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LAMPIRAN A

HASIL UJI MUTU FISIK GRANUL

Mutu fisik yang diuji	Batch	Di Uji	Formula Tablet Ibuprofen			Persyaratan
			FA	FB	FC	
Kadar air (persen)	I	1	3.17	3.26	3.21	3-5% (Voigt, 1995)
	II	2	3.18	3.22	3.27	
	III	3	3.29	3.24	3.23	
	Rata-rata		3.21	3.24	3.24	
	SD		0.07	0.02	0.03	
Waktu alir	I	1	9.22	9.21	9.31	Tidak lebih dari 10 detik (banker & Anderson, 1986)
		2	9.26	9.25	9.27	
		3	9.24	9.17	9.25	
	II	1	9.28	9.24	9.28	
		2	9.2	9.27	9.21	

(detik)	III	3	9.24	9.31	9.27	25-40° (Banker & Anderson, 1986)
		1	9.27	9.19	9.07	
		2	9.25	9.32	9.21	
		3	9.21	9.28	9.23	
	Rata-rata		9.24	9.25	9.23	
SD		0.03	0.05	0.07		
Sudut diam (derajat)	I	1	32.42	32.35	33.12	
		2	33.73	33.21	33.42	
		3	32.33	32.76	32.77	
	II	1	33.21	33.17	32.85	
		2	33.3	32.96	33.91	
		3	33.17	32.71	33.07	
	III	1	32.78	32.62	33.05	
		2	32.95	33.16	32.95	
		3	33.23	32.87	32.87	
	Rata-rata		33.01	32.83	33.11	
	SD		0.44	0.29	0.35	
	Index kompresi (persen)	I	1	11.22	10.97	11.17
			2	11.43	10.95	11.27
3			11.36	11	11.31	
II		1	10.75	10.67	10.98	
		2	10.93	10.72	11.07	
		3	10.87	10.87	10.97	
III		1	10.51	10.89	10.79	
		2	10.47	10.92	10.87	
		3	10.67	10.95	10.5	
Rata-rata		10.91	10.88	10.99		
SD		0.35	0.11	0.25		

LAMPIRAN B
HASIL UJI KEKERASAN TABLET LEPAS LAMBAT IBUPROFEN

Batch I

Kekerasan Tablet Ibuprofen (Kp)			
No.	FA	FB	FC
1	15.8	15.6	15.1
2	15.2	15.4	15.0
3	16.0	16.2	15.7
4	16.4	15.8	16.2
5	15.8	15.9	16.1
6	15.6	16.3	15.7
7	15.5	16.1	15.6
8	15.9	15.7	15.5
9	16.1	16.6	15.7
10	15.7	15.1	15.5
Rata2 ± SD	15.8 ± 0.33	15.87 ± 0.45	15.61 ± 0.38
SD rel (%)	2.11	2.82	2.41

Batch II

No.	Kekerasan Tablet Ibuprofen (Kp)		
	FA	FB	FC
1	16.0	15.6	15.1
2	15.9	15.4	15.0
3	15.7	16.2	15.7
4	16.3	15.8	16.2
5	15.4	15.9	16.1
6	15.8	16.3	15.7
7	16.4	16.1	15.6
8	15.5	15.7	15.5
9	15.3	16.6	15.7
10	16.4	15.1	15.5
Rata2 ± SD	15.87 ± 0.41	15.84 ± 0.41	15.55 ± 0.41
SD rel (%)	2.56	2.56	2.61

Batch III

No.	Kekerasan Tablet Ibuprofen (Kp)		
	FA	FB	FC
1	15.5	15.6	15.1
2	16.1	15.4	15.0
3	15.5	16.2	15.7
4	15.6	15.8	16.2
5	16.2	15.9	16.1
6	15.8	16.3	15.7
7	15.7	16.1	15.6
8	15.5	15.7	15.5
9	15.6	16.6	15.7
10	16.4	15.1	15.5
Rata2 ± SD	15.79 ± 0.33	15.76 ± 0.46	15.72 ± 0.36
SD rel (%)	2.08	2.95	2.32

LAMPIRAN C
HASIL UJI KERAPUHAN TABLET LEPAS LAMBAT IBUPROFEN

Batch 1

Formula	Replikasi	Berat awal (gram)	Berat akhir (gram)	Kerapuhan (%)	Rata-rata ± SD
A	1	16.056	16.026	0.19	0.18
	2	16.034	16.006	0.18	±
	3	16.048	16.019	0.18	0.0047
B	1	16.047	16.018	0.18	0.18
	2	16.068	16.040	0.18	±
	3	16.078	16.049	0.18	0.0015
C	1	16.039	16.010	0.18	0.18
	2	16.052	16.023	0.18	±
	3	16.063	16.034	0.18	0.0003

Batch 1

Formula	Replikasi	Berat awal (gram)	Berat akhir (gram)	Kerapuhan (%)	Rata-rata ± SD
A	1	16.056	16.026	0.19	0.18
	2	16.034	16.006	0.18	±
	3	16.048	16.019	0.18	0.0047
B	1	16.047	16.018	0.18	0.18
	2	16.068	16.040	0.18	±
	3	16.078	16.049	0.18	0.0015
C	1	16.039	16.010	0.18	0.18
	2	16.052	16.023	0.18	±
	3	16.063	16.034	0.18	0.0003

Batch 3

Formula	Replikasi	Berat awal (gram)	Berat akhir (gram)	Kerapuhan (%)	Rata-rata ± SD
A	1	16.038	16.009	0.18	0.18
	2	16.054	16.025	0.18	±
	3	16.048	16.019	0.18	0.0000
B	1	16.038	16.009	0.18	0.18
	2	16.047	16.018	0.18	±
	3	16.076	16.047	0.18	0.0002
C	1	16.063	16.034	0.18	0.18
	2	16.059	16.030	0.18	±
	3	16.044	16.015	0.18	0.0001

