppm

1. *% recovery* = $\frac{14,0130}{13,91}$ x 100% = 101%
2. *% recovery* = $\frac{14,1062}{13,91}$ x 100% = 101%
3. *% recovery* = $\frac{14,0829}{13,91}$ x 100% = 101%

120% Konsentrasi 16,05 ppm

1. *% recovery* = $\frac{16,1104}{16,05}$ x 100% = 100%
2. *% recovery* = $\frac{16,1570}{}$ x 100% = 101%

16,05

3. *% recovery* = $\frac{16,0871}{16,05}$ x 100% = 100%

Hasil dari akurasi didapatkan rata-rata % recovery yaitu 101,57 %, 101,13 % dan 100,42 %. Rata-rata % yaitu 101,04 %.

5. Presisi

REPLIKASI	ABS	KONSENTRASI
1	0.439	11.9156
2	0.437	11.8690
3	0.436	11.8457
4	0.441	11.9622
5	0.445	12.0554
6	0.439	11.9156
7	0.437	11.8690
8	0.473	12.7079
9	0.475	12.7546
10	0.472	12.6846
Rata-rata		12.158
SD		0.38968
CV		0.03205

Hasil presisi didapatkan nilai SD sebesar 0.389 dan nilai CVnya 0,03%.

Perhitungan konsentrasi

1. (Abs – a) / b = [0,439 - (-0,0723)] / 0,0429
   = 11,9156
2. (Abs – a) / b = [0,437 - (-0,0723)] / 0,0429
   = 11,8690
3. (Abs – a) / b = [0,436 - (-0,0723)] / 0,0429
   = 11,8457
4. (Abs – a) / b = [0,441 - (-0,0723)] / 0,0429
   = 11,9622
5. (Abs – a) / b = [0,445 - (-0,0723)] / 0,0429

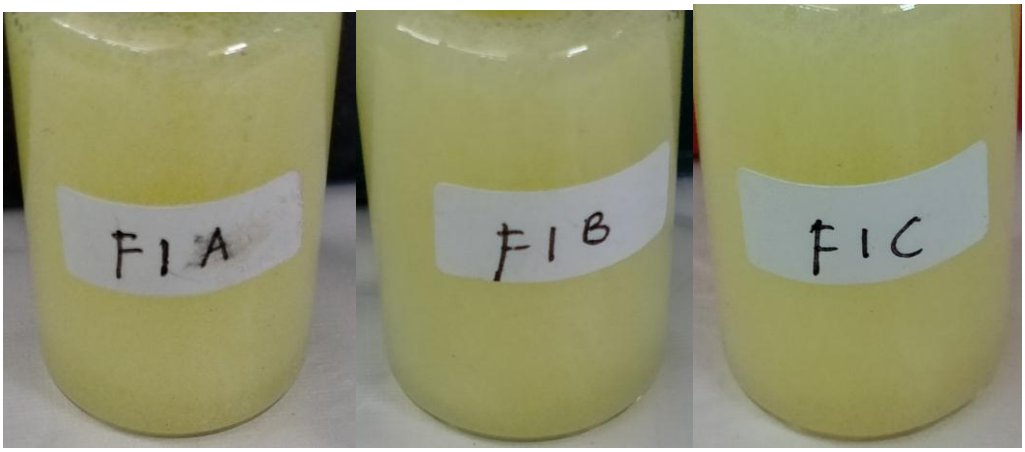
= 12,0554

6. (Abs – a) / b = [0,439 - (-0,0723)] / 0,0429
   = 11,9156
7. (Abs – a) / b = [0,437 - (-0,0723)] / 0,0429
   = 11,8690
8. (Abs – a) / b = [0,473 - (-0,0723)] / 0,0429
   = 12,7079
9. (Abs – a) / b = [0,475 - (-0,0723)] / 0,0429
   = 12,7546
10. (Abs – a) / b = [0,472 - (-0,0723)] / 0,0429
    = 12,6846

Lampiran 8. Hasil uji stabilitas

Siklus	Formula	Pada Suhu Dingin (24 jam)			Pada Suhu Panas (24 jam)		
		Bentuk	Warna	Bau	Bentuk	Warna	Bau
1	1	Gel encer	Putih Kekuningan	Khas askorbil palmitat	Gel encer	Putih kekuningan	Khas askorbil palmitat
	2	Gel encer	Putih kekuningan	Khas askorbil palmitat	Gel encer	Putih kekuningan	Khas askorbil palmitat
	3	Gel encer	Putih kekuningan	Khas askorbil palmitat	Gel encer	Putih kekuningan	Khas askorbil palmitat
2	1	Gel encer	Putih kekuningan	Khas askorbil palmitat	Gel encer	Putih kekuningan	Khas askorbil palmitat
	2	Gel encer	Putih kekuningan	Khas askorbil palmitat	Gel encer	Putih kekuningan	Khas askorbil palmitat
	3	Gel encer	Putih kekuningan	Khas askorbil palmitat	Gel encer	Putih kekuningan	Khas askorbil palmitat
3	1	Gel encer	Putih kekuningan	Khas askorbil palmitat	Gel encer	Putih kekuningan	Khas askorbil palmitat
	2	Gel encer	Putih kekuningan	Khas askorbil palmitat	Gel encer	Putih kekuningan	Khas askorbil palmitat
	3	Gel encer	Putih kekuningan	Khas askorbil palmitat	Gel encer	Putih kekuningan	Khas askorbil palmitat
4	1	Gel encer	Putih kekuningan	Khas askorbil palmitat	Gel encer	Putih kekuningan	Khas askorbil palmitat
	2	Gel encer	Putih kekuningan	Khas askorbil palmitat	Gel encer	Putih kekuningan	Khas askorbil palmitat
	3	Gel encer	Putih kekuningan	Khas askorbil palmitat	Gel encer	Putih kekuningan	Khas askorbil palmitat
5	1	Gel encer	Pudar	Khas askorbil palmitat	Gel encer	Pudar	Khas askorbil palmitat
	2	Gel encer	Putih kekuningan	Khas askorbil palmitat	Gel encer	Pudar	Khas askorbil palmitat
	3	Gel encer	Putih kekuningan	Khas askorbil palmitat	Gel encer	Putih kekuningan	Khas askorbil palmitat
6	1	Gel encer	Pudar	Khas askorbil palmitat	Gel encer	Pudar	Khas askorbil palmitat
	2	Gel encer	Pudar	Khas askorbil palmitat	Gel encer	Pudar	Khas askorbil palmitat
	3	Gel encer	Putih kekuningan	Khas askorbil palmitat	Gel encer	Putih kekuningan	Khas askorbil palmitat

Lampiran 9. Sediaan serum askorbil palmitat.



Formula 1

Formula 2

Formula 3