

BAB 5

SIMPULAN

5.1. Simpulan

Berdasarkan data penelitian yang telah diinterpretasikan, dapat ditarik kesimpulan :

- Teknik likuisolid untuk membuat tablet lepas lambat klorfeniramin maleat dengan menggunakan polimer hidrofilik *guar gum* dan tween 80 sebagai pelarut *non volatile* dapat memperlambat pelepasan obat.
- Jumlah tween 80 berpengaruh signifikan terhadap kekerasan tablet, tetapi tidak berpengaruh signifikan terhadap *Hausner ratio*, *Carr's index*, kerapuhan tablet, dan konstanta disolusi. Konsentrasi *guar gum* berpengaruh signifikan terhadap *Hausner Ratio*, *Carr's Index*, dan kekerasan tablet, tetapi tidak berpengaruh signifikan pada kerapuhan tablet dan konstanta disolusi. Interaksi dari kedua faktor hanya berpengaruh signifikan terhadap kekerasan tablet.
- Formula optimum tablet klorfeniramin maleat dapat diperoleh dengan jumlah pelarut *non volatile* tween 80 sejumlah 12 mg dan konsentrasi polimer hidrofilik *guar gum* 20% dari bobot tablet dengan hasil teoritis *Hausner Ratio* sebesar 1,22; *Carr's Index* sebesar 17,66 %; kekerasan tablet sebesar 16,98 Kp; kerapuhan tablet sebesar 0,16 %; dan nilai konstanta disolusi sebesar 0,0117 mg/menit.

5.2. Alur Penelitian Selanjutnya

Dapat dilakukan penelitian lebih lanjut mengenai tablet lepas lambat likuisolid dengan mencari dan membuktikan formula optimum terpilih, kemudian dibandingkan dengan hasil yang secara teoritis.

DAFTAR PUSTAKA

Al – Saidan, S., Krinaiah, Y., Patro, S., Satyanaryana, V., 2005, In vitro and In Vivo Evaluation of Guar gum Matrix Tablets for Oral Controlled Release of Water Soluble Diltiazem Hydrochloride, **AAPS Pharm SciTech**, 6 (1), 14-21.

Anonim, 1979, **Farmakope Indonesia**, ed. III, Departemen Kesehatan RI, Jakarta, 6-8, 153.

Anonim, 1995, **Farmakope Indonesia**, ed. IV, Departemen Kesehatan RI, Jakarta, 4, 166, 211, 449-450, 488-489, 515, 683, 783-784, 999-1000.

Anonim, 1997, **AHFS**, Drug Information AMERICAN Society of Health Sytem Pharmacist, Inc., Bethesda, 13-15.

Anonim, 2001, **Merc index**, Merck & Co Inc, Whitehouse Station.

Anonim, 2011, Molecular Ingredients: Xanthan gum. Available at : http://wellspringchem.com/html_products/html_products/Microcrystalline-Cellulose-PH102-126.html

Ansel, C. H. 1989. **Pengantar Bentuk Sediaan Farmasi**. Edisi keempat. Penerjemah Farida Ibrahim. Universitas Indonesia Press. Jakarta.

Association of Official Analytical Chemist (AOAC), 1975, **Infra Red and Ultraviolet Spectra of Some Compounds of Pharmaceutical Interest**, Washington, D.C., 246.

Aulton, M.E., 2002, **Pharmaceutics The Science of Dossage Form Design**, 2nd Edition, Churchill Livingstone, UK.

Banakar, U.V., 1992, **Pharmaceutical Disolution Testing**, Marcel Dekker Inc., New York, 19-25.

Banker, G.S. and N.R. Anderson, 1986, Tablet, in: **The Theory and Practice of Industrial Pharmacy: Tablet**, L. Lachman, H.A. Lieberman, and J.L. Kanig (Eds.), 3rd ed., Lea and Febiger, Philadelphia, 259, 295, 299, 316 – 329.

Bolton. S., 1990, **Pharmaceutical Statistic: Pratical and Clinical Applications**, 2nd edition, Marcel Dekker, Inc., New York, 324-427.

Chaplin M, [2006, April 19], **Guar Gum**, [Online], <http://www.isbu.ac.uk/water/hygua.html>. [2006, August 11].

Collet, J. and C. Moreton, 2002, Modified-release peroral dosage form. **Pharmaceutical The Science of Dossage Form design**, 2nd edition, De Montfort University, Leicester, 299-302.

Costa, P. and Sousa Lobo, J.M., 2000, Modelling and Comparison of Dissolution Profiles, **Journal of Pharmaceutical Sciences**, European, 123-133.

Forner, D.E., Anderson, N.R., Banker, G.S. Rosanke, T.W., and Gordon, R.E., 1981, Granulation and Tablet Characteristic, In Lieberman, H.A., Lachman, L., and Schwart, J.B. (Eds.): **Pharmaceutical Dosage Form: Tablet**, Volume 2, 2nd Edition, Marcel Dekker, Inc., New York.

Green, J.M., 1996, A Practical Guide to Analytical Method Validation. **Analytical Chemistry**, 23, 305-309.

Javadzadech, Y., M.R. Siah, M.B. Jalali, and A. Nokhodchi, 2005, Enhancement of Dissolution Rate of Piroxicam Using Lquisolid Compacts, **International Journal of Pharmaceutics**, Farmaco Societa Chimia Italiana, 60, 361-365.

Javadzadech, Y., Musaalrezaei, L., and A. Nokhodchi, 2008, Lquisolid Technique as a New Approach to Sustain Propanolol Hydrochloride Release from Tablet Matrices , **International Journal of Pharmaceutics**, 102-108.

Karmarkar, A.B., I.D.Gonjari, A.H. Hosmani, P.N. Dhabale, and S.B. Bhise, 2009, Lquisolid Tablets: A Novel Approach for Drug Delivery, **International Journal of Health Research**, 2(1), 45-50.

Khan, K.A., 1975, The Concept of Dissolution Efficiency, **J. Pharmac**, 27, 48-49.

Kibbe, A.H. , 2000, **Handbook of Pharmaceutical Excipients**, 3rd ed., The Pharmaceutical Press, London, 102, 143, 305, 501, 555.

Kulkarni, Ajit S., A. Nagesh H., M. Madhav S., and G. Jayashree B., 2010, **Liquisolid System : A Review**, vol.3, Departement of Pharmaceutics, Satara College of Pharmacy, India, 797.

Lachman L., Lieberman H.A., Kauig J.L (Eds.), 1994, **Teori & Praktek Farmasi Industri II**, (Suyatmi S, penerjemah), edisi 3, Penerbit Universitas Indonesia, Jakarta, 643-731.

Maier, H., M. Anderson, C. Karl, and K. Majauson, 1993, Guar, locust bean, tara and fenugreek gums In: **Industrial Gums : Polysaccharides and Their Derivaties**, R. L. Whistler, and J. N. Bemiller (Eds.), 3rd ed., Academic Press, Inc., San Diego, 145-175.

Martin, A., J. Swarbrick, dan A. Cammarata, 1993, **Farmasi Fisik: Dasar-dasar Kimia Fisika dalam Ilmu Farmasetik**, vol. 2, ed. 3, terjemahan Yoshita, Universitas Indonesia, Jakarta, 1135.

Parrott, E.L., 1971, **Pharmaceutical Technology Fundamental Pharmaceutics**, 3rd ed., Burgess Publishing Company, Minneapolis, 17-19, 82, 160-162.

Shargel, L. and A. B. C. Yu, 1999, **Applied Biopharmaceutics and Pharmacokinetics**, 4th ed. McGraw – Hill. New York, 8, 132, 169-200.

Shervington, L.A. and A. Shervington, 1998, **Guaifenesin, In: Analytical Profiles of Drug Substance and Excipients**, H.G. Brittain (Ed.), vol. 25, Academic Press, London,152.

Siregar, Ch. J. P., 1992, **Proses validasi dan Manufaktur Sediaan tablet**, In : Asyarie S., U. Mar'u, S. Badruzzaman (Eds), Prosiding Seminar Validasi di Industri Farmasi, Jurusan Farmasi FMIPA ITB, Bandung, 26 – 41.

Spireas, S., 2002, Liquisolid System and Methods of Preparation Same, **Pharmaceutical Research**, vol 9, 1-6.

Voigt, R., 1995, **Buku Pelajaran Teknologi Farmasi**, Terjemahan S. Noerono dan M. S. Reksohardiprojo, Gadjah Mada University Press, Yogyakarta, 163-210.

Wells, J.T., 1988, **Pharmaceutical Pre formulation: The Physiochemical Properties of Drugs Substances**, Ellis Howard, Chester, 209-211.

Yadav, V.B. and A.V. Yadav, 2009, Liquisolid Granulation Technique for Tablet Manufacturing : an Overview, **Journal of Pharmacy Research** **2009**, 2(4), 670-674.

Zainuddin, M., 2000, **Validasi Metode Analisis Kuantitatif Secara Spektrofotometris Ultra Ungu – Sinar Tampak (UV-VIS)**, Universitas Airlangga, Surabaya.

Zhang, Y., Law, Y., and Chakrabarti, S., 2003, Physical Properties and Compact Analysis of Commonly Used Direct Compression Binders, **AAPS PharmSciTech**, 4 (4), article 62.

LAMPIRAN A
HASIL UJI MUTU FISIK MASSA TABLET

Mutu fisik yang diuji	Replikasi	Formula Tablet Likuisolid Klorfeniramin Maleat				Persyaratan
		FA	FB	FC	FD	
<i>Hausner Ratio</i>	I	1,20	1,22	1,24	1,24	< 1,25 (Wells, 1988)
	II	1,20	1,24	1,23	1,24	
	III	1,23	1,21	1,24	1,23	
	Rata-rata	1,21	1,22	1,24	1,24	
	SD	0,02	0,02	0,01	0,01	
<i>Carr's Index (%)</i>	I	17	18	19,99	19,99	16 - 20 = cukup baik (Siregar, 1992)
	II	16,99	19,99	19	19,99	
	III	19	18	19,99	19	
	Rata-rata	17,66	18,66	19,66	19,66	
	SD	1,16	1,15	0,57	0,57	

LAMPIRAN B
HASIL UJI KERAGAMAN BOBOT TABLET LIKUISOLID
KLORFENIRAMIN MALEAT

Hasil Uji Keragaman Bobot Tablet Formulasi A

No	Replikasi I		Replikasi II		Replikasi III	
	Bobot Tablet (mg)	Y (%)	Bobot Tablet (mg)	Y (%)	Bobot Tablet (mg)	Y (%)
1	512,3	99,03	508,4	100,11	505,6	99,17
2	511,1	98,80	501,8	98,81	506,9	99,43
3	497,6	96,19	510,6	100,54	516,8	101,37
4	510,7	98,72	509,9	100,40	490,9	96,29
5	509,4	98,47	510,1	100,44	510,5	100,14
6	506,7	97,95	509,9	100,40	511,5	100,33
7	510,3	98,64	513,5	101,11	520,1	102,02
8	498,5	96,36	511,5	100,72	509,7	99,98
9	509,8	98,55	517,3	101,86	515,5	101,12
10	509,6	98,51	510,3	100,48	519,3	101,86
Rata-rata	507,6	98,12	510,3	100,49	509,6	99,98
PK (%)	98,11		100,48		99,96	
SD	1,01		0,77		1,68	
KV	1,03		0,76		1,68	