LAMPIRAN D
HASIL PENETAPAN KADAR TABLET LEPAS LAMBAT
IBUPROFEN

Batch I

Formul a	Replikasi	Absorbansi	Csampil (µg/ml)	Cteoritis (µg/ml)	Kadar (%)	Rata- rata ± SD	SD rel (%)
A	1					100.5	
	2	0.717	398.59	397.48	100.28	2	0.22
	3	0.721	401.24	398.97	100.57	±	
		0.721	400.77	397.98	100.70	0.22	
B	1					100.6	
	2	0.719	399.51	395.63	100.98	2	0.31
	3	0.720	400.52	398.45	100.52	±	
		0.721	401.21	399.73	100.37	0.32	
C	1					100.7	
	2	0.711	394.91	394.08	100.21	4	0.55
		0.719	399.73	397.07	100.67	±	

3	0.721	401.23	395.96	101.33	0.56
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Batch 2

Formula	Replikasi	Absorbansi	Csampil (µg/ml)	Cteoritis (µg/ml)	Kadar (%)	Rata- rata ± SD	SD rel (%)
A	1	0.723	402.17	400.13	100.51	100.83 ± 0.35	0.3 4
	2	0.720	400.35	395.56	101.21		
	3	0.722	401.37	398.30	100.77		
B	1	0.720	400.27	398.83	100.36	100.73 ± 0.41	0.4 1
	2	0.722	401.52	396.88	101.17		
	3	0.721	400.78	398.11	100.67		
C	1	0.720	400.31	398.60	100.43	100.54 ± 0.09	0.0 9
	2	0.721	400.92	398.65	100.57		
	3	0.721	400.87	398.44	100.61		

Batch 3

Formul a	Replikasi	Absorbansi	Csampil (µg/ml)	Cteoritis (µg/ml)	Kadar (%)	Rata- rata ± SD	SD rel (%)
A	1	0.723	402.32	402.76	99.89	100.36 ± 0.47	0.46
	2	0.722	401.77	400.29	100.37		
	3	0.720	400.55	397.25	100.83		
B	1	0.719	399.61	397.11	100.63	100.84 ± 0.43	0.42
	2	0.722	401.71	396.44	101.33		
	3	0.723	402.31	400.07	100.56		
C	1	0.720	400.57	396.96	100.91	100.72 ± 0.20	0.41
	2	0.722	401.33	398.42	100.73		
	3	0.721	400.77	398.70	100.52		

LAMPIRAN E
HASIL UJI DISOLUSI TABLET LEPAS LAMBAT IBUPROFEN

Formula A						
	t (menit)		C sampel (µg/ml)	Wt (mg)	% obat terlepas	AUC (mg menit)
Rep		Abs				
1				103,611		
	30	0,235	115,1235	2	25,76	1554,1676
				150,199		
	60	0,323	166,8882	4	37,34	3807,1588
				167,670		
	90	0,356	186,3000	0	41,68	4768,0412
				197,846		
	120	0,413	219,8294	5	49,18	5482,7471
			238,081			
	180	0,489	264,5353	8	59,18	13077,8471

			257,140		
240	0,525	285,7118	6	63,92	14856,6706
			325,964		
300	0,655	362,1824	1	81,03	17493,1412
			350,581		
360	0,702	389,5353	8	87,15	20296,3765
			81336,1500		
			105,728		
30	0,239	117,4765	8	26,28	1585,9324
			150,728		
60	0,324	167,4765	8	37,47	3846,8647
			168,728		
90	0,358	187,4765	8	41,94	4791,8647
			203,140		
120	0,423	225,7118	6	50,50	5578,0412
2			239,140		
180	0,491	265,7118	6	59,45	13268,4353
			256,611		
240	0,524	285,1235	2	63,79	14872,5529
			325,964		
300	0,655	362,1824	1	81,03	17477,2588
			351,111		
360	0,703	390,1235	2	87,28	20312,2588
			81733,2088		
			97,2582	24,18	1458,8735
30	0,223	108,0647	149,140		
			6	37,07	3695,9824
60	0,321	165,7118	171,375		
			9	42,60	4807,7471
90	0,363	190,4176	199,964		
			1	49,71	5570,1000
120	0,417	222,1824	234,375		
			9	58,26	13030,2000
180	0,482	260,4176	257,140		
			6	63,92	14745,4941
240	0,525	285,7118	329,140		
			6	81,82	17588,4353
300	0,661	365,7118	351,640		
			6	87,41	20423,4353
360	0,704	390,7118			
			81320,2676		

Keterangan : Abs = absorbansi sampel, Csampel = konsentrasi sampel, , Wt = jumlah ibuprofen yang terlarut.

Formula B						
Rep	t (menit)	Abs	C sampel (µg/ml)	Wt (mg)	% obat terlepas	AUC (mg menit)
1	30	0,153	66,8882	60,1994 106,787	14,94	902,9912
	60	0,241	118,6529	6 131,140	26,50	2504,8059
	90	0,287	145,7118	6 153,375	32,55	3568,9235
	120	0,329	170,4176	9 176,670	38,07	4267,7471
	180	0,373	196,3000	0 210,552	43,85	9901,3765
	240	0,437	233,9471	4 252,905	52,26	11616,6706
	300	0,517	281,0059	3 285,199	62,77	13903,7294
	360	0,578	316,8882	4	70,78	16143,1412
						62809,3853
2	30	0,157	69,2412	62,3171 109,434	15,47	934,7559
	60	0,246	121,5941	7 130,611	27,16	2576,2765
	90	0,286	145,1235	2 154,434	32,42	3600,6882
	120	0,331	171,5941	7 173,493	38,33	4275,6882
	180	0,367	192,7706	5 215,846	43,06	9837,8471
	240	0,447	239,8294	5 248,670	53,57	11680,2000
	300	0,509	276,3000	0 283,611	61,72	13935,4941
	360	0,575	315,1235	2	70,39	15968,4353
						62809,3853
3	30	0,151	65,7118	59,1406	14,68	887,1088

