

## DAFTAR PUSTAKA

- Allen, L., and Ansel, H. C. 2013. Ansel's pharmaceutical dosage forms and drug delivery systems. Lippincott Williams & Wilkins.
- AlTuraifi, F. H. *et al.* 2019. Assessment of Microbiological Content of Private and Public Recreational Water Facilities and Their Antimicrobial Susceptibility Pattern in Al-Ahsa. *Environmental Health Insights*, 13, 1178630219887393.
- Austin, A., Lietman, T., Rose-Nussbaumer, J., 2017. Update on the Management of Infectious Keratitis. *Ophthalmology* 124, 1678–1689.
- Brunton, L.L., Lazo, J.S., Parker, K.L., 2006. Goodman and Gilman's The Pharmacological Basis of Therapeutics, 11th ed. McGraw-Hill Companies, Inc., United States of America.
- Chavan, P.M., Vyas, S., 2017. A Novel Approach In-Situ Gel for Sustained Drug Delivery : A Review. *Int. J. Pharm. Pharm. Res.* 9.
- BPOM. 2015. Peraturan Kepala Badan Pengawas Obat Dan Makanan Republik Indonesia Nomor 5 Tahun 2015 Tentang Pedoman Cara Ritel Pangan Yang Baik Di Pasar Tradisional. Jakarta: BPOM
- Dhaval, M., Devani, J., Parmar, R., Soniwala, M.M., Chavda, J., 2020. Formulation and optimization of microemulsion based sparfloxacin in-situ gel for ocular delivery: In vitro and ex vivo characterization. *J. Drug Deliv. Sci. Technol.* 55, 101373.
- Donnelly, R.F., 2011. Stability of cefazolin sodium in polypropylene syringes and polyvinylchloride minibags. *Can. J. Hosp. Pharm.* 64, 241–245.
- Ezisi, C.N., Ogbonnaya, C.E., Okoye, O., Ezeanosike, E., Ginger-Eke, H., Arinze, O.C., 2018. Microbial Keratitis—A Review of Epidemiology, Pathogenesis, Ocular Manifestations, and Management. *Niger. J. Ophthalmol.* 26, 13–23.
- Elsahn, A., Cendra, M. del M., Humbert, M.V., Christodoulides, M., Dua, H., Hossain, P., 2020. Pseudomonas aeruginosa host-pathogen interactions in human corneal infection models. *J. EuCornea*.
- Gupta, C., Juyal, V. and Nagaich, U. 2018. Formulation and optimization of thermosensitive in-situ gel of moxifloxacin hydrochloride for ocular drug delivery, *International Journal of Applied Pharmaceutics*, 10(3),

pp. 123–130. doi: 10.22159/ijap.2018v10i3.25083.

Güven, U.M., Berkman, M.S., Şenel, B., Yazan, Y., 2019. Development and in vitro/in vivo evaluation of thermo-sensitive in Situ Gelling Systems for Ocular Allergy. *Brazilian J. Pharm. Sci.* 55, 1–11.

Jain, D. *et al.* 2016. Newer Trends in In Situ Gelling Systems for Controlled Ocular Drug Delivery, *Journal of Analytical & Pharmaceutical Research*, 2(3), pp. 1–16. doi: 10.15406/japlr.2016.02.00022.

Jones, D.S., 2008. FASTtrack: Pharmaceuticals - Dosage Form and Design. Pharmaceutical Press, London.

Khattab, A., Marzok, S., Ibrahim, M., 2019. Development of optimized mucoadhesive thermosensitive pluronic based in situ gel for controlled delivery of Latanoprost: Antiglaucoma efficacy and stability approaches. *J. Drug Deliv. Sci. Technol.* 53, 101134.

Kodym, A., Bilski, P., Domańska, A., Helminiak, Ł., Jabłońska, M., Jachymska, A., 2012. Physical and chemical properties and stability of sodium cefazolin in buffered eye drops determined with HPLC method. *Acta Pol. Pharm. - Drug Res.* 69, 95–105.

Kodym, A., Zawisza, T., Bużka, K., & Kukuła, H. 2006. Influence of additives and storage temperature on physicochemical and microbiological properties of eye drops containing cefazolin. *Acta poloniae pharmaceutica*, 63(3), 225.

Lieberman, Rieger & Banker, 1989. *Pharmaceutical Dosage Form : Disperse System*, Vol ke-3, 495-498, Marcel Dekker Inc, New York.

Madan, J., Adokar, B., Dua, K., 2015. Development and evaluation of in situ gel of pregabalin. *Int. J. Pharm. Investig.* 5, 226.

Madhu, S. N., Jha, K. K., Karthyayani, A. P., & Gajjar, D. U. 2018. Ex vivo caprine model to study virulence factors in keratitis. *Journal of ophthalmic & vision research*, 13(4), 383.

Majeed, A., Khan, N.A., 2019. Ocular in situ gel: An overview. *J. Drug Deliv. Ther.* 9, 337-347.

Marlo, T. L. *et al.* 2017 Development of a novel ex vivo equine corneal model, *Veterinary Ophthalmology*, 20 (4), pp. 288–293. doi: 10.1111/vop.12415.

