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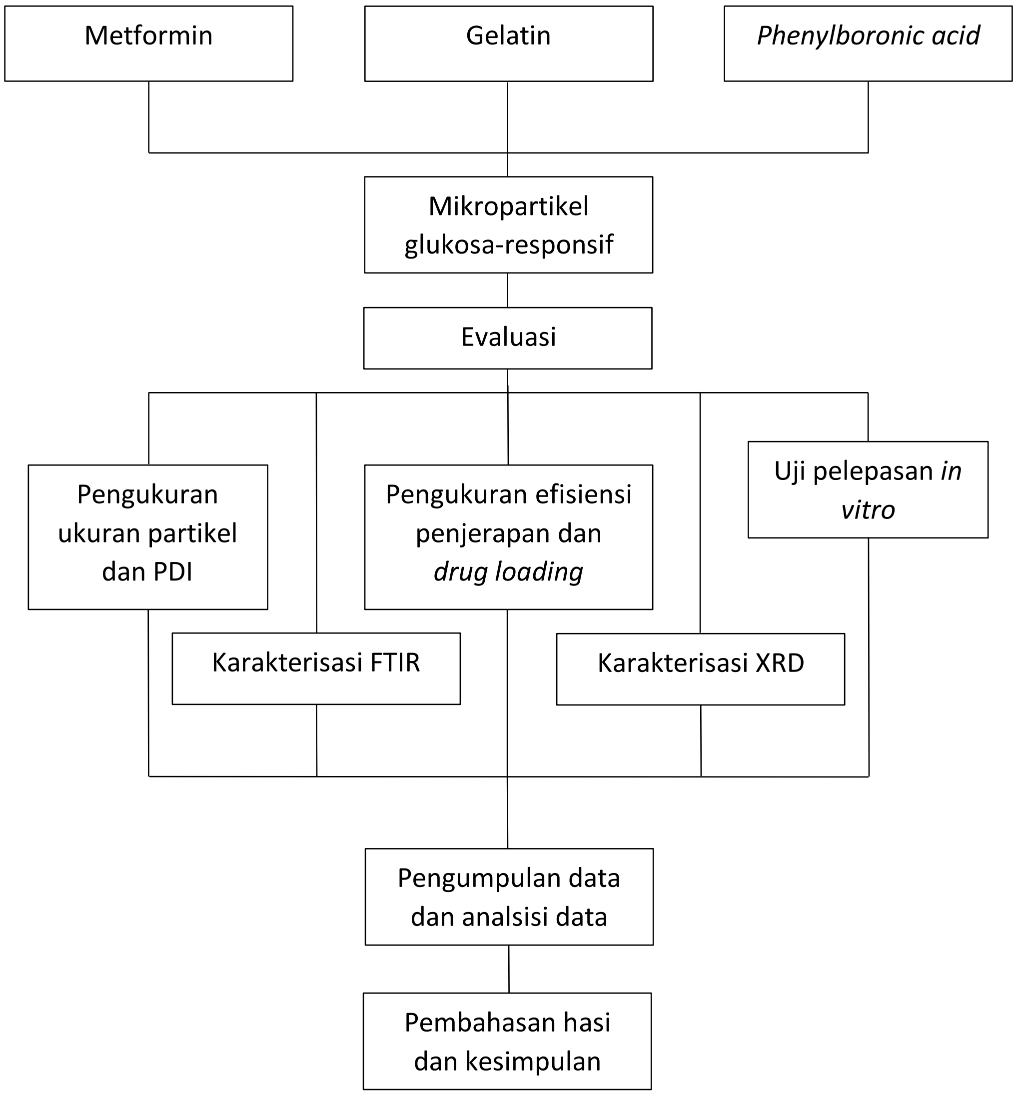
LAMPIRAN