				106,258		
60	0,240	118,0647	2	26,37	2480,9824	
			131,140			
90	0,287	145,7118	6	32,55	3560,9824	
			156,552			
120	0,335	173,9471	4	38,85	4315,3941	
			174,552			
180	0,369	193,9471	4	43,32	9933,1412	
			207,375			
240	0,431	230,4176	9	51,47	11457,8471	
			247,611			
300	0,507	275,1235	2	61,45	13649,6118	
			284,140			
360	0,576	315,7118	6	70,52	15952,5529	
						62237,6206

Keterangan : Abs = absorbansi sampel, Csampel = konsentrasi sampel, Wt = jumlah ibuprofen yang terlarut.

Formula C						
Rep	t (menit)	Abs	C sampel (µg/ml)	Wt (mg)	% obat terlepas	AUC (mg menit)
1	30	0,132	54,5353	49,0818	12,19	736,2265
	60	0,207	98,6529	88,7876	22,05	2068,0412
	90	0,235	115,1235	103,6112	25,73	2885,9824
	120	0,261	130,4176	117,3759	29,15	3314,8059
	180	0,302	154,5353	139,0818	34,54	7693,7294
	240	0,371	195,1235	175,6112	43,61	9440,7882
						11457,847
	300	0,429	229,2412	206,3171	51,24	1
						13681,376
	360	0,511	277,4765	249,7288	62,02	5
						51278,797
						1
2	30	0,132	54,5353	49,0818	12,19	736,2265

	60	0,211	101,0059	90,9053	22,58	2099,8059
	90	0,242	119,2412	107,3171	26,65	2973,3353
	120	0,272	136,8882	123,1994	30,59	3457,7471
	180	0,322	166,3000	149,6700	37,17	8186,0824
	240	0,379	199,8294	179,8465	44,66	9885,4941
						11839,023
	300	0,445	238,6529	214,7876	53,34	5
						13951,376
	360	0,512	278,0647	250,2582	62,15	5
						53129,091
						2
	30	0,139	58,6529	52,7876	13,11	791,8147
	60	0,217	104,5353	94,0818	23,36	2203,0412
	90	0,231	112,7706	101,4935	25,20	2933,6294
3	120	0,274	138,0647	124,2582	30,86	3386,2765
	180	0,323	166,8882	150,1994	37,30	8233,7294
	240	0,381	201,0059	180,9053	44,93	9933,1412
						11807,258
	300	0,441	236,3000	212,6700	52,81	8
						13808,435
	360	0,507	275,1235	247,6112	61,49	3
						53097,326
						5

Keterangan : Abs = absorbansi sampel, Csampel = konsentrasi sampel, Wt = jumlah ibuprofen yang terlarut.

LAMPIRAN F

CONTOH PERHITUNGAN

Contoh perhitungan sudut diam:

Formula A:

W persegi panjang = 4,77 gram

W lingkaran = 1,37 gram

$$\begin{aligned}\text{Luas persegi panjang} &= 21,5 \times 27,9 \\ &= 599,85 \text{ cm}^2\end{aligned}$$

$$\text{Luas lingkaran} = \frac{1,37}{4,77} \times 599,85 = 172,03$$

$$A = \pi r^2$$

$$\begin{aligned}r^2 &= \frac{A}{\pi} \\ &= \frac{172,03}{3,14} = 54,76\end{aligned}$$

$$r = 7,40 \text{ cm}$$

$$\text{tg } \alpha = \frac{t}{r} = \frac{4,70}{7,40} = 0,6351$$

$$\alpha = 32,42^\circ$$

Contoh perhitungan indeks kompresibilitas:

Formula A:

Berat gelas = 121,19 g

Berat gelas + granul = 162,00 g

V1 = 100 ml

V2 = 89 ml

$$\text{Bj nyata} = \frac{(W_2 - W_1)}{V_1} = \frac{(162 - 121,19)}{100} = 0,4081$$

$$\text{Bj mampat} = \frac{(W_2 - W_1)_1}{V_1} = \frac{(162 - 121,19)}{89} = 0,4585$$

$$\text{Indeks kompresibilitas} = \left(1 - \frac{\text{Bj .nyata}}{\text{Bj .mampat}} \right) \times 100 \% = 11 \%$$

Contoh perhitungan akurasi & presisi:

Absorbansi = 0,722 $\rightarrow y = 3,929 \cdot 10^{-2} + 1,7 \cdot 10^{-3} x$.