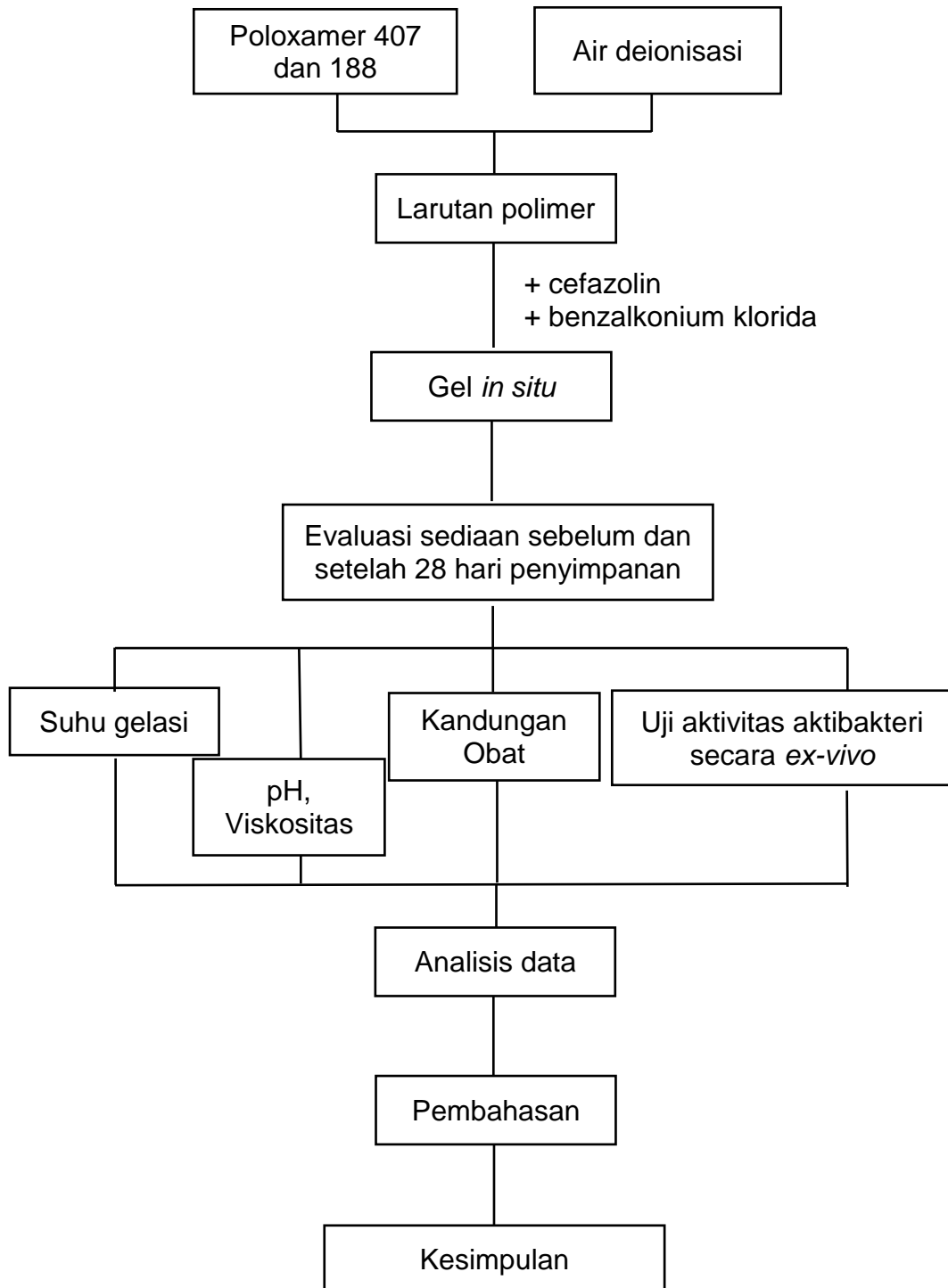
- McEvoy, G. K. 2004. *AHFS Drug Information 2004*. Amer Soc of Health System.
- Mundada, A.S., Avari, J.G., 2009. In situ gelling polymers in ocular drug delivery systems: A review. *Crit. Rev. Ther. Drug Carrier Syst.* 26, 85–118.
- Mohanty, D., Bakshi, V., Simharaju, N., Haque, M.A., Sahoo, C.K., 2018. A Review on in situ Gel: A Novel Drug Delivery System Dibyalochan. *Int. J. Pharm. Sci. Rev. Res.* 50, 175–181.
- Permana, A. D., Mir, M., Utomo, E., & Donnelly, R. F. 2020. Bacterially sensitive nanoparticle-based dissolving microneedles of doxycycline for enhanced treatment of bacterial biofilm skin infection: A proof of concept study. *International Journal of Pharmaceutics: X*, 2, 100047. doi:10.1016/j.ijpx.2020.100047
- Pinnock, A., Shivshetty, N., Roy, S., Rimmer, S., Douglas, I., MacNeil, S., & Garg, P. 2017. Ex vivo rabbit and human corneas as models for bacterial and fungal keratitis. *Graefe's Archive for Clinical and Experimental Ophthalmology*, 255(2), 333-342.
- Plumb, D. C. 2018. *Plumb's Veterinary Drug Handbook: Desk*. John Wiley & Sons.
- Power, D. A., & Johnson, J. A. 2009. Difco™ & BBL™ manual. *Manual of Microbiological Culture Media*, 359-60.
- Ratprasatporn, N., Wittayalertpanya, S., Khemsri, W., Chatsuwana, T., Chongpison, Y., Chamsai, T., Chansangpetch, S. 2019. Stability and Sterility of Extemporaneously Prepared Nonpreserved Cefazolin, Ceftazidime, Vancomycin, Amphotericin B, and Methylprednisolone Eye Drops. *Cornea*, 38(8), 1017–1022. doi:10.1097/ico.0000000000001992
- Rojanarata, T., Tankul, J., Woranaipinich, C., Potawanich, P., Plianwong, S., Sakulma, S., & Saehuan, C. 2010. Stability of fortified cefazolin ophthalmic solutions prepared in artificial tears containing surfactant-based versus oxidant-based preservatives. *Journal of ocular pharmacology and therapeutics*, 26(5), 485-490.
- Rowe, R.C., Sheskey, P.J., Quinn, M.E. (Eds.), 2009. *Handbook of Pharmaceutical Excipients*, 6th ed. Pharmaceutical Press and American Pharmacists Association, London.