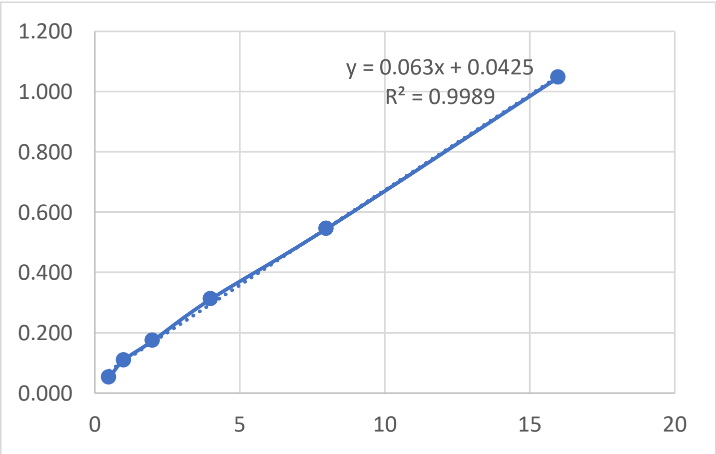
Lampiran 1. Skema Kerja



Lampiran 2. Absorbansi pembuatan kurva baku

Tabel 2. Hasil pengukuran absorbansi kurva baku metformin media PBS

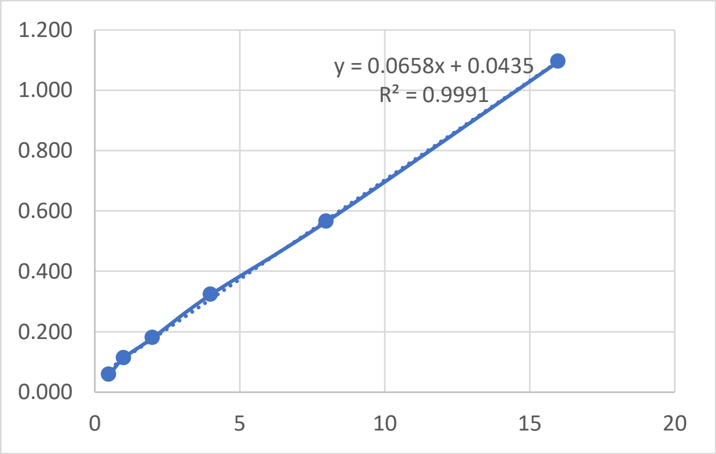
Konsentrasi	Absorbansi rep-1	Absorbansi rep-2	Absorbansi rep-3	Rata-rata
16	1,053	1,037	1,050	1,047
8	0,546	0,538	0,551	0,545
4	0,313	0,315	0,306	0,312
2	0,178	0,174	0,169	0,174
1	0,111	0,105	0,113	0,109
0,5	0,053	0,055	0,051	0,053



Gambar 15. Grafik kurva baku metformin dalam media PBS

Tabel 3. Hasil pengukuran absorbansi kurva baku metformin media PBS + glukosa 1%

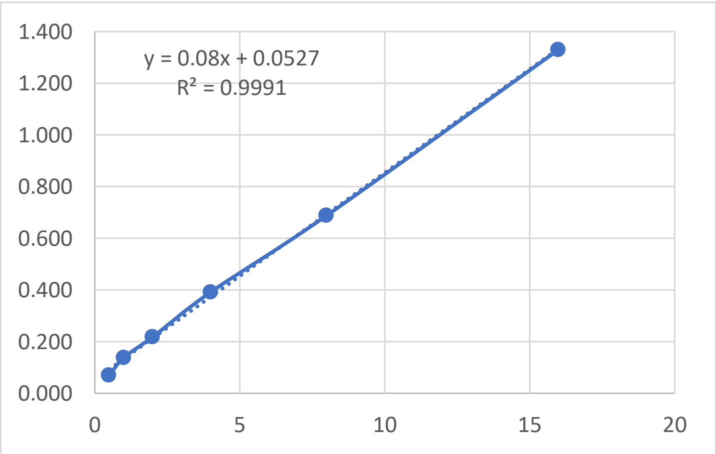
Konsentrasi	Absorbansi rep-1	Absorbansi rep-2	Absorbansi rep-3	Rata-rata
16	1,105	1,088	1,092	1,095
8	0,573	0,549	0,574	0,565
4	0,329	0,322	0,318	0,323
2	0,187	0,177	0,176	0,180
1	0,116	0,107	0,117	0,113
0,5	0,066	0,056	0,053	0,058