Csampel = 401,47 ppm

Cteoritis = 400,8 ppm

$$\begin{aligned}\% \text{perolehan kembali} &= \frac{C_{\text{sampel}}}{C_{\text{teoritis}}} \times 100\% \\ &= \frac{401,47}{400,8} \times 100\% \\ &= 100,17\%\end{aligned}$$

$$\begin{aligned}\text{Untuk menghitung } \%KV &= \frac{SD}{X} \times 100\% \\ &= 0,391\%\end{aligned}$$

Contoh perhitungan AUC pada disolusi:

$$\text{Rumus} = \frac{(Wt_n + Wt_{n-1})}{2} \times (t_n - t_{n-1})$$

Formula A

$$Wt_n = 150,20$$

$$Wt_{n-1} = 103,61$$

$$t_n = 60 \text{ menit}$$

$$t_{n-1} = 30 \text{ menit}$$

$$\begin{aligned}AUC &= \frac{(150,20 + 103,61)}{2} \times (60 - 30) \\ &= 1554,1676\end{aligned}$$

Contoh perhitungan %DE₃₆₀:

$$\text{Luas} = 360 \times \text{rata-rata penetapan kadar} \times \text{dosis}$$

$$\begin{aligned}
 &= 360 \times 100,57\% \times 400 \\
 &= 14482,08 \\
 \%DE_{360} &= (\Sigma AUC / \text{luas}) \times 100\% \\
 &= (81336,15 / 14482,08) \times 100\% \\
 &= 56,16\%
 \end{aligned}$$

Contoh perhitungan % obat terlarut:

Formula A

$$\begin{aligned}
 PK &= 100,57\% \\
 \% \text{ obat terlarut} &= \frac{W_t}{\frac{PK}{100} \times \text{dosis}} \times 100\% \\
 &= \frac{103,6112}{\frac{100,57}{100} \times 400} \times 100\% \\
 &= 25,76\%
 \end{aligned}$$

LAMPIRAN G
UJI F KURVA BAKU

REPLIKASI 1

KONSENTRASI	ABSORBANSI	X ²	Y ²	XY
50.15	0.128	2515.0225	0.0164	6.4192

100.25	0.201	10050.0625	0.0404	20.1503
200.50	0.412	40200.2500	0.1697	82.6060
301.00	0.557	90601.0000	0.3102	167.6570
401.50	0.739	161202.2500	0.5461	296.7085

304568.5850	1.0829	573.5410
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REPLIKASI 2

KONSENTRASI	ABSORBANSI	X ²	Y ²	XY
50.25	0.118	2525.0625	0.0139	5.9295
100.70	0.192	10140.4900	0.0369	19.3344
201.50	0.401	40602.2500	0.1608	80.8015
301.50	0.546	90902.2500	0.2981	164.6190
400.50	0.734	160400.2500	0.5388	293.9670
		304570.3025	1.0485	564.6514

REPLIKASI 3

KONSENTRASI	ABSORBANSI	X ²	Y ²	XY		
50.35	0.134	2535.1225	0.0180	6.7469		
103.20	0.207	10650.2400	0.0428	21.3624		
201.00	0.407	40401.0000	0.1656	81.8070		
302.10	0.553	91264.4100	0.3058	167.0613		
401.00	0.742	160801.0000	0.5506	297.5420		
		305651.7725	1.0828	574.5196		
	ΣX^2	ΣXY	ΣY^2	N	SSi	RDF
Regresi I	304568.5850	573.5410	1.0829	5	1.0810	4
Regresi II	304570.3025	564.6514	1.0485	5	1.0466	4
Regresi III	305651.7725	574.5196	1.0828	5	1.0809	4
	914790.6600	1712.7120	3.2142		3.2086	

SSc= 3.212314755

F= 0.0070021 < F_{tabel}0,05(2;14) 3,74

Karena F hitung < F tabel maka tidak ada perbedaan bermakna antar persamaan regresi

LAMPIRAN H

HASIL UJI STATISTIK KEKERASAN ANTAR FORMULA TABLET LEPAS LAMBAT IBUPROFEN DALAM BATCH

Batch I

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	10	156.1	15.61	0.141
Column 2	10	155.5	15.55	0.165
Column 3	10	157.2	15.72	0.132889

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.148667	2	0.074333	0.508101	0.607275	3.354131
Within Groups	3.95	27	0.146296			
Total	4.098667	29				

Karena $F_{hitung} < F_{tabel_{0,05 (2,29)}}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

Batch II

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	10	158.7	15.87	0.164556
Column 2	10	158.4	15.84	0.164889
Column 3	10	155.5	15.55	0.165

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.624667	2	0.312333	1.895056	0.169769	3.354131
Within Groups	4.45	27	0.164815			
Total	5.074667	29				

Karena $F_{hitung} < F_{tabel_{0,05 (2,29)}}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

Batch III

Anova: Single Factor

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	10	157.9	15.79	0.107667
Column 2	10	157.6	15.76	0.216
Column 3	10	157.2	15.72	0.132889

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	0.024667	2	0.012333	0.081042	0.922379	3.354131
Within Groups	4.109	27	0.152185			
Total	4.133667	29				

Karena $F_{hitung} < F_{tabel\ 0,05\ (2,29)}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

LAMPIRAN I

HASIL UJI STATISTIK KEKERASAN FORMULA TABLET LEPAS LAMBAT IBUPROFEN ANTAR BATCH

FORMULA A

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	10	158	15.8	0.111111
Column 2	10	158.7	15.87	0.164556
Column 3	10	157.9	15.79	0.107667

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.038	2	0.019	0.148696	0.862532	3.354131
Within Groups	3.45	27	0.127778			
Total	3.488	29				

Karena $F_{hitung} < F_{tabel_{0,05 (2,29)}}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

FORMULA B

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	10	158.7	15.87	0.200111
Column 2	10	158.4	15.84	0.164889
Column 3	10	157.6	15.76	0.216

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.064667	2	0.032333	0.166954	0.847106	3.354131
Within Groups	5.229	27	0.193667			
Total	5.293667	29				

Karena $F_{hitung} < F_{tabel_{0,05 (2,29)}}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

FORMULA C

Anova: Single
Factor

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	10	156.1	15.61	0.141
Column 2	10	155.5	15.55	0.165
Column 3	10	157.2	15.72	0.132889

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	0.148667	2	0.074333	0.508101	0.607275	3.354131
Within Groups	3.95	27	0.146296			
Total	4.098667	29				

Karena $F_{hitung} < F_{tabel_{0,05(2,29)}}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