- Sarada, K., Firoz, S., Padmini, K., 2015. In-situ gelling system: A review. *Int. J. Curr. Pharm. Rev. Res.* 5, 76–90.
- Soliman, K.A., Ullah, K., Shah, A., Jones, D.S., Singh, T.R.R., 2019. Poloxamer-based in situ gelling thermoresponsive systems for ocular drug delivery applications. *Drug Discov. Today* 24, 1575–1586.
- Steffen, G. S., & Candelaria, S. M. 2010. *Drug Interdiction: Partnerships, Legal Principles, and Investigative Methodologies for Law Enforcement*. CRC Press.
- Swarbick, J., 2007. *Encyclopedia of Pharmaceutical Technology*, 3rd ed. Informa Healthcare USA, Inc., New York.
- Sweetman, S.C., 2009. *Martindale: The Complete Drug Reference*, 36th ed. Pharmaceutical Press, London.
- Snyder, Katherine, and Chris Keegan. 2016. *Pharmacology for the surgical technologist*. Elsevier Health Sciences.
- Thomas, P., Sekhar, A. C., Upreti, R., Mujawar, M. M., & Pasha, S. S. (2015). Optimization of single plate-serial dilution spotting (SP-SDS) with sample anchoring as an assured method for bacterial and yeast cfu enumeration and single colony isolation from diverse samples. *Biotechnology Reports*, 8, 45–55. doi:10.1016/j.btre.2015.08.003
- Troy, D., 2005. *Remington The Science and Practice of Pharmacy, 21st ed.* Lippincott Williams & Wilkins, a Wolters Kluwer Company, Philadelphia.
- Tuany. 2020. *Formulasi Dan Karakterisasi Gel Mata Thermosensitive Dari Cefazoline*. Skripsi tidak diterbitkan. Makassar. Fakultas Farmasi Unhas.
- Ubani-Ukoma, U. *et al.* 2020. An *ex vivo* cornea infection model, *MethodsX*. Elsevier B.V., 7. doi: 10.1016/j.mex.2020.100876.
- Ubani-Ukoma, U. *et al.* 2019. Evaluating the potential of drug eluting contact lenses for treatment of bacterial keratitis using an *ex vivo* corneal model, *International Journal of Pharmaceutics*. Elsevier, 565(May), pp. 499–508. doi: 10.1016/j.ijpharm.2019.05.031.
- Ung, L., Bispo, P.J.M., Shanbhag, S.S., Gilmore, M.S., Chodosh, J., 2019. The persistent dilemma of microbial keratitis: Global burden, diagnosis, and antimicrobial resistance. *Surv. Ophthalmol.* 64, 255–271.

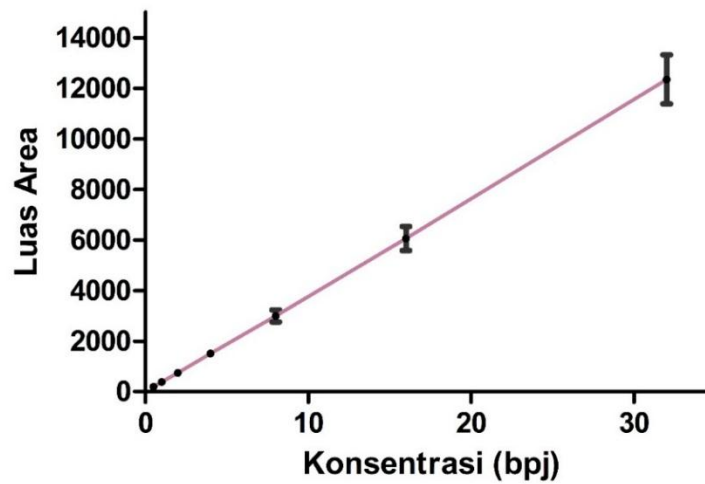
- Valiev, A. K., Zdoryk, A. A., & Georgiyants, V. A. 2015. Chemical Stability of Pharmacy-Compounded Cefazolin Sodium Eye Drops. *Pharmaceutical Chemistry Journal*, 48(11), 759–761. doi:10.1007/s11094-015-1188-x
- Wadetwar, R. N., Agrawal, A. R., & Kanojiya, P. S. 2020. In situ gel containing Bimatoprost solid lipid nanoparticles for ocular delivery: In-vitro and ex-vivo evaluation. *Journal of Drug Delivery Science and Technology*, 56, 101575.
- Wong, R.L.M., Gangwani, R.A., Yu, L.W.H., Lai, J.S.M., 2012. New treatments for bacterial keratitis. *J. Ophthalmol.* 2012, 1–7.
- Zhu, H. *et al.* 2017. Antimicrobial blue light therapy for infectious keratitis: *Ex vivo* and *in vivo* studies, *Investigative Ophthalmology and Visual Science*, 58(1), pp. 586–593. doi: 10.1167/iovs.16-20272.

## LAMPIRAN

### Lampiran 1. Skema kerja penelitian



## Lampiran 2. Pembuatan kurva baku



Gambar 17. Kurva baku cefazolin

Tabel 2. Luas area

Konsentrasi	Area 1	Area 2	Area 3	Rata-rata
0.5	189.80	186.00	214.47	196.76 ± 15.46
1	365.00	357.70	412.45	378.38 ± 29.73
2	722.70	708.25	816.65	749.20 ± 58.86
4	1452.63	1423.57	1641.47	1505.89 ± 118.31
8	2890.73	2832.91	3266.52	2996.72 ± 235.44
16	5839.27	5722.48	6598.38	6053.38 ± 475.58
32	11912.11	11673.87	13460.69	12348.89 ± 970.19