Keterangan: PK = Penetapan Kadar

SD = Standart Deviasi

KV = Koefisien Variasi

Hasil Uji Keragaman Bobot Tablet Formulasi B

No	Replikasi I		Replikasi II		Replikasi III	
	Bobot Tablet (mg)	Y (%)	Bobot Tablet (mg)	Y (%)	Bobot Tablet (mg)	Y (%)
1	510,6	98,66	503,4	98,09	490,8	96,96
2	515,2	99,55	501,4	97,71	508,7	100,50
3	520,8	90,63	510,5	99,48	508,9	100,54
4	509,6	98,46	514,0	100,16	510,1	100,77
5	511,6	98,85	519,7	101,27	505,5	99,87
6	507,9	98,13	500,9	97,61	490,5	96,90
7	510,5	98,64	500,5	97,53	513,5	101,45
8	510,3	96,36	510,8	99,54	507,9	100,34
9	520,9	98,60	500,8	97,59	510,4	100,83
10	519,8	100,43	500,9	97,61	512,4	101,23
Rata-rata	513,72	98,26	506,29	98,66	505,87	99,94
PK (%)	98,26		98,66		99,94	
SD	0,97		1,35		1,64	
KV	0,98		1,37		1,65	

Hasil Uji Keragaman Bobot Tablet Formulasi C

No	Replikasi I		Replikasi II		Replikasi III	
	Bobot Tablet (mg)	Y (%)	Bobot Tablet (mg)	Y (%)	Bobot Tablet (mg)	Y (%)
1	506,7	100,94	511,9	101,42	510,4	99,10
2	497,9	99,19	498,7	98,80	509,1	98,85
3	504,0	100,40	487,8	96,64	520,1	100,99
4	508,1	101,22	501,3	99,32	510,8	99,18
5	507,9	101,18	509,4	100,92	514,7	99,94
6	508,1	101,22	510,4	101,12	508,0	98,64
7	499,6	99,53	509,8	101,00	505,5	98,15
8	501,3	99,86	505,9	100,23	511,3	99,28
9	508,2	101,24	501,1	99,28	519,7	100,91
10	502,5	100,10	504,1	99,87	507,6	98,56
Rata-rata	504,43	101,16	504,04	99,86	511,72	99,36
PK (%)	101,16		99,86		99,36	
SD	0,78		1,44		0,96	
KV	0,78		1,44		0,97	

Hasil Uji Keragaman Bobot Tablet Formulasi D

No	Replikasi I		Replikasi II		Replikasi III	
	Bobot Tablet (mg)	Y (%)	Bobot Tablet (mg)	Y (%)	Bobot Tablet (mg)	Y (%)
1	510,3	98,68	516,4	100,52	490,6	95,56
2	510,5	98,72	510,4	101,32	507,9	98,93
3	504,7	97,60	501,9	99,63	509,6	99,26
4	518,3	100,23	509,5	101,14	497,8	96,96
5	506,2	97,89	507,7	100,78	517,7	100,83
6	505,2	97,69	515,1	102,25	518,6	101,01
7	500,6	96,80	500,6	99,37	500,3	97,45
8	500,1	96,71	501,3	99,51	509,6	99,26
9	508,9	98,41	500,7	99,39	516,7	100,64
10	507,6	98,16	502,3	99,71	495,5	96,51
Rata-rata	507,24	98,10	505,59	100,56	506,43	98,09
PK (%)	98,10		100,56		98,64	
SD	1,02		0,99		1,93	
KV	1,04		0,99		1,96	

LAMPIRAN C

HASIL UJI KESERAGAMAN KANDUNGAN TABLET LIKUISOLID KLORFENIRAMIN MALEAT Hasil uji Keseragaman Kandungan Tablet Formula A Replikasi I

Abs	C sampel ($\mu\text{g/mL}$)	W sampel (mg)	C teoritis ($\mu\text{g/mL}$)	Kadar (%)
0,169	12,07	500,3	12,01	100,56
0,163	11,63	500,8	12,02	96,74
0,171	12,22	510,4	12,25	99,79
0,169	12,07	510,2	12,24	98,61
0,165	11,78	500,4	12,01	98,06
0,17	12,15	510,5	12,25	99,16
0,171	12,22	511,6	12,28	99,56
0,172	12,30	511,5	12,28	100,18
0,175	12,52	510,8	12,26	102,15
0,168	12	510,1	12,24	98,02
			Rata-rata	99,28
			SD	1,53
			KV	1,54

Hasil Uji Keseragaman Kandungan Tablet Formula A Replikasi II

Abs	C sampel ($\mu\text{g/mL}$)	W sampel (mg)	C teoritis ($\mu\text{g/mL}$)	Kadar (%)
0,17	12,15	510,8	12,26	99,10
0,169	12,07	512,7	12,30	98,13
0,171	12,22	509,4	12,23	99,99
0,173	12,37	510,8	12,26	100,93
0,176	12,60	510,4	12,25	102,59
0,176	12,60	514,9	12,36	101,94
0,179	12,82	511,6	12,28	104,42
0,17	12,15	510,5	12,25	99,16
0,171	12,22	518,6	12,45	98,21
0,169	12,07	508,7	12,21	98,90
			Rata-rata	100,12
			SD	1,69
			KV	1,68

Hasil Uji Keseragaman Kandungan Tablet Formula A Replikasi III

Abs	C sampel (µg/mL)	W sampel (mg)	C teoritis (µg/mL)	Kadar (%)
0,169	12,07	500,8	12,02	100,46
0,17	12,15	509,4	12,23	99,38
0,176	12,60	508,5	12,20	103,22
0,179	12,82	510,6	12,25	104,62
0,169	12,07	495,5	11,89	101,54
0,168	12,00	500,5	12,01	99,90
0,172	12,30	512,8	12,31	99,93
0,17	12,15	508,9	12,21	99,47
0,175	12,52	510,2	12,24	102,27
0,174	12,45	509,8	12,24	101,73
			Rata-rata	101,25
			SD	1,75
			KV	1,73

Hasil Uji Keseragaman Kandungan Tablet Formula B Replikasi I

Abs	C sampel (µg/mL)	W sampel (mg)	C teoritis (µg/mL)	Kadar (%)
0,174	12,45	506,7	12,16	102,36
0,175	12,52	497,9	11,95	104,79
0,174	12,45	504	12,10	102,91
0,171	12,22	508,2	12,20	100,22
0,17	12,15	507,4	12,18	99,77
0,169	12,07	508,6	12,21	98,92
0,17	12,15	509,6	12,23	99,34
0,172	12,30	501,3	12,03	102,22
0,174	12,45	508,2	12,20	102,06
0,167	11,93	502,5	12,06	98,88
			Rata-rata	101,15
			SD	2,00
			KV	1,98

Hasil Uji Keseragaman Kandungan Tablet Formula B Replikasi II

Abs	C sampel (µg/mL)	W sampel (mg)	C teoritis (µg/mL)	Kadar (%)
0,175	12,52	511,9	12,29	101,93
0,173	12,37	498,7	11,97	103,38
0,171	12,22	497,8	11,95	102,32
0,169	12,07	501,3	12,03	100,36
0,168	12,00	513,9	12,33	97,30
0,169	12,07	510,9	12,26	98,48
0,173	12,37	509,8	12,24	101,13
0,175	12,52	505,9	12,14	103,14
0,173	12,37	511,1	12,27	100,87
0,168	12,00	504,2	12,10	99,17
			Rata-rata	100,81
			SD	2,01
			KV	1,99

Hasil Uji Keragaman Kandungan Tablet Formula B Replikasi III

Abs	C sampel (µg/mL)	W sampel (mg)	C teoritis (µg/mL)	Kadar (%)
0,166	11,85	501,4	12,03	98,48
0,167	11,93	500,1	12,00	99,36
0,17	12,15	516,3	12,39	98,05
0,174	12,45	510,8	12,26	101,54
0,175	12,52	514,7	12,35	101,37
0,168	12,00	508,1	12,19	98,41
0,17	12,15	505,3	12,13	100,18
0,174	12,45	501,4	12,03	103,44
0,172	12,30	510,6	12,25	100,36
0,172	12,30	508,5	12,20	100,77
			Rata-rata	100,20
			SD	1,68
			KV	1,68

Hasil Uji Keseragaman Kandungan Tablet Formula C Replikasi I

Abs	C sampel (µg/mL)	W sampel (mg)	C teoritis (µg/mL)	Kadar (%)
0,168	12	507,8	12,19	98,46
0,166	11,85	499,6	11,99	98,84
0,171	12,22	508,7	12,21	100,12
0,174	12,45	500,5	12,01	103,63
0,165	11,78	500,4	12,01	98,06
0,169	12,07	510	12,24	98,65
0,172	12,30	512,1	12,29	100,07
0,172	12,30	511,3	12,27	100,22
0,17	12,15	510,6	12,25	99,14
0,164	11,70	500,3	12,01	97,45
			Rata-rata	9,46
			SD	1,73
			KV	1,74

Hasil Uji Keseragaman Kandungan Tablet Formula C Replikasi II

Abs	C sampel (µg/mL)	W sampel (mg)	C teoritis (µg/mL)	Kadar (%)
0,17	12,15	499,8	11,99	101,28
0,167	11,93	500,6	12,01	99,26
0,171	12,22	500,5	12,01	101,76
0,166	11,85	500,4	12,01	98,68
0,165	11,78	490,9	11,78	99,95
0,174	12,45	510	12,24	101,70
0,173	12,37	500,1	12,00	103,09
0,171	12,22	501,3	12,03	101,60
0,175	12,52	500,9	12,02	104,17
0,169	12,07	510,6	12,25	98,53
			Rata-rata	101,00
			SD	1,87
			KV	1,85

Hasil Uji Keseragaman Kandungan Tablet Formula C Replikasi III

Abs	C sampel (µg/mL)	W sampel (mg)	C teoritis (µg/mL)	Kadar (%)
0,166	11,85	500,8	12,02	98,60
0,176	12,60	502,4	12,06	104,47
0,172	12,30	503,7	12,09	101,73
0,167	11,93	490,5	11,77	101,30
0,167	11,93	500,4	12,01	99,30
0,17	12,15	510,2	12,24	99,22
0,173	12,37	511,1	12,27	100,87
0,175	12,52	503,2	12,08	103,69
0,169	12,07	500,6	12,01	100,50
0,17	12,15	500,8	12,02	101,08
			Rata-rata	101,08
			SD	1,88
			KV	1,86

Hasil Uji Keseragaman Kandungan Tablet Formula D Replikasi I

Abs	C sampel (µg/mL)	W sampel (mg)	C teoritis (µg/mL)	Kadar (%)
0,169	12,07	508,7	12,21	98,90
0,172	12,30	510,6	12,25	100,36
0,171	12,22	508,7	12,21	100,12
0,169	12,07	510,5	12,25	98,55
0,166	11,85	500,3	12,01	98,70
0,174	12,45	512,6	12,30	101,18
0,172	12,30	512,1	12,29	100,07
0,169	12,07	511,8	12,28	98,30
0,173	12,37	500,6	12,01	102,99
0,17	12,15	510,2	12,24	99,22
			Rata-rata	99,84
			SD	1,44
			KV	1,44

Hasil Uji Keseragaman Kandungan Tablet Formula D Replikasi II

Abs	C sampel (µg/mL)	W sampel (mg)	C teoritis (µg/mL)	Kadar (%)
0,169	12,07	507,9	12,19	99,06
0,166	11,85	509,8	12,24	96,86
0,175	12,52	510,4	12,25	102,23
0,168	12,00	500,5	12,01	99,90
0,166	11,85	500,1	12,00	98,74
0,166	11,85	500,6	12,01	98,68
0,17	12,15	516,4	12,39	98,03
0,173	12,37	508,5	12,20	101,39
0,169	12,07	510,7	12,26	98,51
0,166	11,85	503,4	12,08	98,09
			Rata-rata	99,14
			SD	1,62
			KV	1,63