Gambar 16. Grafik kurva baku metformin dalam media PBS + glukosa 1%

Tabel 4. Hasil pengukuran absorbansi kurva baku metformin media PBS + glukosa 2%

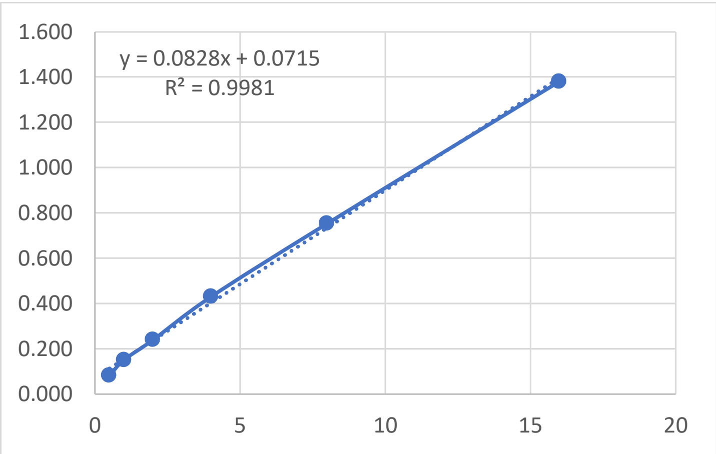
Konsentrasi	Absorbansi rep-1	Absorbansi rep-2	Absorbansi rep-3	Rata-rata
16	1,194	1,167	1,627	1,329
8	0,619	0,589	0,855	0,688
4	0,355	0,345	0,474	0,392
2	0,201	0,190	0,262	0,218
1	0,125	0,115	0,174	0,138
0,5	0,071	0,060	0,079	0,070



Gambar 17. Grafik kurva baku metformin dalam media PBS + glukosa 2%

Tabel 5. Hasil pengukuran absorbansi kurva baku metformin media PBS + glukosa 4%

Konsentrasi	Absorbansi rep-1	Absorbansi rep-2	Absorbansi rep-3	Rata-rata
16	1,331	1,398	1,412	1,380
8	0,638	0,784	0,837	0,753
4	0,366	0,459	0,465	0,430
2	0,207	0,253	0,257	0,239
1	0,129	0,153	0,171	0,151
0,5	0,091	0,080	0,078	0,083



Gambar 18. Grafik kurva baku metformin dalam media PBS + glukosa 4%

Lampiran 3. Hasil Pengukuran Efisiensi Penjerapan dan *Drug Loading*

Tabel 6. Persentase efisiensi penjerapan dan *drug loading*

Formula	Efisiensi penjerapan (%) (rata-rata ± SD)	*Drug loading* (%) (rata-rata ± SD)
F1	28,32 ± 2,13	12,09 ± 1,15
F2	32,12 ± 3,04	13,43 ± 1,24
F3	41,39 ± 4,31	18,21 ± 1,38
F4	69,53 ± 6,46	20,93 ± 1,63
F5	72,09 ± 6,98	18,02 ± 1,28