Persamaan kurva baku

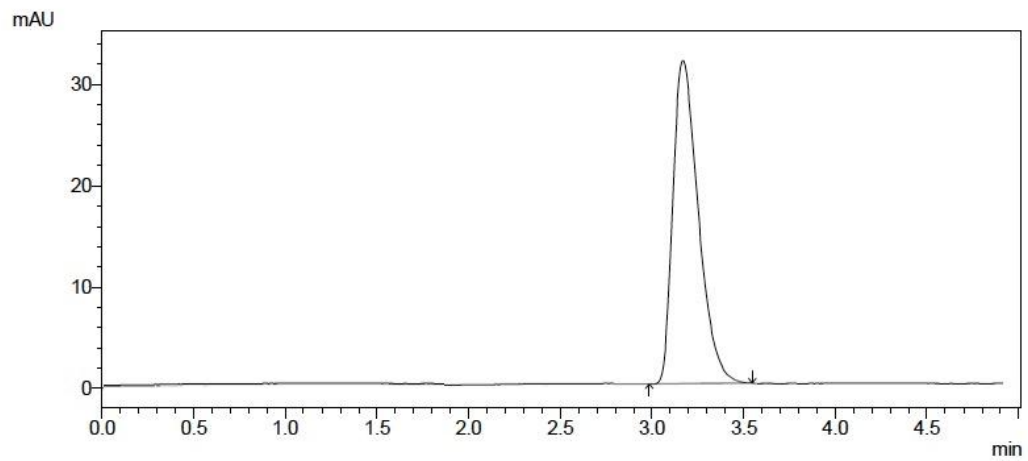
$$Y = ax + b$$

$$y = 385,12x - 28,228$$

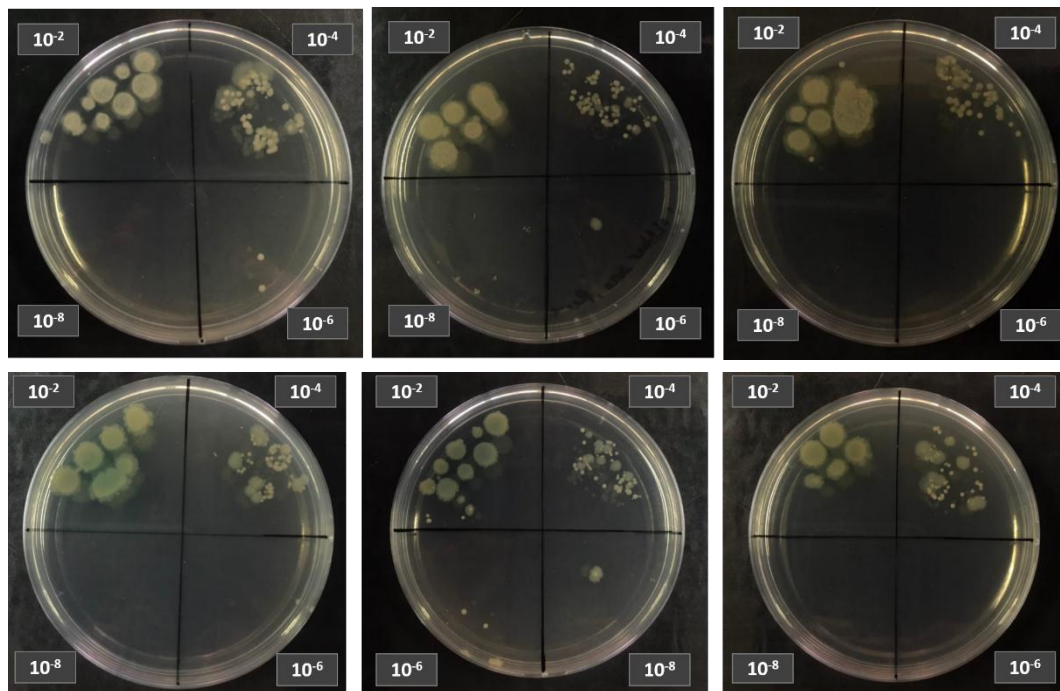
$$a = 385,12$$

$$b = -28,228$$

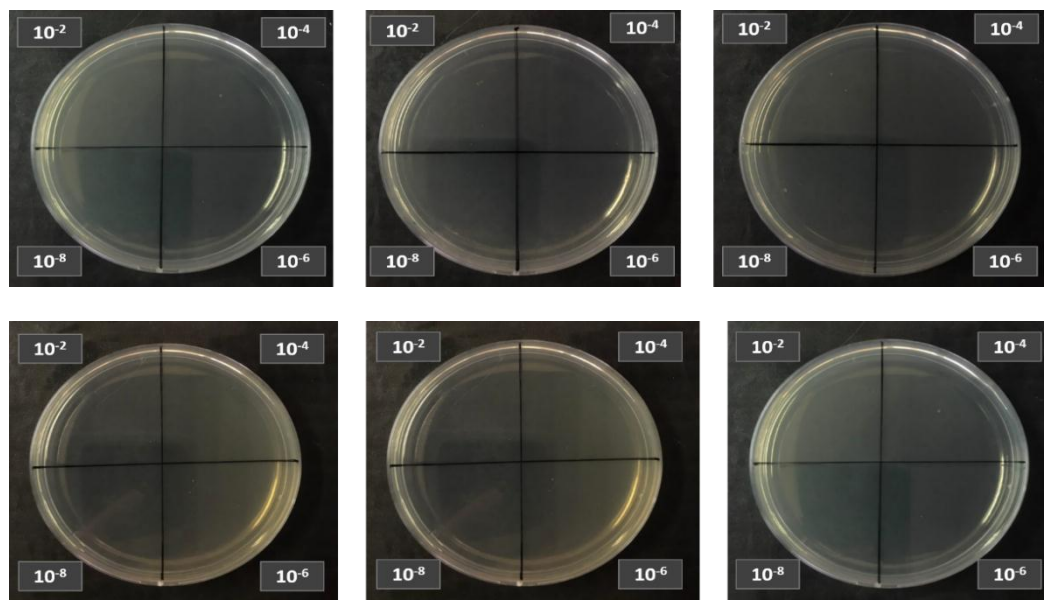
$$R^2 = 0,9999$$

**Lampiran 3. Gambar penelitian****Gambar 18. Kromatogram HPLC cefazolin****Gambar 19. Kornea mata babi****Gambar 20. Aparatus cell difusi Franz**