LAMPIRAN J

HASIL UJI STATISTIK KERAPUHAN ANTAR FORMULA TABLET LEPAS LAMBAT IBUPROFEN DALAM BATCH

Batch I

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	0.549042	0.183014	2.23E-05
Column 2	3	0.537206	0.179069	2.2E-06
Column 3	3	0.540769	0.180256	6.69E-08

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	2.46E-05	2	1.23E-05	1.503752	0.295556	5.143249
Within Groups	4.9E-05	6	8.17E-06			
Total	7.36E-05	8				

Karena $F_{hitung} < F_{tabel_{0,05(2,8)}}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

Batch II

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	0.541043	0.180348	2.92E-08
Column 2	3	0.539648	0.179883	1.82E-08
Column 3	3	0.546041	0.182014	1.17E-05

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	7.53E-06	2	3.77E-06	0.965091	0.433116	5.143249
Within Groups	2.34E-05	6	3.9E-06			
Total	3.1E-05	8				

Karena $F_{hitung} < F_{tabel_{0,05(2,8)}}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

Batch III

Anova: Single Factor

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	3	0.540112	0.180037	2.12E-09
Column 2	3	0.540694	0.180231	2.34E-08
Column 3	3	0.540015	0.180005	1.29E-08

ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	8.98E-08	2	4.49E-08	3.506984	0.098	5.143249
Within Groups	7.68E-08	6	1.28E-08			
Total	1.67E-07	8				

Karena F hitung < F tabel _{0,05 (2,8)} ; maka H₀ diterima dan tidak ada perbedaan bermakna antar formula

LAMPIRAN K
HASIL UJI STATISTIK KERAPUHAN FORMULA TABLET LEPAS
LAMBAT IBUPROFEN ANTAR BATCH

FORMULA A

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	0.549042	0.183014	2.23E-05
Column 2	3	0.541043	0.180348	2.92E-08
Column 3	3	0.540112	0.180037	2.12E-09

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1.61E-05	2	8.03E-06	1.081558	0.397087	5.143249
Within Groups	4.46E-05	6	7.43E-06			
Total	6.06E-05	8				

Karena $F_{hitung} < F_{tabel_{0,05(2,8)}}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

FORMULA B

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	0.537206	0.179069	2.2E-06
Column 2	3	0.539648	0.179883	1.82E-08
Column 3	3	0.540694	0.180231	2.34E-08

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	2.14E-06	2	1.07E-06	1.428071	0.310971	5.143249
Within Groups	4.49E-06	6	7.48E-07			
Total	6.62E-06	8				

Karena $F_{hitung} < F_{tabel_{0,05(2,8)}}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

FORMULA C

Anova: Single Factor

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	3	0.540769	0.180256	6.69E-08
Column 2	3	0.546041	0.182014	1.17E-05
Column 3	3	0.540015	0.180005	1.29E-08

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	7.19E-06	2	3.59E-06	0.917983	0.448927	5.143249
Within Groups	2.35E-05	6	3.91E-06			
Total	3.07E-05	8				

Karena $F_{hitung} < F_{tabel_{0,05(2,8)}}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

LAMPIRAN L

HASIL UJI STATISTIK PENETAPAN KADAR ANTAR FORMULA TABLET LEPAS LAMBAT IBUPROFEN DALAM BATCH

Batch I

Anova: Single Factor

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	3	301.55	100.5167	0.046233
Column 2	3	301.87	100.6233	0.101033
Column 3	3	302.21	100.7367	0.316933

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	0.07262222	2	0.036311	0.234669	0.797764	5.143249
Within Groups	0.9284	6	0.154733			
Total	1.00102222	8				

Karena $F_{hitung} < F_{tabel_{0,05(2,8)}}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

Batch II

Anova: Single Factor

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	3	302.49	100.83	0.1252
Column 2	3	302.2	100.7333	0.167033
Column 3	3	301.61	100.5367	0.008933

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	0.134067	2	0.067033	0.667737	0.547229	5.143249
Within Groups	0.602333	6	0.100389			
Total	0.7364	8				

Karena $F_{hitung} < F_{tabel_{0,05(2,8)}}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

Batch III

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	301.09	100.3633	0.220933
Column 2	3	302.52	100.84	0.1813
Column 3	3	302.16	100.72	0.0381

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.368822	2	0.184411	1.256397	0.350137	5.143249
Within Groups	0.880667	6	0.146778			
Total	1.249489	8				

Karena F hitung < F tabel _{0,05 (2,8)} ; maka H₀ diterima dan tidak ada perbedaan bermakna antar formula

LAMPIRAN M HASIL UJI STATISTIK PENETAPAN KADAR FORMULA TABLET LEPAS LAMBAT IBUPROFEN ANTAR BATCH

FORMULA A

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	301.55	100.5167	0.046233
Column 2	3	302.49	100.83	0.1252
Column 3	3	301.09	100.3633	0.220933

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.339467	2	0.169733	1.297766	0.340123	5.143249
Within Groups	0.784733	6	0.130789			
Total	1.1242	8				

Karena $F_{hitung} < F_{tabel_{0,05(2,8)}}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

FORMULA B

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	301.87	100.6233	0.101033
Column 2	3	302.2	100.7333	0.167033
Column 3	3	302.52	100.84	0.1813

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.070422	2	0.035211	0.235072	0.797466	5.143249
Within Groups	0.898733	6	0.149789			
Total	0.969156	8				

Karena $F_{hitung} < F_{tabel_{0,05(2,8)}}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

FORMULA C

Anova: Single Factor

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	3	302.21	100.7367	0.316933
Column 2	3	301.61	100.5367	0.008933
Column 3	3	302.16	100.72	0.0381