Hasil Uji Keseragaman Kandungan Tablet Formula D Replikasi III

Abs	C sampel (µg/mL)	W sampel (mg)	C teoritis (µg/mL)	Kadar (%)
0,17	12,15	490,6	11,77	103,18
0,168	12,00	496,6	11,92	100,68
0,172	12,30	510,2	12,24	100,44
0,17	12,15	507,4	12,18	99,77
0,168	12,00	506,9	12,17	98,64
0,169	12,07	507,9	12,19	99,06
0,166	11,85	502,1	12,05	98,34
0,174	12,45	513,7	12,33	100,96
0,171	12,22	513,2	12,32	99,25
0,169	12,07	510,3	12,25	98,59
			Rata-rata	99,89
			SD	1,48
			KV	1,48

LAMPIRAN D

HASIL UJI KEKERASAN TABLET LIKUISOLID KLORFENIRAMIN MALEAT

REPLIKASI I

No	Kekerasan Tablet Likuisolid Klorfeniramin Maleat (Kp)			
	Formula A	Formula B	Formula C	Formula D
1	17,8	10,7	10,7	5,4
2	17,3	11,1	10,7	5,0
3	17,8	10,2	10,2	5,5
4	17,9	10,0	10,4	6,7
5	17,0	10,0	10,1	6,9
6	17,3	11,2	10,8	5,4
7	17,5	10,2	9,8	6,3
8	17,8	10,5	10,6	6,9
9	17,5	10,2	10,7	5,0
10	17,2	10,4	9,9	6,1
Rata-rata ± SD	17,51± 0,31	10,45±0,43	10,39±0,36	5,92± 0,75
KV	1,77	4,11	3,46	12,67

REPLIKASI II

No	Kekerasan Tablet Likuisolid Klorfeniramin Maleat (Kp)			
	Formula A	Formula B	Formula C	Formula D
1	16,2	10,3	10,1	4,5
2	16,3	11,1	10,2	5,0
3	16,1	10,3	10,2	4,8
4	16,0	10,1	10,2	5,1
5	16,0	10,0	10,0	5,4
6	16,1	10,5	10,1	5,3
7	16,2	11,3	10,7	5,3
8	16,8	11,4	10,0	5,0
9	16,5	11,7	10,4	5,0
10	16,2	11,2	10,2	5,1
Rata-rata ± SD	16,24 ±0,25	10,79 ±0,61	10,21 ±0,21	5,05 ±0,26
KV	1,54	5,65	2,06	5,15

REPLIKASI III

No	Kekerasan Tablet Likuisolid Klorfeniramin Maleat (Kp)			
	Formula A	Formula B	Formula C	Formula D
1	17,5	11,7	10,2	4,8
2	17,4	11,5	10,1	4,8
3	16,7	10,8	10,1	5,2
4	17,0	10,7	10,3	5,6
5	17,3	10,5	10,8	5,2
6	17,2	10,4	10,1	5,0
7	17,2	10,4	10,1	5,0
8	17,1	11,9	10,2	4,5
9	17,3	10,5	10,7	5,2
10	17,2	10,1	10,3	5,3
Rata-rata ± SD	17,19±0,22	10,89±0,62	10,29± 0,26	5,06 ± 0,31
KV	1,28	5,69	2,53	6,13

LAMPIRAN E
HASIL UJI KERAPUHAN TABLET LIKUISOLID
KLORFENIRAMIN MALEAT

Formula	Replikasi	Berat awal (gram)	Berat akhir (gram)	Kerapuhan (%)	Rata-rata ±SD	KV
A	I	10,05	10,03	0,19	0,16	37,5
	II	10,13	10,12	0,09	±	
	III	9,78	9,76	0,20	0,06	
B	I	10,11	11,10	0,09	0,097	6,2
	II	9,90	9,89	0,10	±	
	III	9,67	9,66	0,10	0,006	
C	I	10,00	9,99	0,10	0,13	4,15
	II	9,78	9,76	0,20	±	
	III	10,00	9,99	0,10	0,06	
D	I	9,41	9,39	0,21	0,17	35,29
	II	10,40	10,38	0,19	±	
	III	9,82	9,81	0,10	0,06	

LAMPIRAN F

HASIL KLORFENIRAMIN MALEAT TERLARUT DALAM TWEEN 80 SELAMA 24 JAM

Absorbansi	Konsentrasi ($\mu\text{g/mL}$)	Dalam 50 $\text{mL}(\mu\text{g})$	Konsentrasi sesungguhnya ($\mu\text{g/mL}$)	Rata- rata \pm SD	Kelarutan
0,11	7,67	383,5	15.340	16.386 \pm 0,45	1:61
0,121	8,49	424,5	16.980		
0,12	8,42	421	16.840		

LAMPIRAN G
HASIL PENETAPAN KADAR TABLET LIKUISOLID KLORFENIRAMIN MALEAT

FORMULA A

Replikasi	Massa (mg)	Absorbansi	C sampel (ppm)	C teoritis (ppm)	% Kadar	Rata-rata	SD	KV
1	500,1	0,165	11,78	12	98,11			
2	500,7	0,169	12,07	12,02	100,48	99,52	1,24	1,25
3	500,2	0,168	12	12	99,96			

FORMULA B

Replikasi	Massa (mg)	Absorbansi	C sampel (ppm)	C teoritis (ppm)	% Kadar	Rata-rata	SD	KV
1	500,6	0,167	11,93	12,01	99,26			
2	500,5	0,166	11,85	12,01	98,66	99,29	0,64	0,65
3	500,3	0,168	12	12	99,94			

FORMULA C

Replikasi	Massa (mg)	Absorbansi	C sampel (ppm)	C teoritis (ppm)	% Kadar	Rata-rata	SD	KV
1	500,4	0,17	12,15	12,01	101,16			
2	500,7	0,168	12	12,02	99,86	100,13	0,93	0,93
3	500,1	0,167	11,92	12	99,36			

FORMULA D

Replikasi	Massa (mg)	Absorbansi	C sampel (ppm)	C teoritis (ppm)	% Kadar	Rata-rata	SD	KV
1	500,2	0,165	11,78	12	98,10			
2	500,3	0,169	12,07	12,01	100,56	99,10	1,30	1,31
3	500,6	0,166	12,01	12,01	98,64			

LAMPIRAN H
HASIL UJI DISOLUSI TABLET LIKUISOLID KLORFENIRAMIN
MALEAT
FORMULA A

Replikasi	t (menit)	A	C (µg/mL)	Wt (mg)	% obat terlepas	Wt∞- Wt
I	30	0,062	4,09	3,68	31,26	7,79
	60	0,081	5,51	4,96	42,10	6,51
	120	0,103	7,15	6,43	54,65	5,04
	180	0,122	8,57	7,71	65,49	3,76
	240	0,126	8,87	7,979	67,77	3,49
	300	0,137	9,69	8,72	74,05	2,75
	360	0,149	10,58	9,52	80,89	1,95
	420	0,154	10,96	9,86	83,74	1,61
	480	0,158	11,25	10,13	86,02	1,34
	540	0,161	11,48	10,33	87,74	1,14
	600	0,166	11,85	10,67	90,59	0,81
	660	0,172	12,30	11,07	94,01	0,40
720	0,178	12,75	11,47	97,43	0,0105	
II	30	0,055	3,57	3,21	26,33	8,40
	60	0,071	4,76	4,29	35,54	7,32
	120	0,11	7,67	6,90	57,26	4,70
	180	0,119	8,34	7,51	62,27	4,10
	240	0,133	9,39	8,45	70,07	3,16
	300	0,14	9,91	8,92	73,97	2,69
	360	0,159	11,33	10,20	84,56	1,41
	420	0,16	11,40	10,26	85,11	1,34
	480	0,164	11,70	10,53	87,34	1,07
	540	0,168	12	10,8	89,57	0,81
	600	0,173	12,37	11,14	92,35	0,47
	660	0,179	12,82	11,54	95,70	0,07
720	0,18	12,90	11,61	96,25	0,0119	
III	30	0,048	3,04	2,74	22,84	9,00
	60	0,064	4,24	3,81	31,80	7,93
	120	0,122	8,57	7,71	64,28	4,03
	180	0,125	8,79	7,91	65,96	3,83
	240	0,134	9,4	8,52	71,00	3,22
	300	0,138	9,76	8,79	73,24	2,96
	360	0,156	11,10	9,99	83,32	1,75
	420	0,169	12,07	10,87	90,60	0,87
	480	0,173	12,37	11,14	92,84	0,60
	540	0,179	12,82	11,54	96,20	0,20
	600	0,182	13,04	11,74	97,87	0,00
	660	0,177	12,67	11,40	95,08	0,34
720	0,182	13,04	11,74	97,87	0,0128	

FORMULA B

Replikasi	t (menit)	A	C sampel ($\mu\text{g/mL}$)	Wt (mg)	% obat terlepas	$Wt_{\infty}-Wt$
I	30	0,051	3,27	2,94	24,70	8,73
	60	0,063	4,16	3,75	31,46	7,93
	120	0,079	5,36	4,82	40,49	6,85
	180	0,107	7,45	6,70	56,28	4,97
	240	0,107	7,45	6,70	56,28	4,97
	300	0,115	8,04	7,24	60,79	4,43
	360	0,138	9,76	8,79	73,76	2,89
	420	0,145	10,28	9,26	77,70	2,42
	480	0,153	10,88	9,79	82,21	1,88
	540	0,166	11,85	10,67	89,54	1,01
	600	0,174	12,45	11,20	94,06	0,47
	660	0,176	12,60	11,34	95,18	0,34
	720	0,181	12,97	11,67	98,00	0,0133
II	30	0,077	5,21	4,69	39,60	6,99
	60	0,097	6,70	6,03	50,59	5,64
	120	0,122	8,57	7,71	64,13	3,96
	180	0,132	9,31	8,38	70,80	3,29
	240	0,142	10,06	9,05	76,47	2,62
	300	0,154	10,96	9,86	83,28	1,81
	360	0,157	11,18	10,06	84,98	1,61
	420	0,163	11,63	10,46	88,39	1,21
	480	0,165	11,78	10,60	89,52	1,07
	540	0,168	12	10,8	91,22	0,87
	600	0,17	12,15	10,93	92,36	0,74
	660	0,177	12,67	11,40	96,33	0,27
	720	0,181	12,97	11,67	98,60	0,0091
III	30	0,064	4,24	3,81	31,81	7,99
	60	0,085	5,81	5,23	43,57	6,58
	120	0,097	6,70	6,03	50,29	5,78
	180	0,121	8,49	7,64	63,73	4,16
	240	0,134	9,46	8,52	71,01	3,29
	300	0,144	10,2	9,19	76,61	2,62
	360	0,153	10,88	9,79	81,65	2,01
	420	0,158	11,25	10,13	84,45	1,68
	480	0,168	12	10,8	90,05	1,01
	540	0,171	12,22	11,00	91,73	0,81
	600	0,18	12,90	11,61	96,77	0,20
	660	0,181	12,97	11,67	97,33	0,13
	720	0,183	13,12	11,81	98,45	0,0118