Contoh perhitungan persen efisiensi penjerapan

Diketahui berat metformin awal: 100 mg

Berat metformin bebas untuk F4: 30,47 mg

$$\% \text{ EP} = \frac{(100 \text{ mg} - 30{,}47 \text{ mg})}{100 \text{ mg}} \times 100$$

$$\% \text{ EP} = \frac{69{,}53 \text{ mg}}{100 \text{ mg}} \times 100$$

% EP = 69,53%

Contoh perhitungan persen *drug loading*

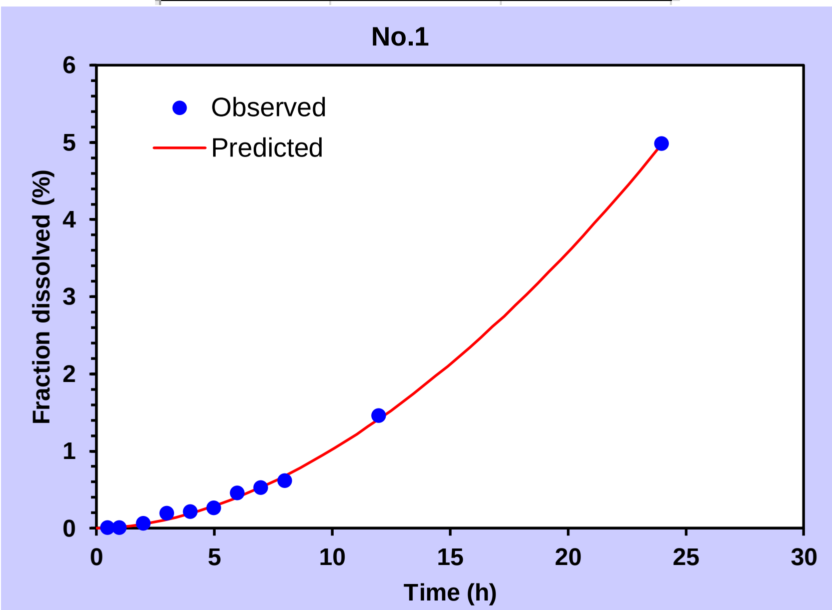
Diketahui berat total mikropartikel untuk F4: 332,02 mg

$$\% \text{ DL} = \frac{69{,}53}{332{,}02} \times 100$$

% DL = 20,93%

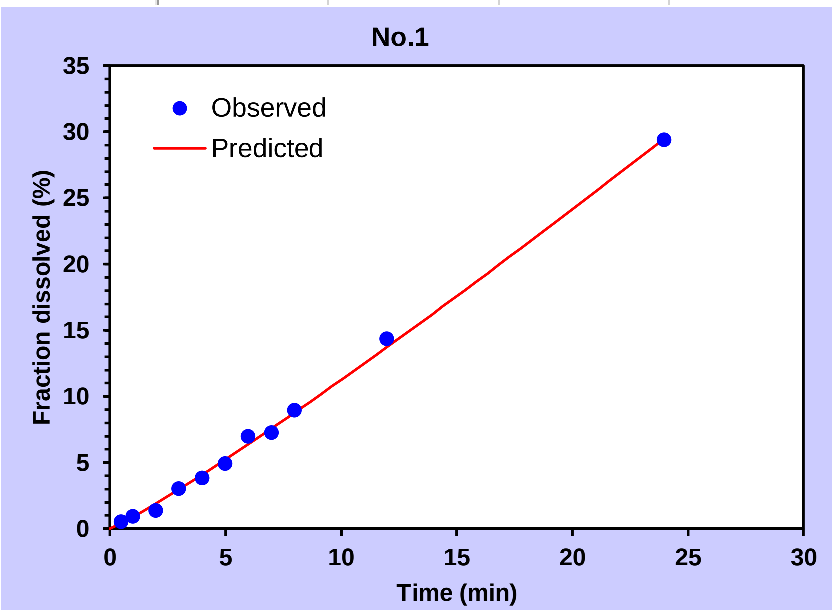
Lampiran 4. Analisis model kinetika pelepasan metformin dalam formula F4