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	0.073889	2	0.036944	0.304515	0.748239	5.143249
Within Groups	0.727933	6	0.121322			
Total	0.801822	8				

Karena $F_{hitung} < F_{tabel_{0,05(2,8)}}$; maka H_0 diterima dan tidak ada perbedaan bermakna antar formula

LAMPIRAN N HASIL UJI STATISTIK %DE₃₆₀

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	168.753	56.25101	0.002801
Column 2	3	129.5109	43.17031	0.072528
Column 3	3	108.6553	36.21843	0.569241

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	620.737609	2	310.3688	1444.537	8.9E-09	5.143249
Within Groups	1.28914196	6	0.214857			
Total	622.026751	8				

Karena $F_{hitung} > F_{tabel_{0,05 (2,8)}}$; maka H_0 ditolak dan ada perbedaan bermakna antar formula Dilanjutkan uji HSD

	FA	FB	FC
	56,2		
Mean	5	43,35	36,22
FA	56,25	0	12,9 *
FB	43,35	0	10,13 *
FC	36,22		0

Keterangan:

Nilai HSD = 1.336436

* = Perbedaannya signifikan, karena selisihnya > nilai HSD

LAMPIRAN O

HASIL UJI STATISTIK % OBAT TERLEPAS (t=360)

Anova: Single
Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	261.84	87.28	0.0169
Column 2	3	211.69	70.56333	0.039433
Column 3	3	185.66	61.88667	0.122233

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	999.5529	2	499.7764	8396.468	4.56E-11	5.143249
Within Groups	0.357133	6	0.059522			
Total	999.91	8				

Karena F hitung > F tabel $_{0,05 (2,8)}$; maka H_0 ditolak dan ada perbedaan bermakna antar formula Dilanjutkan uji HSD

	FA	FB	FC
Mean	87,2	70,56	61,88
FA	87,28	0	16,72 *
FB	70,56	0	8,68 *
FC	61,88		0

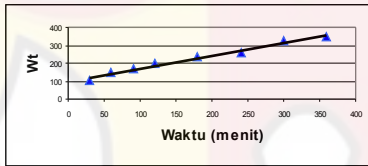
Keterangan:

Nilai HSD = 1.756443

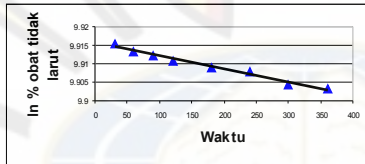
* = Perbedaannya signifikan, karena selisihnya > nilai HSD

LAMPIRAN P
PERSAMAAN FORMULA A

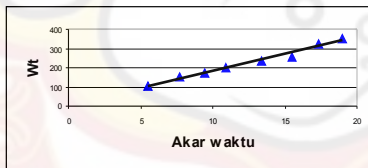
Persamaan Orde Nol



Persamaan Orde Satu



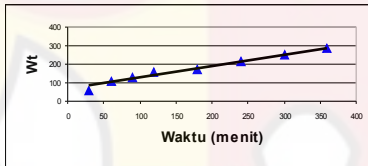
Persamaan Higuchi



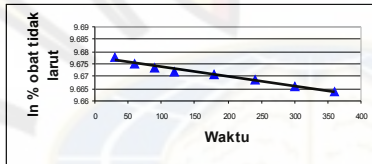
LAMPIRAN Q

PERSAMAAN FORMULA B

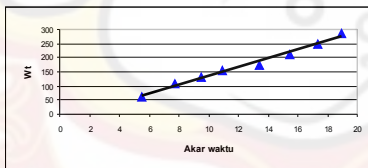
Persamaan Orde Nol



Persamaan Orde Satu



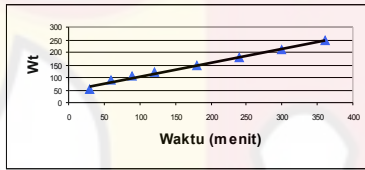
Persamaan Higuchi



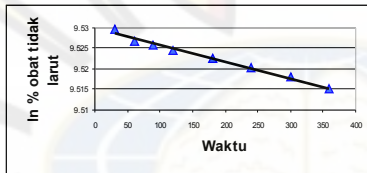
LAMPIRAN R

PERSAMAAN FORMULA C

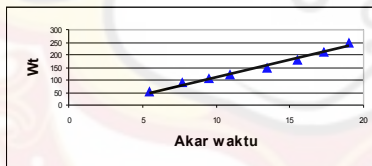
Persamaan Orde Nol



Persamaan Orde Satu



Persamaan Higuchi



LAMPIRAN S

SERTIFIKAT ANALISIS IBUPROFEN



Shasun Chemicals And Drugs Ltd.