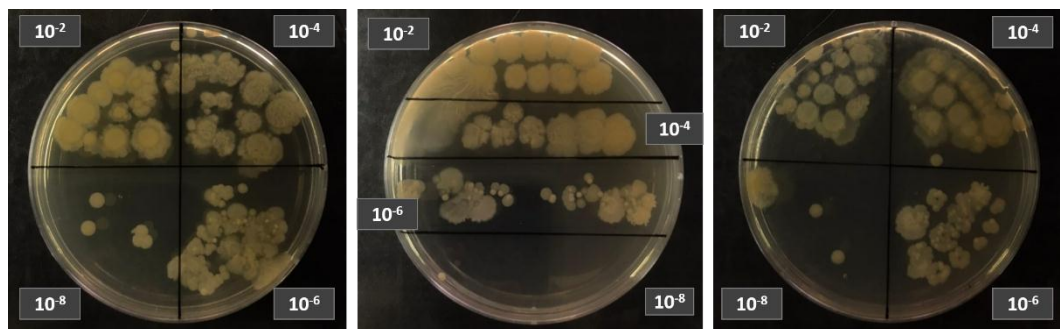




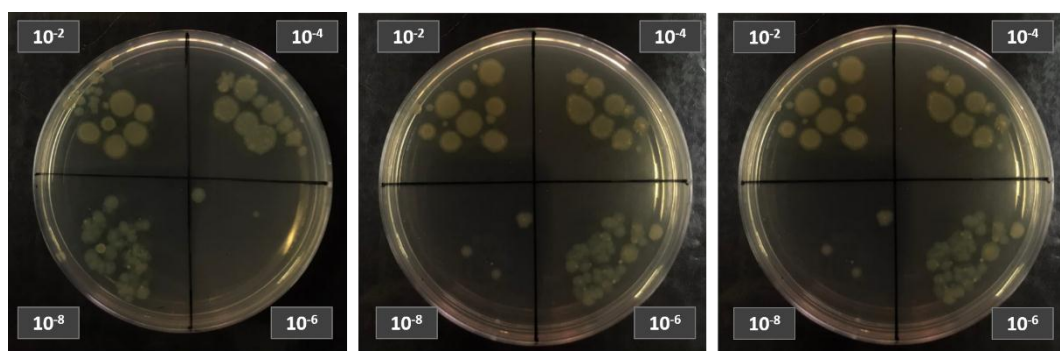
**Gambar 21. Hasil perhitungan ALT pada kontrol (tetes mata) sebelum penyimpanan (atas) dan setelah penyimpanan (bawah)**



**Gambar 22. Hasil perhitungan ALT pada formula gel in situ sebelum penyimpanan (atas) dan setelah penyimpanan (bawah)**



Gambar 23. Hasil perhitungan ALT jumlah koloni awal



Gambar 24. Hasil perhitungan ALT kontrol

#### Lampiran 4 Tabel hasil pengujian

**Tabel 3.1 Hasil uji suhu gelasi penyimpanan suhu 4°C**

Replikasi	Suhu Gelasi (°C)							
	AWAL	Hari-1	Hari-3	Hari-5	Hari-7	Hari-14	Hari-21	Hari-28
1	36,00	36,00	37,00	36,00	36,00	37,00	37,00	36,00
2	37,00	35,00	36,00	35,00	36,00	36,00	37,00	36,00
3	37,00	36,00	36,00	35,00	36,00	36,00	36,00	37,00
Rata-rata	36,67±0,58	35,67±0,58	36,33±0,58	35,33±0,58	36,00±0	36,33±0,58	36,67±0,58	36,33±0,58

**Tabel 3.2 Hasil uji suhu gelasi penyimpanan suhu 25°C**

Replikasi	Suhu Gelasi (°C)							
	AWAL	Hari-1	Hari-3	Hari-5	Hari-7	Hari-14	Hari-21	Hari-28
1	36,00	37,00	36,00	37,00	37,00	36,00	36,00	36,00
2	37,00	37,00	35,00	36,00	36,00	35,00	36,00	36,00
3	37,00	36,00	35,00	36,00	36,00	36,00	37,00	36,00
Rata-rata	36,67±0,58	36,67±0,58	35,33±0,58	36,33±0,58	36,33±0,58	35,67±0,58	36,33±0,58	36,00±0,00

**Tabel 4.1 Hasil uji pH penyimpanan suhu 4°C**

Replikasi	pH							
	AWAL	Hari-1	Hari-3	Hari-5	Hari-7	Hari-14	Hari-21	Hari-28
1	4,74	4,71	4,73	4,75	4,73	4,74	4,71	4,73
2	4,69	4,70	4,74	4,69	4,73	4,72	4,73	4,74
3	4,72	4,73	4,72	4,73	4,72	4,73	4,73	4,72
Rata-rata	4,72±0,03	4,71±0,02	4,73±0,01	4,72±0,03	4,73±0,01	4,73±0,01	4,72±0,01	4,73±0,01

**Tabel 4.2 Hasil uji pH penyimpanan suhu 25°C**

Replikasi	pH							
	AWAL	Hari-1	Hari-3	Hari-5	Hari-7	Hari-14	Hari-21	Hari-28
1	4,74	4,70	4,72	4,73	4,74	4,72	4,70	4,72
2	4,69	4,72	4,73	4,71	4,68	4,73	4,69	4,72
3	4,72	4,74	4,73	4,74	4,74	4,73	4,74	4,73
Rata-rata	4,72±0,03	4,72±0,02	4,73±0,01	4,73±0,02	4,72±0,03	4,73±0,01	4,71±0,03	4,72±0,01

**Tabel 5.1 Hasil uji kandungan obat penyimpanan suhu 4°C**

Hari	AREA	Konsentrasi (ug/ml)	Drug content (%)	Rata-rata
AWAL	6811	17,76	101,48	100,36±0,98
	6706	17,49	99,92	
	6689	17,44	99,67	
1	6654	17,35	99,15	99,56±0,63
	6730	17,55	100,28	
	6660	17,37	99,24	
3	6741	17,58	100,44	99,88±0,97
	6741	17,58	100,44	
	6627	17,28	98,75	
5	6615	17,25	98,57	99,49±0,82
	6723	17,53	100,17	
	6692	17,45	99,71	
7	6694	17,46	99,75	99,65±0,34
	6707	17,49	99,94	
	6663	17,37	99,28	
14	6622	17,27	98,68	99,84±1,59
	6822	17,79	101,65	
	6657	17,36	99,19	
21	6616	17,25	98,59	99,95±1,26
	6722	17,53	100,16	
	6785	17,69	101,09	
28	6763	17,63	100,76	99,67±1,04
	6624	17,27	98,70	
	6681	17,42	99,55	

**Tabel 5.2 Hasil uji kandungan obat penyimpanan suhu 25°C**

Hari	AREA	Konsentrasi (ug/ml)	Drug content (%)	Rata-rata
AWAL	6811	17,76	101,48	100,36±0,98
	6706	17,49	99,92	
	6689	17,44	99,67	
1	6635	17,30	98,87	100,04±1,02
	6744	17,58	100,48	
	6763	17,63	100,76	
3	6702	17,48	99,86	100,37±0,47
	6764	17,64	100,79	
	6742	17,58	100,46	
5	6665	17,38	99,32	99,37±0,55
	6708	17,49	99,95	
	6634	17,30	98,84	
7	5491	14,33	81,89	82,65±0,68
	5580	14,56	83,22	
	5554	14,50	82,83	
14	3507	9,18	52,45	53,17±0,67
	3563	9,32	53,28	
	3596	9,41	53,77	
21	3046	7,98	45,62	46,15±0,73
	3138	8,22	46,98	
	3062	8,02	45,85	
28	2391	6,28	35,89	35,29±0,59
	2311	6,08	34,71	
	2348	6,17	35,25	