FORMULA C

Replikasi	t (menit)	A	C sampel ($\mu\text{g/mL}$)	Wt (mg)	% obat terlepas	W _∞ -Wt
I	30	0,055	3,57	3,21	26,45	8,46
	60	0,074	4,99	4,49	36,96	7,19
	120	0,091	6,25	5,63	46,36	6,04
	180	0,104	7,22	6,50	53,56	5,17
	240	0,132	9,31	8,38	69,05	3,29
	300	0,141	9,99	8,99	74,03	2,69
	360	0,147	10,43	9,39	77,35	2,28
	420	0,152	10,81	9,73	80,11	1,95
	480	0,159	11,33	10,20	83,99	1,48
	540	0,162	11,55	10,40	85,65	1,28
	600	0,166	11,85	10,67	87,86	1,01
	660	0,175	12,52	11,27	92,84	0,40
720	0,181	12,97	11,67	96,16	0,0118	
II	30	0,071	4,76	4,28	35,76	7,52
	60	0,088	6,03	5,43	42,29	6,38
	120	0,119	8,34	7,51	62,66	4,30
	180	0,122	8,57	7,71	64,34	4,10
	240	0,135	9,54	8,58	71,63	3,22
	300	0,143	10,13	9,12	76,11	2,69
	360	0,153	10,88	9,79	81,72	2,01
	420	0,155	11,03	9,927	82,84	1,88
	480	0,159	11,33	10,20	84,08	1,61
	540	0,162	11,55	10,40	85,76	1,41
	600	0,175	12,52	11,27	94,05	0,54
	660	0,176	12,60	11,34	94,61	0,47
720	0,183	13,12	11,801	98,53	0,0099	
III	30	0,078	5,28	4,75	39,88	6,78
	60	0,084	5,73	5,15	43,26	6,38
	120	0,121	8,49	7,64	64,11	3,90
	180	0,139	9,84	8,85	74,25	2,69
	240	0,145	10,28	9,26	77,63	2,28
	300	0,148	10,51	9,46	79,31	2,08
	360	0,151	10,73	9,66	81,00	1,88
	420	0,155	11,03	9,93	83,26	1,61
	480	0,157	11,18	10,06	84,38	1,48
	540	0,163	11,63	10,46	87,76	1,07
	600	0,168	12	10,8	90,58	0,74
	660	0,173	12,37	11,14	93,40	0,40
720	0,179	12,82	11,54	96,78	0,0088	

FORMULA D

Replikasi	t (menit)	A	C sampel ($\mu\text{g/mL}$)	Wt (mg)	% obat terlepas	Wt _o -Wt
I	30	0,067	4,46	4,02	34,12	7,72
	60	0,081	5,51	4,96	42,11	6,78
	120	0,084	5,73	5,16	43,82	6,58
	180	0,098	6,78	6,10	51,81	5,64
	240	0,122	8,57	7,71	65,50	4,03
	300	0,133	9,39	8,45	71,78	3,29
	360	0,143	10,13	9,12	77,48	2,62
	420	0,152	10,81	9,73	82,62	2,01
	480	0,167	11,93	10,73	91,18	1,01
	540	0,169	12,07	10,87	92,32	0,87
	600	0,175	12,52	11,27	95,74	0,47
	660	0,178	12,75	11,47	97,45	0,27
	720	0,182	13,04	11,74	99,74	0,0124
II	30	0,054	3,49	3,14	26,05	8,66
	60	0,065	4,31	3,88	32,17	7,93
	120	0,082	5,58	5,02	41,63	6,78
	180	0,128	9,01	8,11	67,23	3,69
	240	0,133	9,39	8,45	70,02	3,36
	300	0,153	10,88	9,79	81,15	2,01
	360	0,159	11,33	10,20	84,49	1,61
	420	0,164	11,70	10,53	87,27	1,28
	480	0,169	12,07	10,87	90,05	0,94
	540	0,172	12,30	11,07	91,72	0,74
	600	0,174	12,45	11,20	92,84	0,60
	660	0,177	12,67	11,40	94,51	0,40
	720	0,183	12,90	11,81	97,85	0,0129
III	30	0,056	3,64	3,28	27,69	8,26
	60	0,064	4,24	3,81	32,23	7,72
	120	0,092	6,33	5,70	48,12	5,84
	180	0,109	7,60	6,84	57,76	4,70
	240	0,131	9,24	8,31	70,25	3,22
	300	0,137	9,69	8,72	73,65	2,82
	360	0,143	10,13	9,12	77,06	2,42
	420	0,148	10,51	9,46	79,89	2,08
	480	0,157	11,18	10,06	85,00	1,48
	540	0,159	11,33	10,20	86,14	1,34
	600	0,167	11,93	10,73	90,68	0,81
	660	0,177	12,67	11,40	96,35	0,13
	720	0,179	12,82	11,54	97,48	0,0120

LAMPIRAN I
CONTOH PERHITUNGAN

Contoh perhitungan Carr's Index dan Hausner Ratio:

Formula A :

Berat gelas = 125,8641 g (W_1)

Berat gelas + granul = 153,9399 g (W_2)

$V_1 = 100$ mL

$V_2 = 83$ mL

$$Bj \text{ nyata} = \frac{(W_2 - W_1)}{V_1} = \frac{(153,9399 - 125,8641)}{100} = 0,280758$$

$$Bj \text{ mampat} = \frac{(W_2 - W_1)}{V_2} = \frac{(153,9399 - 125,8641)}{83} = 0,33826$$

$$\% \text{ kompresibilitas} = \left(1 - \frac{Bj.nyata}{Bj.mc \cdot Bj \text{ mampat}} \right) \times 100\% = 17\%$$

Formula A:

$$Hausner \text{ Ratio} = \frac{Bj \text{ mampat}}{Bj \text{ nyata}} = 1,20$$

Contoh perhitungan akurasi & presisi:

%	Bahan aktif + matrik (mg)	Air Ad	Pipet (mL)	Air Ad	Konsentrasi (ppm)
100	503	100	0,8	10	9,76

Absorbansi = 0,14 $\rightarrow y = 0,0134x + 0,0072$

Konsentrasi sebenarnya = 9,91 ppm

Konsentrasi teoritis = 9,76 ppm

$$\begin{aligned} \% \text{ perolehan kembali} &= (\text{konsentrasi sebenarnya} / \text{konsentrasi teoritis}) \times 100\% \\ &= (9,91 / 9,76) \times 100\% \\ &= 100,56 \% \end{aligned}$$

$$\begin{aligned} \text{Untuk menghitung \% KV} &= \frac{SD}{\bar{X}} \times 100\% \\ &= \frac{1,37}{100,41} \times 100\% \\ &= 1,37 \% \end{aligned}$$

Contoh perhitungan % obat terlepas:

$$\% \text{ obat terlepas} = \frac{Wt}{\frac{PK}{100} \times \text{dosis}} \times 100\%$$

Formula A replikasi 1 pada t = 30 menit

$$\% \text{ obat terlepas} = \frac{3,68}{\frac{98,1147}{100} \times 12} \times 100\% = 31,26\%$$

Contoh Perhitungan Jumlah Klorfeniramin Maleat terlarut dalam Tween 80:

Replikasi I:

Absorbansi	Konsentrasi (µg/mL)	Dalam 50 mL (µg)	Konsentrasi sesungguhnya (µg/mL)	Kelarutan
0,11	7,67	383,5	15.340	1:65

$$\text{Absorbansi} = 0,11 \rightarrow y = 0,0134x + 0,0072$$

$$\text{Konsentrasi} = 7,67 \mu\text{g/mL}$$

$$\text{CTM } 10,0020 \text{ g ad } 25 \text{ mL} \rightarrow \text{pipet } 25\mu\text{L ad } 50 \text{ mL}$$

$$\text{Dalam } 50 \text{ mL} \rightarrow 7,67 \mu\text{g/mL} \times 50 \text{ mL} = 383,5 \mu\text{g}$$

Jadi dalam 25 mL Tween 80 =

$$\frac{25 \text{ mL} \times 1000}{25 \mu\text{L}} \times 383,5 \mu\text{g} = 383.500 \mu\text{g} / 25 \text{ mL} \rightarrow 15.340 \mu\text{g/mL}$$

Kelarutan = 1.000.000/15.340 µg/mL = 1 gram dalam 65 mL

Contoh Perhitungan LOD dan LOQ:

C (ppm)	Abs(y)	Yi	y-yi	(y-yi) ²
3,015	0,046	0,047667	-0,00167	2,77778E-06
5,025	0,077	0,074667	0,002333	5,44444E-06
7,035	0,102	0,101667	0,000333	1,11111E-07
9,045	0,128	0,128667	-0,00067	4,44444E-07
11,055	0,155	0,155667	-0,00067	4,44444E-07
13,065	0,183	0,182667	0,000333	1,11111E-07
				Σ = 9,33333E-06

Persamaan → y = 0,0134x + 0,0072

$$SB = \frac{\sqrt{\frac{\sum (y - y_i)^2}{n - 2}}}{\text{slope}} = \frac{\sqrt{9,33333E - 06}}{0,0134} = 0,001528$$

$$LOD = \frac{3 SB}{\text{slope}} = \frac{3 \cdot 0,001528}{0,0134} = 0,341147 \text{ ppm}$$

$$LOQ = \frac{10 SB}{\text{slope}} = \frac{10 \cdot 0,001528}{0,0134} = 1,137158 \text{ ppm}$$

Contoh Perhitungan konversi dari Nilai Sesungguhnya Menjadi Bentuk yang Berada dalam Rentang Angka Baku:

Misal: tingkat *guar gum* = -1, tingkat rendah = 20, tingkat tinggi = 40

$$X' = \frac{X - \text{rata - rata 2 level}}{1/2 \text{ perbedaan level}} \rightarrow -1 = \frac{X - (20 + 40)/2}{1/2 \cdot (40 - 20)} \rightarrow X = 20$$

Contoh Perhitungan Hasil teoritis:

Missal : repon *Hausner Ratio* pada formula A

$$Y = B_o + B_a X_A + B_b X_B + B_{ab} X_A X_B$$

$$Y = 1,23 + 3,333 \cdot 10^{-3} X_A + 1,00 \cdot 10^{-2} X_B - 3,333 \cdot 10^{-5} X_A X_B$$

$$= 1,23 + 3,333 \cdot 10^{-3} (-1) + 1,00 \cdot 10^{-2} (-1) - 3,333 \cdot 10^{-5} (-1)(-1) \rightarrow Y = 1,22$$

LAMPIRAN J
HASIL UJI F KURVA BAKU

REPLIKASI I

KONSENTRASI	ABSORBANSI	X²	Y²	XY
3,015	0,046	9,0902	0,0021	0,1387
5,025	0,077	25,2506	0,0059	0,3869
7,035	0,102	49,4912	0,0104	0,7176
9,045	0,128	81,8120	0,0164	1,1578
11,055	0,155	122,2130	0,0240	1,7135
13,065	0,183	170,6942	0,0335	2,3909

Persamaan Regresi pada replikasi 2 → $Y = 0,0134X + 0,0072$

$r_{hitung}/r_{tabel}: 0,9996/0,811$

REPLIKASI II

KONSENTRASI	ABSORBANSI	X²	Y²	XY
3,015	0,047	9,0902	0,0022	0,1417
5,025	0,072	25,2506	0,0052	0,3618
7,035	0,106	49,4912	0,0112	0,7457
9,045	0,136	81,8120	0,0185	1,2301
11,055	0,161	122,2130	0,0259	1,7799
13,065	0,193	170,6942	0,0372	2,5215

Persamaan Regresi pada replikasi 2 → $Y = 0,0146X + 0,0018$

$r_{hitung}/r_{tabel}: 0,9992 /0,811$

REPLIKASI III

KONSENTRASI	ABSORBANSI	X ²	Y ²	XY
3	0,046	9,0721	0,0021	0,1386
5,02	0,074	25,2004	0,0055	0,3715
7,028	0,104	49,3928	0,0108	0,7309
9,036	0,126	81,6493	0,0159	1,1385
11,044	0,158	121,9699	0,0250	1,7450
13,052	0,185	170,3547	0,0342	2,4146

Persamaan Regresi pada replikasi 2 → $Y = 0,0138X + 0,0048$

r_{hitung}/r_{tabel} : 0,9993 / 0,811

	ΣX^2	ΣXY	ΣY^2	N	Residual SS	RDF
Replikasi I	458,5514	6,5054	0,0923	6	$5,6848 \cdot 10^{-5}$	4
Replikasi II	458,5514	6,7807	0,1003	6	$2,6256 \cdot 10^{-5}$	4
Replikasi III	457,6393	6,5391	0,0935	6	$3,8707 \cdot 10^{-5}$	4
Pooled regression					$1,22 \cdot 10^{-4}$	12
Common regression	1374,7420	19,8252	0,2861		$2,17 \cdot 10^{-4}$	11

$F_{hitung} < F_{tabel}_{0,05(3,12)} = 3,1096 < 3,49$.