Goodness of Fit		
Parameter	No.1	No.2
N_observed	11	11
DF	9	9
R_obs-pre	0.9996	0.9909
Rsqr	0.9993	0.9805
Rsqr_adj	0.9992	0.9783
MSE	0.0017	0.0317
MSE_root	0.0413	0.1781
Weighting	1	1
SS	0.0153	0.2856
WSS	0.0153	0.2856
AIC	-41.9449	-9.7857
MSC	6.7944	3.5407



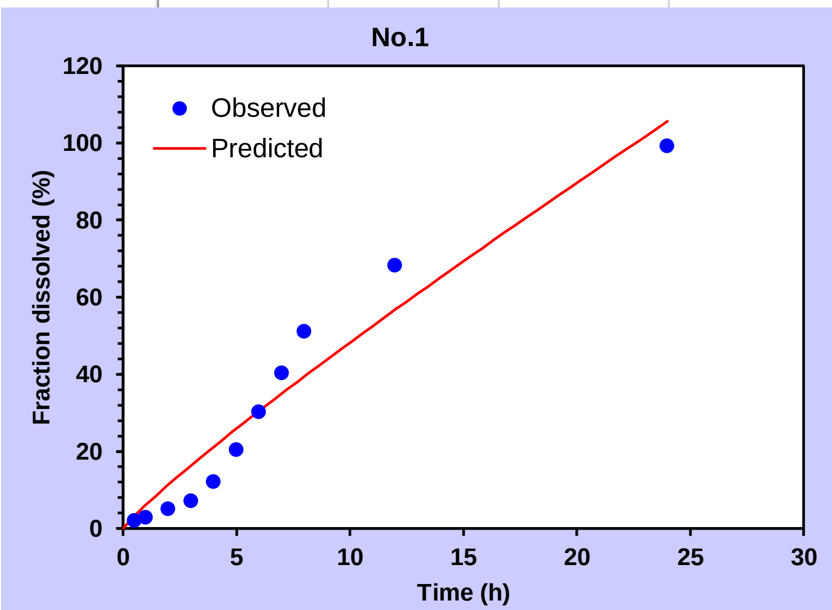
Gambar 19. Model kinetika pelepasan Korsmeyer-Peppas dalam media PBS

Goodness of Fit		
Parameter	**No.1**	**No.2**
N_observed	11	11
DF	9	9
R_obs-pre	0.9990	0.9865
Rsqr	0.9980	0.9719
Rsqr_adj	0.9978	0.9688
MSE	0.1527	0.0187
MSE_root	0.3908	0.1367
Weighting	1	1
SS	1.3745	0.1681
WSS	1.3745	0.1681
AIC	7.4987	-15.6143
MSC	5.8657	3.2083



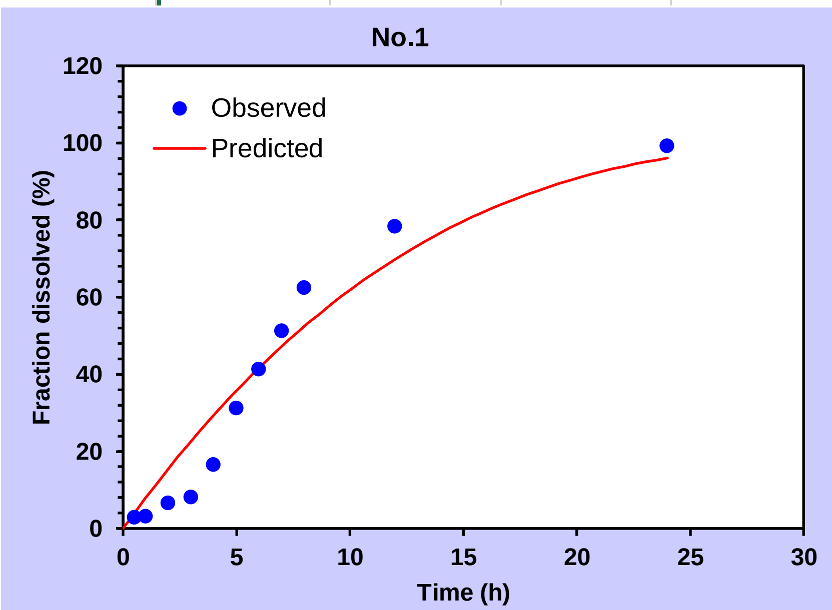
Gambar 20. Model kinetika pelepasan Korsmeyer-Peppas dalam media PBS+glukosa 1%