IBUPROFEN BP/Ph.Eur. (SN Grade) CERTIFICATE OF ANALYSIS

Nature of Packing : Sea Worthy Fibre Drum		Analytical Report No. : FPIBU0607674	
Sample Taken By : S.Sivakumar		Batch Number : IBU0607674	
Date of Manufacture : July 2006		Date of Analysis : 25-07-2006	
Expiry Date : June 2011		Date of Report : 25-07-2006	
Batch Volume(Qty) : 3000 Kg.		Manufactured By : Shasun Chemicals And Drugs Limited, Pondicherry.	
S.No	TESTS	RESULTS	LIMITS
1.	Appearance	White crystalline powder	White, crystalline powder or colourless crystals
2.	Solubility	Complies	Freely soluble in acetone, in methanol and in methylene chloride. Dissolves in dilute solutions of alkali hydroxides and carbonates. Practically insoluble in water
3.	Clarity and colour of solution	Complies	10 % w/v solution (5g in 50 mL of the solution) in methanol should be clear and colourless
4.	Identification a) By IR	Conforms	The IR spectrum of sample should be concordant with the spectrum of Ibuprofen RS
	b) By UV	1.24	The ratio of absorbance at the max at 264 nm to that at 258 nm is 1.20 to 1.30
		1.03	The ratio of absorbance at the max at 272 nm to that at 258 nm is 1.00 to 1.10
	c) By TLC	Complies	Principal spot should be similar in position, colour and size compared to Ibuprofen RS
	d) Melting point	76.1 °C	75.0°C to 78.0 °C
5.	Optical rotation	0.30 °	- 0.05° to +0.05°
6.	Heavy metals	LT 10 PPM	NMT 10 PPM
7.	Related substances (by HPLC)		
	a) 2-(4-Isobutylphenyl) Phenyl Propanoic Acid (Impurity J)	0.06 % (Area %)	NMT 0.20 % (Area %)
	b) 2-(4-Butylphenyl)propanoic acid (Impurity B)	Not Detected	NMT 0.30 % (w/w)
	c) 4-Isobutylacetophenone (Impurity E)	Not Detected	NMT 0.30 % (Area %)
	d) Any unidentified impurity	0.04 % (Area %)	NMT 0.10 % (Area %)
	e) Total impurities (Apart from impurity B)	0.14 % (Area %)	NMT 0.50 % (Area %)
8.	Sulphated ash	0.04 % (w/w)	NMT 0.10 % (w/w)
9.	Loss on drying	0.10 % (w/w)	NMT 0.50 % (w/w)
10.	Assay (dry basis)	99.8 % (w/w)	98.5 % -101.0 % (w/w)

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Shasun Road, Periyakalpet, Pondicherry - 605 014, India
Ph : 91-413-2655202, 2655156, 2655157, 2655441, 2655442
2655827, 2655828, 2655829, 2655830
Fax : 091 - 413 - 2655154, e-mail : shapondy@md4.vsnl.net.in
shapdy@shasun.com



Shasun Chemicals And Drugs Ltd.

IBUPROFEN BP/Ph.Eur. (SN Grade)			
CERTIFICATE OF ANALYSIS			
Nature of Packing : Sea Worthy Fibre Drum		Analytical Report No. : FPBU0607674	
Sample Taken By : S.Sivakumar		Batch Number : IBU0607674	
Date of Manufacture : July 2006		Date of Analysis : 25-07-2006	
Expiry Date : June 2011		Date of Report : 25-07-2006	
Batch Volume(Qty) : 3000 Kg.		Manufactured By : Shasun Chemicals And Drugs Limited, Pondicherry.	
S.No	TESTS	RESULTS	LIMITS
ADDITIONAL TESTS			
a.	Bulk Density		
	Untapped	0.45 g/mL	0.35- 0.55 g/mL
	Tapped(1250 tappings)	0.64 g/mL	0.50- 0.75 g/mL
b.	Mean Particle Size	76.4 microns	60.0 - 130.0 microns
c.	Residual solvents		
	i) Acetone	17 PPM	NMT 100 PPM
	ii) Isopropyl alcohol	LT 0.89 PPM	NMT 250 PPM
	iii) Hexanes	29 PPM	NMT 290 PPM
	iv) Tri chloro ethylene	LT 0.19 PPM	NMT 80 PPM
	v) Methanol ϕ	Not Detected	NMT 500 PPM
OPINION: The Material Complies As Per BP/Ph.Eur. Standard.			
Note : NMT = Not more than NLT = Not less than LT = Less than			
ϕ NOT USED IN THE PROCESS, TEST INCLUDED FOR COMPLIANCE WITH CERTIFICATE OF SUITABILITY.			
Compiled by : <i>Ch</i> Date : 25/07/2006 (E.Senthilkumar) Senior Chemist		Reviewed by : <i>pr</i> Date : 25/07/2006 (S.Rajasudalaiimuthu) Senior Chemist	
		Approved by : <i>[Signature]</i> Date : 25/07/2006 (N.Vinayagaperumal) Dy.QC-Incharge	
SCQC/F-024/F/06			

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Shasun Road, Periyakalpet, Pondicherry - 605 014, India
Ph : 91-413-2655302, 2655156, 2655157, 2655441, 2655442
2655827, 2655828, 2655829, 2655830

Fax : 091 - 413 - 2655154, e-mail : shapondy@md4.vsnl.net.in
shapdy@shasun.com

LAMPIRAN T

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 U

TABEL UJI HSD

k											
d.k.	2	3	4	5	6	7	8	9	10	11	
5	3.64	4.60	5.22	5.67	6.03	6.33	6.58	6.80	6.99	7.17	
6	3.46	4.34	4.90	5.30	5.63	5.90	6.12	6.32	6.49	6.65	
7	3.34	4.16	4.68	5.06	5.36	5.61	5.82	6.00	6.16	6.30	
8	3.26	4.01	4.53	4.89	5.17	5.40	5.60	5.77	5.92	6.05	
9	3.20	3.95	4.41	4.76	5.02	5.24	5.43	5.59	5.74	5.87	
10	3.15	3.88	4.33	4.65	4.91	5.12	5.30	5.46	5.60	5.72	
11	3.11	3.82	4.26	4.57	4.82	5.03	5.20	5.35	5.49	5.61	
12	3.08	3.77	4.20	4.51	4.75	4.95	5.12	5.27	5.39	5.51	
13	3.06	3.73	4.15	4.45	4.69	4.88	5.05	5.19	5.32	5.43	
14	3.03	3.70	4.11	4.41	4.64	4.83	4.99	5.13	5.25	5.36	
15	3.01	3.67	4.08	4.37	4.59	4.78	4.94	5.08	5.20	5.31	
16	3.00	3.65	4.05	4.33	4.56	4.74	4.90	5.03	5.15	5.26	
17	2.98	3.63	4.02	4.30	4.52	4.71	4.86	4.99	5.11	5.21	
18	2.97	3.61	4.00	4.28	4.49	4.67	4.82	4.96	5.07	5.17	
19	2.96	3.59	3.98	4.25	4.47	4.65	4.79	4.92	5.04	5.14	
20	2.95	3.58	3.96	4.23	4.45	4.62	4.77	4.90	5.01	5.11	
24	2.92	3.53	3.90	4.17	4.37	4.54	4.68	4.81	4.92	5.01	
30	2.89	3.49	3.85	4.10	4.30	4.46	4.60	4.72	4.82	4.92	
40	2.86	3.44	3.79	4.04	4.23	4.39	4.52	4.63	4.73	4.82	
60	2.83	3.40	3.74	3.98	4.16	4.31	4.44	4.55	4.65	4.73	
120	2.80	3.36	3.68	3.92	4.10	4.24	4.36	4.47	4.56	4.64	
∞	2.77	3.31	3.63	3.86	4.03	4.17	4.29	4.39	4.47	4.55	