Karena F_{hitung} lebih kecil dari F_{tabel} maka tidak ada perbedaan bermakna antar persamaan regresi.

LAMPIRAN K
SERTIFIKAT ANALISIS KLORFENIRAMIN MALEAT

PT Sni Aman Corp.
JAKARTA



SUPRIYA LIFESCIENCE LTD.
 (Formerly known as Supriya Chemicals)

QCA-F-02
 Rev. No. 01

CERTIFICATE OF ANALYSIS

Name	: Chlorpheniramine Maleate USP		
Manufacture	: Supriya Lifescience Ltd.		
Batch No.	: SLL/C/0111016	A. R. Number	: SLL/QC/FP/11/0074
Batch Size	: 1000.0 kgs	Drug License No.	: KD-129
Date of Manufacturing	: Jan-2011	Date of Sampling	: 29/01/2011
Date of Expiry	: Dec-2015	Date of Release	: 30/01/2011
Quantity Sampled	: 60 gms	Sampled By	: SUN

Tests	Specification & Limits	Results
Description	White, odourless, crystalline powder	White, odourless, Crystalline powder
Solubility	Freely soluble in water, soluble in alcohol, and in chloroform, slightly soluble in ether, and in benzene	Freely soluble in water, soluble in alcohol, and in chloroform, slightly soluble in ether, and in benzene
Identification: IR Absorption	The infra red absorption spectrum should be concordant with the reference spectrum of chlorpheniramine maleate	The infra red absorption spectrum is concordant with the reference spectrum of chlorpheniramine maleate
Melting Range	130°C to 135°C	133-134°C
Loss on Drying	Not more than 0.5%	0.22%
Residue on Ignition	Not more than 0.2%	0.05%
Related Compounds	Total impurity not more than 2.0%	0.52%
Assay (on dried basis)	NLT 98.0% and NMT 100.5%	99.72%
Residual Solvents		
Isopropanol	Not more than 5000ppm	438ppm
O-xylene	Not more than 2170ppm	Not detected
Methanol	Not more than 3000ppm	Not detected

REMARKS: Chlorpheniramine maleate complies / does not comply with respect to above mentioned test as per USP 32 Specification

<i>[Signature]</i> Analysed By	<i>[Signature]</i> Checked By	 Quality Control Manager
-----------------------------------	----------------------------------	-----------------------------

Corporate office : 207/208, Ildhyon Bhavan, Sonawala Road, Goregaon (East), Mumbai - 400 063, Maharashtra, India.
 Tel. +91 22 40332727 / 66942507 Fax : +91 22 26860011
 E-mail: supriya@supriyalifescience.com Website: www.supriyalifescience.com

Factory : A 5/2, Late Parshuram Industrial Area, M.I.D.C., Tal- Khed, Dist- Ratnagiri, 415 722, Maharashtra, India.
 Tel. +91 2356 272299 Fax : +91 2356 272178
 E-mail: factory@supriyalifescience.com
 COIT, REGISTERED EXPORT HOUSE

SERTIFIKAT ANALISIS *GUAR GUM*

Mfg. & Exporter of : Textile Printing Thickeners & Auxiliaries
 41, Ghanshyam Estate, Margha Farm, B/h Shastri Stadium, Bapunagar, Ahmedabad-380024 (India)



CERTIFICATE OF ANALYSIS

PRODUCT NAME : GUAR POWDER 5000 CPS	LOT NO. : 267/A LOT NO. : 267/B	BAG NO. : 001 tp 200 BAG NO. : 201 to 400
INVOICE NO. : S-290/1213	MFG. DATE : 15.07.2012	
INVOICE DATE : 18.07.2012	EXPIRY DATE : 14.07.2013	
QUANTITY : 10 Mt.		

PARAMETERS	GUAR POWDER 5000 CPS		SPECIFICATION
	267/A	267/B	
APPEARANCE	White to Off White	White to Off White	White to Off White
ODOUR	NATURAL	NATURAL	NATURAL
TASTE	NATURAL	NATURAL	NATURAL
CONSISTENCY	IN ORDER	IN ORDER	IN ORDER
pH	6,94	9,91	6,0 TO 7,5
MOISTURE PERCENT	8,40	8,70	12 (MAX.)
GUM CONTENT PERCENT	83,5	81,5	80 (MIN.)
PROTIN PERCENT	4,64	4,45	5 (MAX.)
ASH PERCENT	0,65	0,75	1 (MAX.)
VISCOSITY 2 hrs.	5100	5200	5000 CPS.
(in CPS) 24 hrs.	5200	5400	
PARTICAL SIZE	98,90	98,90	IN 200 MESH 95 PERCENT PARSING
TYPE OF GOODS	POWDER	POWDER	POWDER

PACKING : 25 KG. IN HDPE LAMINATED PAPER BAG WITH INNER LINER IN
STANDARD EXPORT PACKING.

VISCOSITY METHOD : VISCOSITY MASURED IN 1 PERCENT SOLUTION ON BROOKFIELD
VISCOMETER MODEL RVT, 20 RPM SPINDEL NO. : 4 AT 25c°

FOR, SHREEJI INDUSTRIES

megAsetia
PT. MEGASETIA AGUNG KIMIA

PROPRIETOR

SERTIFIKAT ANALISIS AVICEL PH-102

AsahiKASEI
ASAHI KASEI CHEMICALS

1-105 Kanda Jinbocho, Chiyoda-ku, TOKYO 101-8101, JAPAN
TEL +81-(0)3-3296-3361 FAX +81-(0)3-3296-3467
Manufacturing site: 304, Mizushiri-machi, Nobeoka-city, Miyazaki 882-0015, Japan

Date: 26-SEP-2012
Issued by manufacturer

3035/1315/x1/12
3031/1315/x1/12

YOUR NO.: B7ME-12-5298-0089

CERTIFICATE OF ANALYSIS

Compendial name: **Microcrystalline Cellulose, NF, Ph. Eur., JP**

Trade name : **CEOLUS®**

Grade : **PH-102** Lot No. 2291 (320bags)

Manufacturing Date: 05-SEP-2012

Re-evaluation Date: 05-SEP-2015

Organic Solvent: not used in our process

Compendial Standards

Description	Specifications	Lot Analysis
Identification	Passes	Passes
Degree of polymerization	100 - 300	Passes
Loss on drying (%)	2.0 - 5.0	Passes
Water-soluble substances (mg)	NMT 12.5	4.0
Ether-soluble substances (mg)	NMT 5.0	6.2
Conductivity (μ S/cm)	NMT 75	0.6
Heavy metals (ppm)	NMT 10	24
Solubility	NMT 1000	NMT 10
Residue on ignition (%)	NMT 0.1	Passes
Bulk density (g/cm ³)	0.28 - 0.33	0.00
pH	5.0 - 7.5	0.303
Total aerobic microbial count (cfu/g)	NMT 100	6.2
Total combined molds and yeasts count (cfu/g)	NMT 100	Passes
<i>Escherichia coli</i>	None Present	Passes
<i>Salmonella</i> species	None Present	None Present
<i>Pseudomonas Aeruginosa</i>	None Present	None Present
<i>Staphylococcus Aureus</i>	None Present	None Present

ASAHI Standards

Particle size, wt. % >250 μ m (60 mesh)	LT 8.0	0.8
Particle size, wt. % >150 μ m (100 mesh)	20 - 40	33

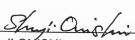
NMT --Not More Than; LT --Less Than

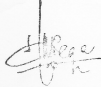
We certify that the product complies with the standards of the NF, Ph. Eur., JP.

Storage conditions: Store at ambient conditions. Keep containers sealed; material is hygroscopic.

Re-evaluation Date: Three years after manufacturing, if stored as recommended.

Asahi Kasei Chemicals recommends that the customer's quality control unit may re-evaluate the quality of this material at the given time e.g. for loss on drying and extend the shelf life of this lot on its own responsibility.


Shuji OISHI
Manager
Quality Assurance Section
CEOLUS Production Department


Donda Siregan, S. Farm., Apt.
SP.No. KP.01.03.1.3.0661
Apoteker Penanggung Jawab

P.T. WARIS
JAKARTA

LAMPIRAN L
TABEL UJI F

TABEL DISTRIBUSI F UNTUK 5% DAN 1%

Baris atas untuk taraf signifikan 5%
Baris bawah untuk taraf signifikan 1%

$V_2 = dk$ penyebut	$V_1 = dk$ pembilang																																																
	1	2	3	4	5	6	7	8	9	10	11	12	14	16	20	24	30	40	50	75	100	200	500	∞																									
1	161	200	216	225	230	234	237	239	241	242	243	244	245	246	248	249	250	251	252	253	253	254	254	254	4052	4999	5403	5825	5764	5859	5928	5961	6022	6056	6082	6106	6142	61,69	6208	6234	6258	6286	6302	6323	6334	6352	6361	6366	
2	18,51	19,00	19,16	19,25	19,30	19,33	19,36	19,37	19,38	19,39	19,40	19,41	19,42	19,43	19,44	19,45	19,46	19,47	19,47	19,48	19,49	19,49	19,50	19,50	98,49	99,01	99,17	99,25	99,30	99,33	99,34	99,36	97,38	99,40	99,41	99,42	99,43	99,44	99,45	99,46	99,47	99,48	99,48	99,49	99,49	99,49	99,50	99,50	99,50
3	10,13	9,55	9,28	9,12	9,01	8,94	8,88	8,84	8,81	8,78	8,76	8,74	8,71	8,69	8,66	8,64	8,62	8,60	8,58	8,57	8,56	8,54	8,54	8,53	34,12	30,81	29,46	28,71	28,24	27,91	27,67	27,49	27,34	27,23	27,13	27,05	26,92	26,83	26,69	26,60	26,50	26,41	26,30	26,27	26,23	26,18	26,14	26,12	
4	7,71	6,94	6,59	6,39	6,26	6,16	6,09	6,04	6,00	5,96	5,93	5,91	5,87	5,84	5,80	5,77	5,74	5,71	5,70	5,68	5,66	5,65	5,64	5,53	21,20	18,00	16,69	15,98	15,52	15,21	14,98	14,80	14,66	14,54	14,45	14,37	14,24	14,15	14,02	13,93	13,83	13,74	13,69	13,61	13,57	13,52	13,48	13,46	
5	6,61	5,79	5,41	5,19	5,05	4,95	4,88	4,82	4,78	4,74	4,70	4,68	4,64	4,60	4,56	4,53	4,50	4,46	4,44	4,42	4,40	4,38	4,37	4,36	16,26	13,27	12,06	11,39	10,97	10,67	10,45	10,27	10,15	10,05	9,96	9,89	9,77	9,68	9,55	9,47	9,38	9,29	9,24	9,17	9,13	9,07	9,04	9,02	
6	5,99	5,14	4,76	4,53	4,39	4,28	4,21	4,15	4,10	4,06	4,03	4,00	3,96	3,92	3,87	3,84	3,81	3,77	3,75	3,72	3,71	3,69	3,68	3,67	13,74	10,92	9,78	9,15	8,75	8,47	8,26	8,10	7,98	7,87	7,79	7,72	7,60	7,52	7,39	7,31	7,23	7,14	7,09	7,02	6,99	6,94	6,90	6,88	
7	5,59	4,74	4,35	4,12	3,97	3,87	3,79	3,73	3,68	3,63	3,60	3,57	3,52	3,49	3,44	3,41	3,38	3,34	3,32	3,29	3,28	3,25	3,24	3,23	12,25	9,55	8,45	7,85	7,46	7,19	7,00	6,84	6,71	6,62	6,54	6,47	6,35	6,27	6,15	6,07	5,98	5,90	5,85	5,78	5,75	5,70	5,67	5,65	
8	5,32	4,46	4,07	3,84	3,69	3,58	3,50	3,44	3,39	3,34	3,31	3,28	3,23	3,20	3,15	3,12	3,08	3,05	3,03	3,00	2,98	2,96	2,94	2,93	11,28	8,65	7,59	7,01	6,63	6,37	6,19	6,03	5,91	5,82	5,74	5,67	5,56	5,48	5,36	5,28	5,20	5,11	5,06	5,00	4,96	4,91	4,88	4,86	
9	5,12	4,26	3,86	3,63	3,48	3,37	3,29	3,23	3,18	3,13	3,10	3,07	3,02	2,98	2,93	2,90	2,86	2,82	2,80	2,77	2,76	2,73	2,72	2,71	10,56	8,02	6,99	6,42	6,06	5,80	5,62	5,47	5,35	5,26	5,18	5,11	5,00	4,92	4,80	4,73	4,61	4,56	4,51	4,45	4,41	4,36	4,33	4,34	