Rumus =

$$\text{Kandungan obat} = \frac{\text{Konsentrasi (ug/ml)}}{17,5 \text{ ug/ml}} \times 100\%$$

Perhitungan =

$$\text{Kandungan obat} = \frac{17,74 \text{ ug/ml}}{17,5 \text{ ug/ml}} \times 100\%$$

$$\text{Kandungan obat} = 101,34\%$$

Tabel 6.1 Hasil uji viskositas penyimpanan suhu 4°C

Replika si	Viskositas (cps)							
	AWAL		Hari-1		Hari-3		Hari-5	
	Sebelum Gelasi	Sesudah Gelasi	Sebelum Gelasi	Sesudah Gelasi	Sebelum Gelasi	Sesudah Gelasi	Sebelum Gelasi	Sesudah Gelasi
1	201,00	28400,00	218,00	32100,00	220,00	30400,00	210,00	32200,00
2	221,00	30200,00	220,00	28800,00	206,00	29400,00	208,00	28800,00
3	204,00	31200,00	210,00	29800,00	210,00	32100,00	222,00	32200,00
Rata- rata	208,67 +10,79	29933,33 +1418,92	216,00 +5,29	30233,33 +1692,14	212,00 +7,21	30633,33 +1365,04	213,33 +7,57	31066,67 +1962,99

Replika si	Viskositas (cps)							
	Hari-7		Hari-14		Hari-21		Hari-28	
	Sebelum Gelasi	Sesudah Gelasi	Sebelum Gelasi	Sesudah Gelasi	Sebelum Gelasi	Sesudah Gelasi	Sebelum Gelasi	Sesudah Gelasi
1	208,00	32400,00	210,00	31800,00	210,00	31200,00	218,00	30600,00
2	212,00	34200,00	220,00	29400,00	205,00	28600,00	210,00	28800,00
3	210,00	29800,00	208,00	31600,00	218,00	30800,00	220,00	30200,00
Rata- rata	210,00 +2,00	32133,33 +2212,09	212,67 +6,43	30933,33 +1400,00	211,00 +6,56	30200,00 +1400,00	216,00 +5,29	29866,67 +945,16

Tabel 6.2 Hasil uji viskositas penyimpanan suhu 25°C

		Viskositas (cps)							
Replikas i	AWAL		Hari-1		Hari-3		Hari-5		
	Sebelum Gelasi	Sesudah Gelasi	Sebelum Gelasi	Sesudah Gelasi	Sebelum Gelasi	Sesudah Gelasi	Sebelum Gelasi	Sesudah Gelasi	
1	201,00	28400,00	208,00	32000,00	208,00	31000,00	216,00	31900,00	
2	221,00	30200,00	210,00	28900,00	207,00	28700,00	222,00	28900,00	
3	204,00	31200,00	220,00	32100,00	216,00	30700,00	208,00	29700,00	
Rata-rata	208,67 ±10,79	29933,33 ±1418,92	212,67 ±6,43	31000,00 ±1819,34	210,33 ±4,93	30133,33 ±1250,33	215,33 ±7,02	30166,67 ±1553,49	

		Viskositas (cps)							
Replikas i	Hari-7		Hari-14		Hari-21		Hari-28		
	Sebelum Gelasi	Sesudah Gelasi	Sebelum Gelasi	Sesudah Gelasi	Sebelum Gelasi	Sesudah Gelasi	Sebelum Gelasi	Sesudah Gelasi	
1	218,00	30200,00	216,00	30400,00	208,00	31600,00	206,00	32200,00	
2	208,00	29500,00	212,00	28900,00	222,00	29500,00	214,00	34300,00	
3	208,00	32000,00	218,00	30100,00	206,00	31500,00	208,00	29700,00	
Rata-rata	211,33 ±5,77	30566,67 ±1289,70	215,33 ±3,06	29800,00 ±793,73	212,00 ±8,72	30866,67 ±1184,62	209,33 ±4,16	32066,67 ±2302,90	



Tabel 7 Hasil uji aktivitas antibakteri

Replikasi	Jumlah Bakteri (cfu/ml)					
	Tetes mata sebelum penyimpanan	Tetes mata setelah penyimpanan	Gel <i>in situ</i> sebelum penyimpanan	Gel <i>in situ</i> setelah penyimpanan	Kontrol	Koloni Awal
1	$2,4 \times 10^7$	$3,0 \times 10^7$	0	0	$3,0 \times 10^9$	$2,6 \times 10^9$
2	$2,5 \times 10^7$	$2,4 \times 10^7$	0	0	$2,8 \times 10^9$	$2,7 \times 10^9$
3	$2,6 \times 10^7$	$2,4 \times 10^7$	0	0	$3,0 \times 10^9$	$2,8 \times 10^9$
Rata-rata	$2,5 \times 10^7$ $\pm 1,0 \times 10^6$	$2,6 \times 10^7$ $\pm 3,3 \times 10^6$	0	0	$2,9 \times 10^9$ $\pm 1,2 \times 10^8$	$2,7 \times 10^9$ $\pm 1,3 \times 10^8$

## Lampiran 5. Hasil analisis statistika

### 1. Evaluasi suhu gelas

#### (a) Penyimpanan 4°C

##### Test Statistics<sup>a</sup>

N	3
Chi-Square	10.662
Df	7
Asymp. Sig.	.154

a. Friedman Test

#### (b) Penyimpanan 25°C

##### Test Statistics<sup>a</sup>

N	3
Chi-Square	10.662
Df	7
Asymp. Sig.	.154

a. Friedman Test

#### (c) Hari Ke-1

Independent Samples Test										
		Levene's Test for Equality of Variances					t-test for Equality of Means		95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Gelas	Equal variances assumed	.000	1.000	-2.121	4	.101	-1.000	.471	-2.309	.309
	Equal variances not assumed			-2.121	4.000	.101	-1.000	.471	-2.309	.309

#### (d) Hari Ke-3

Independent Samples Test										
		Levene's Test for Equality of Variances					t-test for Equality of Means		95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Gelas	Equal variances assumed	.000	1.000	2.121	4	.101	1.000	.471	-.309	2.309
	Equal variances not assumed			2.121	4.000	.101	1.000	.471	-.309	2.309