Goodness of Fit		
Parameter	No.1	No.2
N_observed	11	11
DF	9	9
R_obs-pre	0.9718	0.9110
Rsqr	0.9403	0.8217
Rsqr_adj	0.9337	0.8019
MSE	65.3433	2.0514
MSE_root	8.0835	1.4323
Weighting	1	1
SS	588.0899	18.4628
WSS	588.0899	18.4628
AIC	74.1457	36.0734
MSC	2.4554	1.3606



Gambar 21. Model kinetika pelepasan Korsmeyer-Peppas dalam media PBS+glukosa 2%

Goodness of Fit		
Parameter	**No.1**	**No.2**
N_observed	11	11
DF	10	10
R_obs-pre	0.9813	0.8114
Rsqr	0.9358	0.5886
Rsqr_adj	0.9358	0.5886
MSE	70.4102	5.1727
MSE_root	8.3911	2.2744
Weighting	1	1
SS	704.1019	51.7269
WSS	704.1019	51.7269
AIC	74.1262	45.4058
MSC	2.5635	0.7064



Gambar 22. Model kinetika pelepasan Hixson Crowell dalam media PBS+glukosa 4%

Lampiran 5. Data Analisis Statistika

Lampiran 5.1 Analisis statistika data ukuran partikel

One-way analysis of variance					
P value	< 0.0001				
P value summary	***				
Are means signif. different? (P < 0.05)	Yes				
Number of groups	5				
F	66.92				
R square	0.9640				
ANOVA Table	SS	df	MS		
Treatment (between columns)	128.0	4	32.00		
Residual (within columns)	4.782	10	0.4782		
Total	132.8	14			
Tukey's Multiple Comparison Test	Mean Diff.	q	Significant? P < 0.05?	Summary	95% CI of diff
F1 vs F2	-2.150	5.385	Yes	*	-4.008 to -0.2919
F1 vs F3	-2.990	7.489	Yes	**	-4.848 to -1.132
F1 vs F4	-4.150	10.39	Yes	***	-6.008 to -2.292
F1 vs F5	-8.790	22.02	Yes	***	-10.65 to -6.932
F2 vs F3	-0.8400	2.104	No	ns	-2.698 to 1.018
F2 vs F4	-2.000	5.009	Yes	*	-3.858 to -0.1419
F2 vs F5	-6.640	16.63	Yes	***	-8.498 to -4.782
F3 vs F4	-1.160	2.905	No	ns	-3.018 to 0.6981
F3 vs F5	-5.800	14.53	Yes	***	-7.658 to -3.942
F4 vs F5	-4.640	11.62	Yes	***	-6.498 to -2.782