$V_2 = dk$ perlybut	$V_1 = dk$ pembilang																							
	1	2	3	4	5	6	7	8	9	10	11	12	14	16	20	24	30	40	50	75	100	200	500	X
10	4,96	4,10	3,71	3,48	3,33	3,22	3,14	3,07	3,02	2,97	2,94	2,91	2,86	2,82	2,77	2,74	2,70	2,67	2,64	2,61	2,59	2,56	2,55	2,54
11	10,04	7,56	6,55	5,99	5,64	5,39	5,21	5,06	4,95	4,85	4,78	4,71	4,60	4,52	4,41	4,33	4,25	4,17	4,12	4,05	4,01	3,96	3,93	3,91
12	4,84	3,98	3,59	3,36	3,20	3,09	3,01	2,95	2,90	2,86	2,82	2,79	2,74	2,70	2,65	2,61	2,57	2,53	2,50	2,47	2,45	2,42	2,41	2,40
13	9,05	7,20	6,22	5,67	5,32	5,07	4,88	4,74	4,63	4,54	4,46	4,40	4,29	4,21	4,10	4,02	3,94	3,86	3,80	3,74	3,70	3,66	3,62	3,60
14	4,75	3,88	3,49	3,26	3,11	3,00	2,92	2,85	2,80	2,76	2,72	2,69	2,64	2,60	2,54	2,50	2,46	2,42	2,40	2,36	2,35	2,32	2,31	2,30
15	9,33	6,93	5,95	5,41	5,06	4,82	4,65	4,50	4,39	4,30	4,22	4,16	4,05	3,98	3,86	3,78	3,70	3,61	3,56	3,49	3,46	3,41	3,38	3,36
16	4,67	3,80	3,41	3,18	3,02	2,92	2,84	2,77	2,72	2,67	2,63	2,60	2,55	2,51	2,46	2,42	2,38	2,34	2,32	2,28	2,26	2,24	2,22	2,21
17	9,01	6,70	5,74	5,20	4,86	4,62	4,44	4,30	4,19	4,10	4,02	3,96	3,85	3,78	3,67	3,59	3,51	3,42	3,37	3,30	3,27	3,21	3,18	3,16
18	4,63	3,74	3,34	3,11	2,96	2,85	2,77	2,70	2,65	2,60	2,56	2,53	2,48	2,44	2,39	2,35	2,31	2,27	2,24	2,21	2,19	2,16	2,14	2,13
19	8,86	6,51	5,56	5,03	4,69	4,46	4,28	4,14	4,03	3,94	3,86	3,80	3,70	3,62	3,51	3,43	3,34	3,26	3,21	3,14	3,11	3,06	3,02	3,00
20	4,54	3,68	3,29	3,06	2,90	2,79	2,70	2,64	2,59	2,55	2,51	2,48	2,43	2,39	2,33	2,29	2,25	2,21	2,18	2,15	2,12	2,10	2,08	2,07
21	8,68	6,36	5,42	4,89	4,56	4,32	4,14	4,00	3,89	3,80	3,73	3,67	3,56	3,48	3,36	3,29	3,20	3,12	3,07	3,00	2,97	2,92	2,89	2,87
22	4,49	3,63	3,24	3,01	2,85	2,74	2,66	2,59	2,54	2,49	2,45	2,42	2,37	2,33	2,28	2,24	2,20	2,16	2,13	2,09	2,07	2,04	2,02	2,01
23	8,53	6,23	5,29	4,77	4,44	4,20	4,03	3,89	3,78	3,69	3,61	3,55	3,45	3,37	3,25	3,18	3,10	3,01	2,96	2,89	2,86	2,80	2,77	2,75
24	4,45	3,59	3,20	2,96	2,81	2,70	2,62	2,55	2,50	2,45	2,41	2,38	2,33	2,29	2,23	2,19	2,15	2,11	2,08	2,04	2,02	1,99	1,97	1,96
25	8,41	6,11	5,18	4,67	4,34	4,10	3,93	3,79	3,68	3,59	3,52	3,45	3,35	3,27	3,16	3,08	3,00	2,92	2,86	2,79	2,76	2,70	2,67	2,65
26	4,41	3,55	3,16	2,93	2,77	2,66	2,58	2,51	2,46	2,41	2,37	2,34	2,29	2,25	2,19	2,15	2,11	2,07	2,04	2,00	1,98	1,95	1,93	1,92
27	8,28	6,01	5,09	4,58	4,25	4,01	3,85	3,71	3,60	3,51	3,44	3,37	3,27	3,19	3,07	3,00	2,91	2,83	2,78	2,71	2,68	2,62	2,59	2,57
28	4,38	3,52	3,13	2,90	2,74	2,63	2,55	2,48	2,43	2,38	2,34	2,31	2,26	2,21	2,15	2,11	2,07	2,02	2,00	1,96	1,94	1,91	1,90	1,88
29	8,18	5,93	5,01	4,50	4,17	3,94	3,77	3,63	3,52	3,43	3,36	3,30	3,19	3,12	3,00	2,92	2,84	2,76	2,70	2,63	2,60	2,54	2,51	2,49
30	4,35	3,49	3,10	2,87	2,71	2,60	2,52	2,45	2,40	2,35	2,31	2,26	2,23	2,18	2,12	2,08	2,04	1,99	1,96	1,92	1,90	1,87	1,85	1,84
31	8,10	5,85	4,94	4,43	4,10	3,87	3,71	3,56	3,45	3,37	3,30	3,23	3,13	3,05	2,94	2,86	2,77	2,69	2,63	2,56	2,53	2,47	2,44	2,42
32	4,32	3,47	3,07	2,84	2,68	2,57	2,49	2,42	2,37	2,32	2,28	2,25	2,20	2,15	2,09	2,05	2,00	1,96	1,93	1,89	1,87	1,84	1,82	1,81
33	8,02	5,78	4,87	4,37	4,04	3,81	3,65	3,51	3,40	3,31	3,24	3,17	3,07	2,99	2,88	2,80	2,72	2,63	2,58	2,51	2,47	2,42	2,38	2,36
34	4,30	3,44	3,05	2,82	2,66	2,55	2,47	2,40	2,35	2,30	2,26	2,23	2,18	2,13	2,07	2,03	1,98	1,93	1,91	1,87	1,84	1,81	1,80	1,78
35	7,94	5,72	4,82	4,31	3,99	3,76	3,59	3,45	3,35	3,26	3,18	3,12	3,02	2,94	2,83	2,75	2,67	2,58	2,53	2,46	2,42	2,37	2,33	2,31
36	4,28	3,42	3,03	2,80	2,64	2,53	2,45	2,38	2,32	2,28	2,24	2,20	2,14	2,10	2,04	2,00	1,96	1,91	1,88	1,84	1,82	1,79	1,77	1,76
37	7,88	5,66	4,76	4,26	3,94	3,71	3,54	3,41	3,30	3,21	3,14	3,07	2,97	2,89	2,78	2,70	2,62	2,53	2,48	2,41	2,37	2,32	2,28	2,26

LAMPIRAN M
TABEL UJI R

DEGREES OF FREEDOM (DF)	5 PERCENT	1 PERCENT	DEGREES OF FREEDOM (DF)	5 PERCENT	1 PERCENT
1	.997	1.000	24	.388	.496
2	.950	.990	25	.381	.487
3	.878	.959	26	.374	.478
4	.811	.917	27	.367	.470
5	.754	.874	28	.361	.463
6	.707	.834	29	.355	.456
7	.666	.798	30	.349	.449
8	.632	.765	35	.325	.418
9	.602	.735	40	.304	.393
10	.576	.708	48	.288	.372
11	.553	.684	50	.273	.354
12	.532	.661	60	.250	.325
13	.514	.641	70	.232	.302
14	.497	.623	80	.217	.283
15	.482	.606	90	.205	.267
16	.468	.590	100	.195	.254
17	.456	.575	125	.174	.228
18	.444	.561	150	.159	.208
19	.433	.549	200	.138	.181
20	.423	.537	300	.113	.148
21	.413	.526	400	.098	.128
22	.404	.515	500	.088	.115
23	.396	.505	1000	.062	.081

LAMPIRAN N
TABEL UJI T

v	α				
	0.10	0.05	0.025	0.01	0.005
1	3.078	6.314	12.706	31.821	63.657
2	1.886	2.920	4.303	6.965	9.925
3	1.638	2.353	3.182	4.451	5.841
4	1.533	2.132	2.776	3.747	4.604
5	1.476	2.015	2.561	3.365	4.012
6	1.440	1.943	2.447	3.143	3.707
7	1.415	1.895	2.365	2.998	3.499
8	1.397	1.860	2.306	2.896	3.355
9	1.383	1.833	2.262	2.821	3.250
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.055
13	1.350	1.771	2.160	2.650	3.012
14	1.345	1.761	2.145	2.624	2.977
15	1.341	1.753	2.131	2.602	2.947
16	1.337	1.746	2.120	2.583	2.921
17	1.333	1.740	2.110	2.567	2.898
18	1.330	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845
21	1.323	1.721	2.080	2.518	2.831
22	1.321	1.717	2.074	2.508	2.819
23	1.319	1.714	2.069	2.500	2.807
24	1.318	1.711	2.064	2.492	2.797
25	1.316	1.708	2.060	2.485	2.787
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.771
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.756
inf.	1.282	1.645	1.960	2.326	2.576

Sumber : Ronald E. Walpole (1995) : Pengantar Statistika.

LAMPIRAN O

HASIL UJI STATISTIK *HAUSNER RATIO* TABLET LIKUISOLID KLORFENIRAMIN MALEAT ANTAR FORMULA

Descriptives

Hausner ratio

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
A	3	1.2100	.01732	.01000	1.1670	1.2530	1.20	1.23
B	3	1.2233	.01528	.00882	1.1854	1.2613	1.21	1.24
C	3	1.2367	.00577	.00333	1.2223	1.2510	1.23	1.24
D	3	1.2367	.00577	.00333	1.2223	1.2510	1.23	1.24
Total	12	1.2267	.01557	.00449	1.2168	1.2366	1.20	1.24

Test of Homogeneity of Variances

Hausner ratio

Levene Statistic	df1	df2	Sig.
2.833	3	8	.106

ANOVA

Hausner ratio

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.001	3	.000	3.259	.081
Within Groups	.001	8	.000		
Total	.003	11			

Karena $F_{hitung} < F_{tabel_{0,05(3,8)}} = 3,259 < 4,07$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula.