## (e) Hari Ke-5

Independent Samples Test										
		Levene's Test for Equality of Variances			t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Gelasi	Equal variances assumed	.000	1.000	-2.121	4	.101	-1.000	.471	-2.309	.309
	Equal variances not assumed			-2.121	4.000	.101	-1.000	.471	-2.309	.309

## (f) Hari Ke-7

**Test Statistics<sup>a</sup>**

Gelasi	
Mann-Whitney U	3.000
Wilcoxon W	9.000
Z	-1.000
Asymp. Sig. (2-tailed)	.317
Exact Sig. [2*(1-tailed Sig.)]	.700 <sup>b</sup>

## (g) Hari Ke-14

**Test Statistics<sup>a</sup>**

Gelasi	
Mann-Whitney U	4.500
Wilcoxon W	10.500
Z	.000
Asymp. Sig. (2-tailed)	1.000
Exact Sig. [2*(1-tailed Sig.)]	1.000 <sup>b</sup>

## (h) Hari Ke-21

Independent Samples Test										
		Levene's Test for Equality of Variances			t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Gelasi	Equal variances assumed	.000	1.000	.707	4	.519	.333	.471	-.975	1.642
	Equal variances not assumed			.707	4.000	.519	.333	.471	-.975	1.642

## (i) Hari Ke-28

**Test Statistics<sup>a</sup>**

Gelasi	
Mann-Whitney U	3.000
Wilcoxon W	9.000

Z	-1.000
Asymp. Sig. (2-tailed)	.317
Exact Sig. [2*(1-tailed Sig.)]	.700 <sup>b</sup>

## 2. Evaluasi pH

### (a) Penyimpanan 4°C

#### Test Statistics<sup>a</sup>

N	3
Chi-Square	2.291
Df	7
Asymp. Sig.	.942

a. Friedman Test

### (b) Penyimpanan 25°C

#### Test Statistics<sup>a</sup>

N	3
Chi-Square	1.803
Df	7
Asymp. Sig.	.970

a. Friedman Test

### (c) Hari Ke-1

Independent Samples Test										
		Levene's Test for Equality of Variances					t-test for Equality of Means		95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
pH	Equal variances assumed	.400	.561	.500	4	.643	.00333	.00667	-.01518	.02184
	Equal variances not assumed			.500	3.200	.649	.00333	.00667	-.01715	.02382

### (d) Hari Ke-3

Independent Samples Test										
		Levene's Test for Equality of Variances					t-test for Equality of Means		95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
pH	Equal variances assumed	.400	.561	.500	4	.643	.00333	.00667	-.01518	.02184
	Equal variances not assumed			.500	3.200	.649	.00333	.00667	-.01715	.02382

## (e) Hari Ke-5

Independent Samples Test										
		Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
pH	Equal variances assumed	1.538	.283	-.169	4	.874	-.00333	.01972	-.05809	.05142
	Equal variances not assumed			-.169	2.941	.877	-.00333	.01972	-.06681	.06014

## (f) Hari Ke-7

Independent Samples Test										
		Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
pH	Equal variances assumed	10.811	.030	.329	4	.759	.00667	.02028	-.04963	.06296
	Equal variances not assumed			.329	2.111	.772	.00667	.02028	-.07632	.08965

## (g) Hari Ke-14

Independent Samples Test										
		Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
pH	Equal variances assumed	.400	.561	.500	4	.643	.00333	.00667	-.01518	.02184
	Equal variances not assumed			.500	3.200	.649	.00333	.00667	-.01715	.02382

## (h) Hari Ke-21

Independent Samples Test										
		Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
pH	Equal variances assumed	3.226	.147	.800	4	.469	.01333	.01667	-.03294	.05961
	Equal variances not assumed			.800	2.735	.487	.01333	.01667	-.04273	.06940

## (i) Hari Ke-28

Independent Samples Test										
		Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
pH	Equal variances assumed	.400	.561	1.000	4	.374	.00667	.00667	-.01184	.02518
	Equal variances not assumed			1.000	3.200	.387	.00667	.00667	-.01382	.02715

### 3. Evaluasi viskositas

(a) Sebelum gelas penyimpanan 4°C

N	3
Chi-Square	3.269
Df	7
Asymp. Sig.	.859

a. Friedman Test

(b) Setelah gelas penyimpanan 4°C

N	3
Chi-Square	5.463
Df	7
Asymp. Sig.	.604

a. Friedman Test

(c) Sebelum gelas penyimpanan 25°C

N	3
Chi-Square	4.715
Df	7
Asymp. Sig.	.695

a. Friedman Test

(d) Setelah gelas penyimpanan 25°C

N	3
Chi-Square	5.463
Df	7
Asymp. Sig.	.604

a. Friedman Test

(e) Sebelum gelas

1. Hari Ke-1

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
Viskositas	Equal variances assumed	.250	.643	.693	4
	Equal variances not assumed			.693	3.857

2. Hari Ke-3

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
Viskositas	Equal variances assumed	.592	.485	.330	4
	Equal variances not assumed			.330	3.536

3. Hari Ke-5

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
Viskositas	Equal variances assumed	.114	.752	-.335	4
	Equal variances not assumed			-.335	3.978

4. Hari Ke-7

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df

Viskositas	Equal variances assumed	5.765	.074	-.378	4
	Equal variances not assumed			-.378	2.473

### 5. Hari Ke-14

#### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
Viskositas	Equal variances assumed	2.880	.165	-.649	4
	Equal variances not assumed			-.649	2.859

### 6. Hari Ke-21

#### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
Viskositas	Equal variances assumed	.176	.696	-.630	4
	Equal variances not assumed			-.630	3.893

### 7. Hari Ke-28

#### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	Df
Viskositas	Equal variances assumed	1.322	.314	-1.531	4
	Equal variances not assumed			-1.531	2.655



(f) Setelah gelas

1. Hari Ke-1

#### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
Viskositas	Equal variances assumed	.080	.792	-.534	4
	Equal variances not assumed			-.534	3.979

2. Hari Ke-3

#### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
Viskositas	Equal variances assumed	.002	.963	.468	4
	Equal variances not assumed			.468	3.970

3. Hari Ke-5

#### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
Viskositas	Equal variances assumed	.452	.538	.623	4
	Equal variances not assumed			.623	3.799

4. Hari Ke-7

#### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df

Viskositas	Equal variances assumed	.693	.452	1.060	4
	Equal variances not assumed			1.060	3.219