Lampiran 5.2 Analisis statistika data efisiensi penjerapan

One-way analysis of variance					
P value	< 0.0001				
P value summary	***				
Are means signif. different? (P < 0.05)	Yes				
Number of groups	5				
F	52.66				
R square	0.9547				
ANOVA Table	SS	df	MS		
Treatment (between columns)	5174	4	1293		
Residual (within columns)	245.6	10	24.56		
Total	5420	14			
Tukey's Multiple Comparison Test	Mean Diff.	q	Significant? P < 0.05?	Summary	95% CI of diff
F1 vs F2	-3.800	1.328	No	ns	-17.12 to 9.517
F1 vs F3	-13.07	4.568	No	ns	-26.39 to 0.2465
F1 vs F4	-41.21	14.40	Yes	***	-54.53 to -27.89
F1 vs F5	-43.77	15.30	Yes	***	-57.09 to -30.45
F2 vs F3	-9.270	3.240	No	ns	-22.59 to 4.047
F2 vs F4	-37.41	13.07	Yes	***	-50.73 to -24.09
F2 vs F5	-39.97	13.97	Yes	***	-53.29 to -26.65
F3 vs F4	-28.14	9.835	Yes	***	-41.46 to -14.82
F3 vs F5	-30.70	10.73	Yes	***	-44.02 to -17.38
F4 vs F5	-2.560	0.8947	No	ns	-15.88 to 10.76

Lampiran 5.3 Analisis statistika data *drug loading*

One-way analysis of variance				
P value				
P value summary				
Are means signif. different? (P < 0.05)				
Number of groups				
F				
R square				
ANOVA Table	df	MS		
Treatment (between columns)	4	40.29		
Residual (within columns)	10	1.812		
Total	14			
Tukey's Multiple Comparison Test	q	Significant? P < 0.05?	Summary	95% CI of diff
F1 vs F2	1.724	No	ns	-4.957 to 2.277
F1 vs F3	7.875	Yes	**	-9.737 to -2.503
F1 vs F4	11.37	Yes	***	-12.46 to -5.223
F1 vs F5	7.630	Yes	**	-9.547 to -2.313
F2 vs F3	6.151	Yes	**	-8.397 to -1.163
F2 vs F4	9.650	Yes	***	-11.12 to -3.883
F2 vs F5	5.906	Yes	*	-8.207 to -0.9731
F3 vs F4	3.500	No	ns	-6.337 to 0.8969
F3 vs F5	0.2445	No	ns	-3.427 to 3.807
F4 vs F5	3.744	No	ns	-0.7069 to 6.527

Lampiran 5.4 Analisis statistik data pelepasan metformin dalam media PBS setelah 24 jam

One-way analysis of variance					
P value	< 0.0001				
P value summary	***				
Are means signif. different? (P < 0.05)	Yes				
Number of groups	3				
F	320.5				
R square	0.9907				
ANOVA Table	SS	df	MS		
Treatment (between columns)	17507	2	8754		
Residual (within columns)	163.9	6	27.31		
Total	17671	8			
Tukey's Multiple Comparison Test	Mean Diff.	q	Significant? P < 0.05?	Summary	95% CI of diff
F4 vs F4 without PBA	-92.03	30.50	Yes	***	-105.1 to -78.94
F4 vs Pure MTF	-95.02	31.49	Yes	***	-108.1 to -81.93
F4 without PBA vs Pure MTF	-2.990	0.9909	No	ns	-16.08 to 10.10

Lampiran 5.5 Analisis statistik data pelepasan metformin dalam media PBS+Glukosa 1% setelah 24 jam

One-way analysis of variance					
P value	< 0.0001				
P value summary	***				
Are means signif. different? (P < 0.05)	Yes				
Number of groups	3				
F	169.0				
R square	0.9826				
ANOVA Table	SS	df	MS		
Treatment (between columns)	9571	2	4785		
Residual (within columns)	169.9	6	28.31		
Total	9741	8			
Tukey's Multiple Comparison Test	Mean Diff.	q	Significant? P < 0.05?	Summary	95% CI of diff
F4 vs F4 without PBA	-67.59	22.00	Yes	***	-80.92 to -54.26
F4 vs Pure MTF	-70.66	23.00	Yes	***	-83.99 to -57.33
F4 without PBA vs Pure MTF	-3.070	0.9993	No	ns	-16.40 to 10.26

Lampiran 5.6 Analisis statistik data pelepasan metformin dalam media PBS+Glukosa 2% setelah 24 jam