LAMPIRAN P

HASIL UJI STATISTIK CARR'S INDEX TABLET LIKUISOLID KLORFENIRAMIN MALEAT ANTAR FORMULA

Descriptives

Carr's index

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
A	3	17.6633	1.15760	.66834	14.7877	20.5390	16.99	19.00
B	3	18.6633	1.14893	.66333	15.8092	21.5174	18.00	19.99
C	3	19.6600	.57158	.33000	18.2401	21.0799	19.00	19.99
D	3	19.6600	.57158	.33000	18.2401	21.0799	19.00	19.99
Total	12	18.9117	1.16178	.33538	18.1735	19.6498	16.99	19.99

Test of Homogeneity of Variances

Carr's index

Levene Statistic	df1	df2	Sig.
2.179	3	8	.168

ANOVA

Carr's index

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.220	3	2.740	3.308	.078
Within Groups	6.627	8	.828		
Total	14.847	11			

Karena $F_{hitung} < F_{tabel_{0,05}(3,8)} = 3,308 < 4,07$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula.

LAMPIRAN Q

HASIL UJI STATISTIK KEKERASAN TABLET LIKUISOLID KLORFENIRAMIN MALEAT ANTAR FORMULA

Descriptives

Kekerasan Tablet

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
A	3	16.9800	.66053	.38136	15.3392	18.6208	16.24	17.51
B	3	10.7100	.23065	.13317	10.1370	11.2830	10.45	10.89
C	3	10.2967	.09018	.05207	10.0726	10.5207	10.21	10.39
D	3	5.3433	.49943	.28835	4.1027	6.5840	5.05	5.92
Total	12	10.8325	4.32927	1.24975	8.0818	13.5832	5.05	17.51

Test of Homogeneity of Variances

Kekerasan Tablet

Levene Statistic	df1	df2	Sig.
4.211	3	8	.046

ANOVA

Kekerasan Tablet

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	204.674	3	68.225	365.294	.000
Within Groups	1.494	8	.187		
Total	206.169	11			

Karena $F_{hitung} > F_{tabel_{0,05}(3,8)} = 365,294 > 4,07$; maka H_0 ditolak dan ada perbedaan bermakna antar formula.

Multiple Comparisons

Kekerasan Tablet
LSD

(I) FORMU LA	(J) FORMU LA	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
A	B	6.27000 ^a	.35286	.000	5.4563	7.0837
	C	6.68333 ^a	.35286	.000	5.8696	7.4970
	D	11.63667 ^a	.35286	.000	10.8230	12.4504
B	A	-6.27000 ^a	.35286	.000	-7.0837	-5.4563
	C	.41333	.35286	.275	-.4004	1.2270
	D	5.36667 ^a	.35286	.000	4.5530	6.1804
C	A	-6.68333 ^a	.35286	.000	-7.4970	-5.8696
	B	-.41333	.35286	.275	-1.2270	.4004
	D	4.95333 ^a	.35286	.000	4.1396	5.7670
D	A	-11.63667 ^a	.35286	.000	-12.4504	-10.8230
	B	-5.36667 ^a	.35286	.000	-6.1804	-4.5530
	C	-4.95333 ^a	.35286	.000	-5.7670	-4.1396

*. The mean difference is significant at the 0.05 level.

Keterangan:

Hasil uji LSD dari keempat formula, diperoleh nilai sig. < $\alpha(0,05)$ sehingga H_0 ditolak (*), berarti rata-rata kekerasan tablet dari keempat formula menunjukkan bahwa ada perbedaan yang signifikan antar formula yaitu formula A dan formula D menunjukkan perbedaan yang signifikan terhadap semua formula; formula B menunjukkan perbedaan yang signifikan terhadap formula D, sedangkan untuk formula C tidak menunjukkan perbedaan yang signifikan terhadap formula B.

LAMPIRAN R

HASIL UJI STATISTIK KERAPUHAN TABLET LIKUISOLID KLORFENIRAMIN MALEAT ANTAR FORMULA

Descriptives

Kerapuhan Tablet

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
A	3	.1600	.06083	.03512	.0089	.3111	.09	.20
B	3	.0967	.00577	.00333	.0823	.1110	.09	.10
C	3	.1333	.05774	.03333	-.0101	.2768	.10	.20
D	3	.1667	.05859	.03383	.0211	.3122	.10	.21
Total	12	.1392	.05230	.01510	.1059	.1724	.09	.21

Test of Homogeneity of Variances

Kerapuhan Tablet

Levene Statistic	df1	df2	Sig.
3.907	3	8	.055

ANOVA

Kerapuhan Tablet

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.009	3	.003	1.154	.385
Within Groups	.021	8	.003		
Total	.030	11			

Karena $F_{hitung} < F_{tabel_{0,05}(3,8)} = 1,154 < 4,07$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula.

LAMPIRAN S

HASIL UJI STATISTIK KONSTANTA DISOLUSI TABLET LIKUISOLID KLORFENIRAMIN MALEAT ANTAR FORMULA

Descriptives

K disolusi

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minim	Max
					Lower	Upper		
					Bound	Bound		
A	3	.011733	.0011590	.0006692	.008854	.014613	.0105	.0128
B	3	.011400	.0021284	.0012288	.006113	.016687	.0091	.0133
C	3	.010167	.0015177	.0008762	.006397	.013937	.0088	.0118
D	3	.012433	.0004509	.0002603	.011313	.013553	.0120	.0129
Total	12	.011433	.0015029	.0004339	.010478	.012388	.0088	.0133

Test of Homogeneity of Variances

K disolusi

Levene Statistic	df1	df2	Sig.
1.636	3	8	.257

ANOVA

K disolusi

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.000	3	.000	1.287	.343
Within Groups	.000	8	.000		
Total	.000	11			

Karena $F_{hitung} < F_{tabel_{0,05}(3,8)} = 1,287 < 4,07$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula.

LAMPIRAN T
HASIL UJI ANAVA HAUSNER RATIO KLORFENIRAMIN
MALEAT DENGAN DESIGN EXPERT

Use your mouse to right click on individual cells for definitions.

Response 1 hausner ratio
ANOVA for selected factorial model
Analysis of variance table [Partial sum of squares - Type III]

F Source Value	Sum of p-value Squares Prob > F	df	Mean Square
Model	1.467E-003	3	4.889E-004
3.260.0806	not significant		
<i>A-konsentrasi tween</i>	<i>1.333E-004</i>	<i>1</i>	<i>1.333E-004</i>
0.890.3734			
<i>B-konsentrasi guar gum</i>	<i>1.200E-003</i>	<i>1</i>	<i>1.200E-003</i>
8.000.0222			
<i>AB</i>	<i>1.333E-004</i>	<i>1</i>	<i>1.333E-004</i>
0.890.3734			
Pure Error	1.200E-003	8	1.500E-004
Cor Total	2.667E-003	11	

The Model F-value of 3.26 implies there is a 8.06% chance that a "Model F-Value"

this large could occur due to noise.

Values of "Prob > F" less than 0.0500 indicate model terms are significant.

In this case B are significant model terms.

Values greater than 0.1000 indicate the model terms are not significant.

If there are many insignificant model terms (not counting those required to support hierarchy),

model reduction may improve your model.

Std. Dev.	0.012		R-Squared	0.5500
Mean1.23		Adj R-Squared	0.3812	
C.V. %	1.00		Pred R-Squared	-0.0125
PRESS	2.700E-003		Adeq Precision	3.771

A negative "Pred R-Squared" implies that the overall mean is a better predictor of your response than the current model.

"Adeq Precision" measures the signal to noise ratio. A ratio of 3.77 indicates an inadequate signal and we should not use this model to navigate the design space.

Factor	Coefficient Estimate	df	Standard Error	95% CI Low	95% CI High
Intercept	1.23	1	3.536E-003	1.22	1.23
A-konsentrasi tween 1.00	3.333E-003	1	3.536E-003	-4.820E-003	0.011
B-konsentrasi guar gum 1.00	1.000E-002	1	3.536E-003	1.847E-003	0.018
AB - 1.00	3.333E-003	1	3.536E-003	-0.011	4.820E-003

Final Equation in Terms of Coded Factors:

$$\begin{aligned} \text{hausner ratio} &= \\ +1.23 & \\ +3.333\text{E-}003 & * A \\ +1.000\text{E-}002 & * B \\ -3.333\text{E-}003 & * A * B \end{aligned}$$

Final Equation in Terms of Actual Factors:

$$\begin{aligned} \text{hausner ratio} &= \\ +1.22667 & \\ +3.33333\text{E-}003 & * \text{konsentrasi tween} \\ +1.00000\text{E-}002 & * \text{konsentrasi guar gum} \\ -3.33333\text{E-}003 & * \text{konsentrasi tween} * \text{konsentrasi guar gum} \end{aligned}$$

The Diagnostics Case Statistics Report has been moved to the Diagnostics Node.
In the Diagnostics Node, Select Case Statistics from the View Menu.

Proceed to Diagnostic Plots (the next icon in progression). Be sure to look at the:

- 1) Normal probability plot of the studentized residuals to check for normality of residuals.
- 2) Studentized residuals versus predicted values to check for constant error.
- 3) Externally Studentized Residuals to look for outliers, i.e., influential values.
- 4) Box-Cox plot for power transformations.

If all the model statistics and diagnostic plots are OK, finish up with the Model Graphs icon.

Std. Dev.	0.91		R-Squared	0.5537
Mean	18.91	Adj R-Squared	0.3863	
C.V. %	4.81		Pred R-Squared	-0.0043
PRESS	14.91		Adeq Precision	3.800

A negative "Pred R-Squared" implies that the overall mean is a better predictor of your response than the current model.

"Adeq Precision" measures the signal to noise ratio. A ratio of 3.80 indicates an inadequate signal and we should not use this model to navigate the design space.

123

Factor	Coefficient		Standard df	95% CI		High	VIF
	Estimate			Error	Low		
Intercept	18.91		1	0.26	18.31	19.52	
A-konsentrasi tween	0.25		1	0.26	-0.36	0.86	1.00
B-konsentrasi guar gum	0.75		1	0.26	0.14	1.35	1.00
AB	-0.25		1	0.26	-0.86	0.36	1.00

Final Equation in Terms of Coded Factors:

$$\begin{aligned} \text{carrs index} &= \\ +18.91 & \\ +0.25 & * A \\ +0.75 & * B \\ -0.25 & * A * B \end{aligned}$$

Final Equation in Terms of Actual Factors:

$$\begin{aligned} \text{carrs index} &= \\ +18.91167 & \\ +0.25000 & * \text{konsentrasi tween} \\ +0.74833 & * \text{konsentrasi guar gum} \\ -0.25000 & * \text{konsentrasi tween} * \text{konsentrasi guar gum} \end{aligned}$$

The Diagnostics Case Statistics Report has been moved to the Diagnostics Node. In the Diagnostics Node, Select Case Statistics from the View Menu. Proceed to Diagnostic Plots (the next icon in progression). Be sure to look at the:

- 1) Normal probability plot of the studentized residuals to check for normality of residuals.
- 2) Studentized residuals versus predicted values to check for constant error.
- 3) Externally Studentized Residuals to look for outliers, i.e., influential values.
- 4) Box-Cox plot for power transformations.

If all the model statistics and diagnostic plots are OK, finish up with the Model Graphs icon.