## 5. Hari Ke-14

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	Df
Viskositas	Equal variances assumed	1.807	.250	1.266	4
	Equal variances not assumed			1.266	3.262

## 6. Hari Ke-21

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	Df
Viskositas	Equal variances assumed	.610	.478	-.159	4
	Equal variances not assumed			-.159	3.714

## 7. Hari Ke-28

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	T	df
Viskositas	Equal variances assumed	.348	.587	1.715	4
	Equal variances not assumed			1.715	3.790

#### 4. Pengukuran kandungan obat

##### (a) Penyimpanan 25°C

N	3
Chi-Square	19.222
Df	7
Asymp. Sig.	.008

a. Friedman Test

##### (b) Penyimpanan 4°C

N	3
Chi-Square	.556
Df	7
Asymp. Sig.	.999

a. Friedman Test

##### (c) Hari ke-1

		Levene's Test for Equality of Variances		t-test for Equality of Means				95% Confidence Interval of the Difference		
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Kadar	Equal variances assumed	1.467	.293	-.694	4	.526	-.48000	.69158	-2.40015	1.44015
	Equal variances not assumed			-.694	3.326	.533	-.48000	.69158	-2.56382	1.60382

##### (d) Hari ke-3

	Kadar
Mann-Whitney U	2.000
Wilcoxon W	8.000
Z	-1.107
Asymp. Sig. (2-tailed)	.268
Exact Sig. [2*(1-tailed Sig.)]	.400 <sup>b</sup>

## (e) Hari ke-5

		Independent Samples Test								
		Levene's Test for Equality of Variances					t-test for Equality of Means		95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Kadar	Equal variances assumed	.712	.446	.197	4	.853	.11333	.57400	-1.48035	1.70702
	Equal variances not assumed			.197	3.512	.854	.11333	.57400	-1.57170	1.79836

## (f) Hari ke-7

		Independent Samples Test								
		Levene's Test for Equality of Variances					t-test for Equality of Means		95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Kadar	Equal variances assumed	1.806	.250	38.590	4	.000	17.01000	.44078	15.78619	18.23381
	Equal variances not assumed			38.590	2.931	.000	17.01000	.44078	15.58837	18.43163

## (g) Hari ke-14

		Independent Samples Test								
		Levene's Test for Equality of Variances					t-test for Equality of Means		95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Kadar	Equal variances assumed	3.615	.130	46.930	4	.000	46.67333	.99454	43.91205	49.43462
	Equal variances not assumed			46.930	2.685	.000	46.67333	.99454	43.28729	50.05937

## (h) Hari ke-21

		Independent Samples Test								
		Levene's Test for Equality of Variances					t-test for Equality of Means		95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Kadar	Equal variances assumed	.840	.411	63.897	4	.000	53.79667	.84193	51.45910	56.13424
	Equal variances not assumed			63.897	3.196	.000	53.79667	.84193	51.20780	56.38553

## (r) Hari ke-28

		Independent Samples Test								
		Levene's Test for Equality of Variances					t-test for Equality of Means		95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Kadar	Equal variances assumed	.813	.418	93.565	4	.000	64.38667	.68815	62.47607	66.29727
	Equal variances not assumed			93.565	3.178	.000	64.38667	.68815	62.26430	66.50904

## 5. Uji aktivitas antibakteri

### 1. Efektivitas antibakteri sebelum dan setelah 28 hari penyimpanan

#### Test Statistics<sup>a</sup>

	Kontrol tetes mata setelah penyimpanan - kontrol tetes mata sebelum penyimpanan	Formula gel <i>in situ</i> setelah penyimpanan - Formula gel <i>in situ</i> sebelum penyimpanan
Z	.000 <sup>b</sup>	.000 <sup>b</sup>
Asymp. Sig. (2-tailed)	1.000	1.000

a. Wilcoxon Signed Ranks Test

b. The sum of negative ranks equals the sum of positive ranks.

### 2. Efektivitas antibakteri antara formula gel *in situ* dan kontrol

#### Test Statistics<sup>a,b</sup>

	Koloni
Kruskal-Wallis H	14.813
Df	5
Asymp. Sig.	.011

#### Lanjutan Post Hoc *Kruskal Wallis*

#### Pairwise Comparisons of Formula

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. <sup>a</sup>
Gel <i>in situ</i> Sebelum Penyimpanan- kontrol tetes mata Sebelum Penyimpanan	6.000	4.273	1.404	.160	1.000
Gel <i>in situ</i> Setelah Penyimpanan-kontrol tetes mata Sebelum Penyimpanan	6.000	4.273	1.404	.160	1.000

Gel <i>in situ</i> Sebelum Penyimpanan-kontrol tetes mata Setelah Penyimpanan	6.000	4.273	1.404	.160	1.000
Gel <i>in situ</i> Setelah Penyimpanan-kontrol tetes mata Setelah Penyimpanan	6.000	4.273	1.404	.160	1.000
Gel <i>in situ</i> Sebelum Penyimpanan- Gel <i>in situ</i> Setelah Penyimpanan	.000	4.273	.000	1.000	1.000
Gel <i>in situ</i> Sebelum Penyimpanan-Koloni Awal	-10.667	4.273	-2.497	.013	.188
Gel <i>in situ</i> Sebelum Penyimpanan-Kontrol	-13.333	4.273	-3.121	.002	.027
Gel <i>in situ</i> Setelah Penyimpanan-Koloni Awal	-10.667	4.273	-2.497	.013	.188
Gel <i>in situ</i> Setelah Penyimpanan-Kontrol	-13.333	4.273	-3.121	.002	.027
Kontrol tetes mata Sebelum Penyimpanan- Kontrol tetes mata Setelah Penyimpanan	.000	4.273	.000	1.000	1.000
Kontrol tetes mata Sebelum Penyimpanan-Koloni Awal	-4.667	4.273	-1.092	.275	1.000
Kontrol tetes mata Sebelum Penyimpanan-Kontrol	-7.333	4.273	-1.716	.086	1.000
Kontrol tetes mata Setelah Penyimpanan-Koloni Awal	-4.667	4.273	-1.092	.275	1.000
Kontrol tetes mata Setelah Penyimpanan-Kontrol	-7.333	4.273	-1.716	.086	1.000
Koloni Awal-Kontrol	2.667	4.273	.624	.533	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.