One-way analysis of variance					
P value	0.9483				
P value summary	ns				
Are means signif. different? (P < 0.05)	No				
Number of groups	3				
F	0.05356				
R square	0.01754				
ANOVA Table	SS	df	MS		
Treatment (between columns)	6.016	2	3.008		
Residual (within columns)	337.0	6	56.16		
Total	343.0	8			
Tukey's Multiple Comparison Test	Mean Diff.	q	Significant? P < 0.05?	Summary	95% CI of diff
F4 vs F4 without PBA	1.090	0.2519	No	ns	-17.68 to 19.86
F4 vs Pure MTF	-0.9100	0.2103	No	ns	-19.68 to 17.86
F4 without PBA vs Pure MTF	-2.000	0.4622	No	ns	-20.77 to 16.77

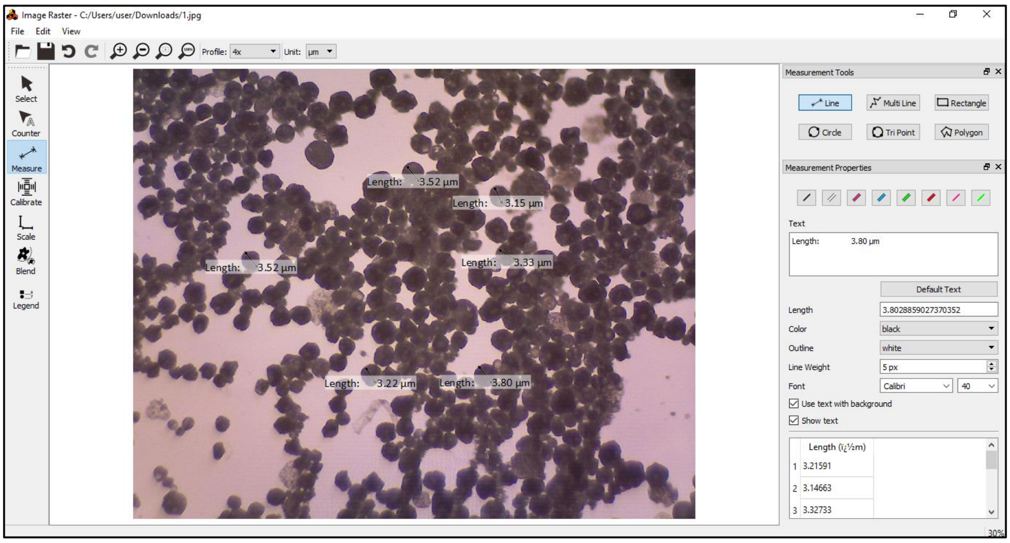
Lampiran 5.7 Analisis statistik data pelepasan metformin dalam media PBS+Glukosa 2% setelah 24 jam

One-way analysis of variance					
P value	0.9845				
P value summary	ns				
Are means signif. different? (P < 0.05)	No				
Number of groups	3				
F	0.01563				
R square	0.005182				
ANOVA Table	SS	df	MS		
Treatment (between columns)	1.705	2	0.8524		
Residual (within columns)	327.3	6	54.55		
Total	329.0	8			
Tukey's Multiple Comparison Test	Mean Diff.	q	Significant? P < 0.05?	Summary	95% CI of diff
F4 vs F4 without PBA	0.1800	0.04221	No	ns	-18.32 to 18.68
F4 vs Pure MTF	-0.8200	0.1923	No	ns	-19.32 to 17.68
F4 without PBA vs Pure MTF	-1.000	0.2345	No	ns	-19.50 to 17.50

Lampiran 7. Gambar Penelitian

Gambar 23. Pengukuran panjang gelombang maksimum dan pembuatan kurva baku

Gambar 24. Proses formulasi mikropartikel metformin glukosa-responsif



Gambar 25. Pengamatan dan pengukuran ukuran partikel

Gambar 26. Pengukuran efisensi penjerapan dan drug loading

Gambar 27. Uji pelepasan in vitro