Values greater than 0.1000 indicate the model terms are not significant.
 If there are many insignificant model terms (not counting those required to support hierarchy), model reduction may improve your model.

Std. Dev.	0.43	R-Squared	0.9928
Mean	10.83	Adj R-Squared	0.9900
C.V. %	3.99	Pred R-Squared	0.9837
PRESS	3.36	Adeq Precision	46.638

The "Pred R-Squared" of 0.9837 is in reasonable agreement with the "Adj R-Squared" of 0.9900.

"Adeq Precision" measures the signal to noise ratio. A ratio greater than 4 is desirable. Your ratio of 46.638 indicates an adequate signal. This model can be used to navigate the design space.

Factor	Coefficient		Standard	95% CI		VIF
	Estimate	df		Low	High	
Intercept	10.83	1	0.12	10.54	11.12	
A-konsentrasi tween	-2.81	1	0.12	-3.09	-2.52	1.00
B-konsentrasi guar gum	-3.01	1	0.12	-3.30	-2.72	1.00
AB0.33	1	0.12	0.041	0.62	1.00	

Final Equation in Terms of Coded Factors:

$$\begin{aligned} \text{kekerasan tablet} &= \\ +10.83 & \\ -2.81 & \quad * A \\ -3.01 & \quad * B \\ +0.33 & \quad * A * B \end{aligned}$$

Final Equation in Terms of Actual Factors:

$$\begin{aligned} \text{kekerasan tablet} &= \\ +10.83250 & \\ -2.80583 & \quad * \text{konsentrasi tween} \\ -3.01250 & \quad * \text{konsentrasi guar gum} \\ +0.32917 & \quad * \text{konsentrasi tween} * \text{konsentrasi guar gum} \end{aligned}$$

The Diagnostics Case Statistics Report has been moved to the Diagnostics Node.

In the Diagnostics Node, Select Case Statistics from the View Menu.

Proceed to Diagnostic Plots (the next icon in progression). Be sure to look at the:

- 1) Normal probability plot of the studentized residuals to check for normality of residuals.
- 2) Studentized residuals versus predicted values to check for constant error.
- 3) Externally Studentized Residuals to look for outliers, i.e., influential values.
- 4) Box-Cox plot for power transformations.

If all the model statistics and diagnostic plots are OK, finish up with the Model Graphs icon.

model reduction may improve your model.

Std. Dev.	0.051		R-Squared	0.3021
Mean	0.14	Adj R-Squared	0.0404	
C.V. %	36.82		Pred R-Squared	-0.5702
PRESS	0.047		Adeq Precision	2.366

A negative "Pred R-Squared" implies that the overall mean is a better predictor of your response than the current model.

"Adeq Precision" measures the signal to noise ratio. A ratio of 2.37 indicates an inadequate signal and we should not use this model to navigate the design space.

129

Factor	Coefficient Estimate	df	Standard Error	95% CI Low	95% CI High
VIF					
Intercept	0.14	1	0.015	0.11	0.17
A-konsentrasi tween	-7.500E-003	1	0.015	-0.042	0.027
1.00					
B-konsentrasi guar gum	0.011	1	0.015	-0.023	0.045
1.00					
AB0.024	1	0.015	-9.940E-003	0.058	1.00

Final Equation in Terms of Coded Factors:

$$\begin{aligned} \text{kerapuhan tablet} &= \\ +0.14 & \\ -7.500\text{E-}003 & * A \\ +0.011 & * B \\ +0.024 & * A * B \end{aligned}$$

Final Equation in Terms of Actual Factors:

$$\begin{aligned} \text{kerapuhan tablet} &= \\ +0.13917 & \\ -7.50000\text{E-}003 & * \text{konsentrasi tween} \\ +0.010833 & * \text{konsentrasi guar gum} \\ +0.024167 & * \text{konsentrasi tween} * \text{konsentrasi guar gum} \end{aligned}$$

The Diagnostics Case Statistics Report has been moved to the Diagnostics Node.
In the Diagnostics Node, Select Case Statistics from the View Menu.

Proceed to Diagnostic Plots (the next icon in progression). Be sure to look at the:

- 1) Normal probability plot of the studentized residuals to check for normality of residuals.
- 2) Studentized residuals versus predicted values to check for constant error.
- 3) Externally Studentized Residuals to look for outliers, i.e., influential values.
- 4) Box-Cox plot for power transformations.

If all the model statistics and diagnostic plots are OK, finish up with the Model Graphs icon.

LAMPIRAN X

HASIL UJI ANAVA KONSTANTA LAJU DISOLUSI KLORFENIRAMIN MALEAT DENGAN *DESIGN EXPERT*

Use your mouse to right click on individual cells for definitions.

Response **5** **K disolusi**

ANOVA for selected factorial model

Analysis of variance table [Partial sum of squares - Type III]

Source	Sum of Squares	df	Mean Square	F Value	p-value Prob > F	
Model	8.087E-006	3	2.696E-006	1.29	0.3434	not significant
<i>A-konsentrasi tween</i>	2.803E-006	1	2.803E-006	1.34	0.2807	
<i>B-konsentrasi guar gum</i>	2.133E-007	1	2.133E-007	0.10	0.7578	
<i>AB</i>	5.070E-006	1	5.070E-006	2.42	0.1584	
Pure Error	1.676E-005	8	2.095E-006			
Cor Total	2.485E-005	11				

The "Model F-value" of 1.29 implies the model is not significant relative to the noise. There is a 34.34 % chance that a "Model F-value" this large could occur due to noise.

Values of "Prob > F" less than 0.0500 indicate model terms are significant.

In this case there are no significant model terms.

Values greater than 0.1000 indicate the model terms are not significant.

If there are many insignificant model terms (not counting those required to support hierarchy),

model reduction may improve your model.

Std. Dev.	1.447E-003		R-Squared	0.3255
Mean	0.011	Adj R-Squared	0.0725	
C.V. %	12.66		Pred R-Squared	-0.5177
PRESS	3.771E-005		Adeq Precision	2.712

A negative "Pred R-Squared" implies that the overall mean is a better predictor of your response than the current model.

"Adeq Precision" measures the signal to noise ratio. A ratio of 2.71 indicates an inadequate signal and we should not use this model to navigate the design space.

Factor	Coefficient Estimate	df	Standard Error	95% CI Low	95% CI High	VIF
Intercept	0.011	1	4.178E-004	0.010	0.012	
A-konsentrasi tween	4.833E-004	1	4.178E-004	-4.802E-004	1.447E-003	1.00
B-konsentrasi guar gum	-1.333E-004	1	4.178E-004	-1.097E-003	8.302E-004	1.00
AB	6.500E-004	1	4.178E-004	-3.135E-004	1.614E-003	1.00

Final Equation in Terms of Coded Factors:

$$\begin{aligned} \text{K disolusi} &= \\ +0.011 & \\ +4.833\text{E-}004 & * A \\ -1.333\text{E-}004 & * B \\ +6.500\text{E-}004 & * A * B \end{aligned}$$

Final Equation in Terms of Actual Factors:

$$\begin{aligned} \text{K disolusi} &= \\ +0.011433 & \\ +4.83333\text{E-}004 & * \text{konsentrasi tween} \\ -1.33333\text{E-}004 & * \text{konsentrasi guar gum} \\ +6.50000\text{E-}004 & * \text{konsentrasi tween} * \text{konsentrasi guar gum} \end{aligned}$$

The Diagnostics Case Statistics Report has been moved to the Diagnostics Node. In the Diagnostics Node, Select Case Statistics from the View Menu. Proceed to Diagnostic Plots (the next icon in progression). Be sure to look at the:

- 1) Normal probability plot of the studentized residuals to check for normality of residuals.
- 2) Studentized residuals versus predicted values to check for constant error.
- 3) Externally Studentized Residuals to look for outliers, i.e., influential values.
- 4) Box-Cox plot for power transformations.

If all the model statistics and diagnostic plots are OK, finish up with the Model Graphs icon.

LAMPIRAN Y
HASIL UJI STATISTIK HASIL PERCOBAAN DAN HASIL
TEORITIS PADA UJI HAUSNER RATIO TABLET
KLORFENIRAMIN MALEAT

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	haunerpercobaan	1.2225	4	.02062	.01031
	hausnerteoritis	1.2300	4	.01155	.00577

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	haunerpercobaan & hausnerteoritis	4	.980	.020

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 haunerpercobaan - hausnerteoritis	-.00750	.00957	.00479	-.02273	.00773	-1.567	3	.215

135

Hipotesa Pengujian :

Ho diterima jika $T_{hitung} (-1,567) < T_{0,025 (3)} (3,182)$, berarti hasil percobaan dan hasil teoritis pada uji disolusi tidak berbeda bermakna antar formula.

LAMPIRAN Z
HASIL UJI STATISTIK HASIL PERCOBAAN DAN HASIL
TEORITIS PADA UJI CARR'S INDEX TABLET KLORFENIRAMIN
MALEAT

Warnings

The Paired Samples Correlations table is not produced.

The Paired Samples Test table is not produced.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	carrsindpercobaan	18.9100 ^a	4	.95743	.47871
	Carrsindteoritis	18.9100 ^a	4	.95743	.47871

a. The correlation and t cannot be computed because the standard error of the difference is 0.

LAMPIRAN AA

HASIL UJI STATISTIK HASIL PERCOBAAN DAN HASIL TEORITIS PADA UJI KEKERASAN TABLET KLORFENIRAMIN MALEAT

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	kekerasanpercobaan	10.8325	4	4.76997	2.38499
	kekerasanteoritis	10.8300	4	4.77006	2.38503

Paired Samples Correlations

	N	Correlation	Sig.
Pair 1 kekerasanpercobaan & kekerasanteoritis	4	1.000	.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 kekerasan percobaan - kekerasan teoritis	.00250	.00500	.00250	-.00546	.01046	1.000	3	.391

Hipotesa Pengujian :

Ho diterima jika $T_{hitung}(1,000) < T_{0,025(3)}(3,182)$, berarti hasil percobaan dan hasil teoritis pada uji disolusi tidak berbeda bermakna antar formula.

LAMPIRAN AB

**HASIL UJI STATISTIK HASIL PERCOBAAN DAN HASIL
TEORITIS PADA UJI KERAPUHAN TABLET KLORFENIRAMIN
MALEAT**

Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Kerapuhanpercobaan	.1393	4	.03290	.01645
kerapuhanteoritis	.1218	4	.03275	.01637

Paired Samples Correlations

	N	Correlation	Sig.
Pair 1 Kerapuhanpercobaan & kerapuhanteoritis	4	.741	.259

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 Kerapuhanpercobaan - kerapuhanteoritis	.01750	.02363	.01181	-.02010	.05510	1.481	3	.235

Hipotesa Pengujian :

Ho diterima jika $T_{hitung} (1,481) < T_{0,025 (3)} (3,182)$, berarti hasil percobaan dan hasil teoritis pada uji disolusi tidak berbeda bermakna antar formula.

LAMPIRAN AC
HASIL UJI STATISTIK HASIL PERCOBAAN DAN HASIL
TEORITIS PADA UJI KONTANTA DISOLUSI TABLET
KLORFENIRAMIN MALEAT

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	kdisolusipercobaan	.011175	4	.0006652	.0003326
	kdisolusiteoritis	.011075	4	.0010275	.0005138

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	kdisolusipercobaan & kdisolusiteoritis	4	.896	.104

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 kdisolusipercobaan - kdisolusiteoritis	.0001000	.0005228	.0002614	-.0007319	.0009319	.383	3	.728

Hipotesa Pengujian :

Ho diterima jika $T_{hitung} (0,383) < T_{0,025 (3)} (3,182)$, berarti hasil percobaan dan hasil teoritis pada uji disolusi tidak berbeda bermakna antar formula.