Catatan kaki: Dari *Annals of mathematical statistics*. Diulang cetak selzin penerbit, The Institute of Mathematical Statistics.

Sumber: Scheffler (1987).

LAMPIRAN V

TABEL UJI F

TABEL DISTRIBUSI F UNTUK 5% DAN 1%

Baris atas untuk taraf signifikansi 5%

Baris bawah untuk taraf signifikansi 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 4052	200 4999	216 5403	225 5625	230 5764	234 5859	237 5928	239 5961	241 6022	242 6056	243 6082	244 6106	245 6142	246 61,69	248 6208	249 6234	250 6258	251 6286	252 6302	253 6323	253 6334	254 6352	254 6361	254 6366						
2	18,51 98,49	19,00 99,01	19,16 99,17	19,25 99,25	19,30 99,30	19,33 99,33	19,36 99,34	19,37 99,36	19,38 97,38	19,39 99,40	19,40 99,41	19,41 99,42	19,42 99,43	19,43 99,44	19,44 99,45	19,45 99,46	19,46 99,47	19,47 99,48	19,47 99,48	19,48 99,49	19,49 99,49	19,49 99,49	19,50 99,50	19,50 99,50						
3	10,13 34,12	9,55 30,81	9,28 29,46	9,12 28,71	9,01 28,24	8,94 27,91	8,88 27,67	8,84 27,49	8,81 27,34	8,78 27,23	8,76 27,13	8,74 27,05	8,71 26,92	8,69 26,83	8,66 26,69	8,64 26,60	8,62 26,50	8,60 26,41	8,58 26,30	8,57 26,27	8,56 26,23	8,54 26,18	8,54 26,14	8,53 26,12						
4	7,71 21,20	6,94 18,00	6,59 16,69	6,39 15,98	6,26 15,52	6,16 15,21	6,09 14,98	6,04 14,80	5,96 14,66	5,93 14,54	5,91 14,45	5,87 14,37	5,84 14,24	5,80 14,15	5,77 14,02	5,74 13,93	5,71 13,83	5,70 13,74	5,68 13,69	5,66 13,61	5,65 13,57	5,64 13,52	5,64 13,48	5,53 13,46						
5	6,61 16,26	5,79 13,27	5,41 12,06	5,19 11,39	5,05 10,97	4,95 10,67	4,88 10,45	4,82 10,27	4,78 10,15	4,74 10,05	4,70 9,96	4,68 9,89	4,66 9,77	4,60 9,68	4,56 9,55	4,53 9,47	4,50 9,38	4,46 9,29	4,44 9,24	4,42 9,17	4,40 9,13	4,38 9,07	4,37 9,04	4,36 9,02						
6	5,99 13,74	5,14 10,92	4,76 9,78	4,53 9,15	4,39 8,75	4,28 8,47	4,21 8,26	4,15 8,10	4,10 7,98	4,06 7,87	4,03 7,79	4,00 7,72	3,96 7,60	3,92 7,52	3,87 7,39	3,84 7,31	3,81 7,23	3,77 7,14	3,75 7,09	3,72 7,02	3,71 6,99	3,69 6,94	3,68 6,90	3,67 6,88						
7	5,59 12,25	4,74 9,55	4,35 8,45	4,12 7,85	3,97 7,46	3,87 7,19	3,79 7,00	3,73 6,84	3,68 6,71	3,63 6,62	3,60 6,54	3,57 6,47	3,52 6,35	3,49 6,27	3,44 6,15	3,41 6,07	3,38 5,98	3,34 5,90	3,32 5,85	3,29 5,78	3,28 5,75	3,25 5,70	3,24 5,67	3,23 5,65						
8	5,32 11,26	4,46 8,65	4,07 7,59	3,84 7,01	3,69 6,63	3,58 6,37	3,50 6,19	3,44 6,03	3,39 5,91	3,34 5,82	3,31 5,74	3,28 5,67	3,23 5,56	3,20 5,48	3,15 5,36	3,12 5,28	3,08 5,20	3,05 5,11	3,03 5,06	3,00 5,00	2,98 4,96	2,96 4,91	2,94 4,88	2,93 4,86						
9	5,12 10,56	4,26 8,02	3,86 6,99	3,63 6,42	3,48 6,06	3,37 5,80	3,29 5,62	3,23 5,47	3,18 5,35	3,13 5,26	3,10 5,18	3,07 5,11	3,02 5,00	2,98 4,92	2,93 4,80	2,90 4,73	2,86 4,61	2,82 4,56	2,80 4,51	2,77 4,45	2,76 4,41	2,73 4,36	2,72 4,33	2,71 4,34						