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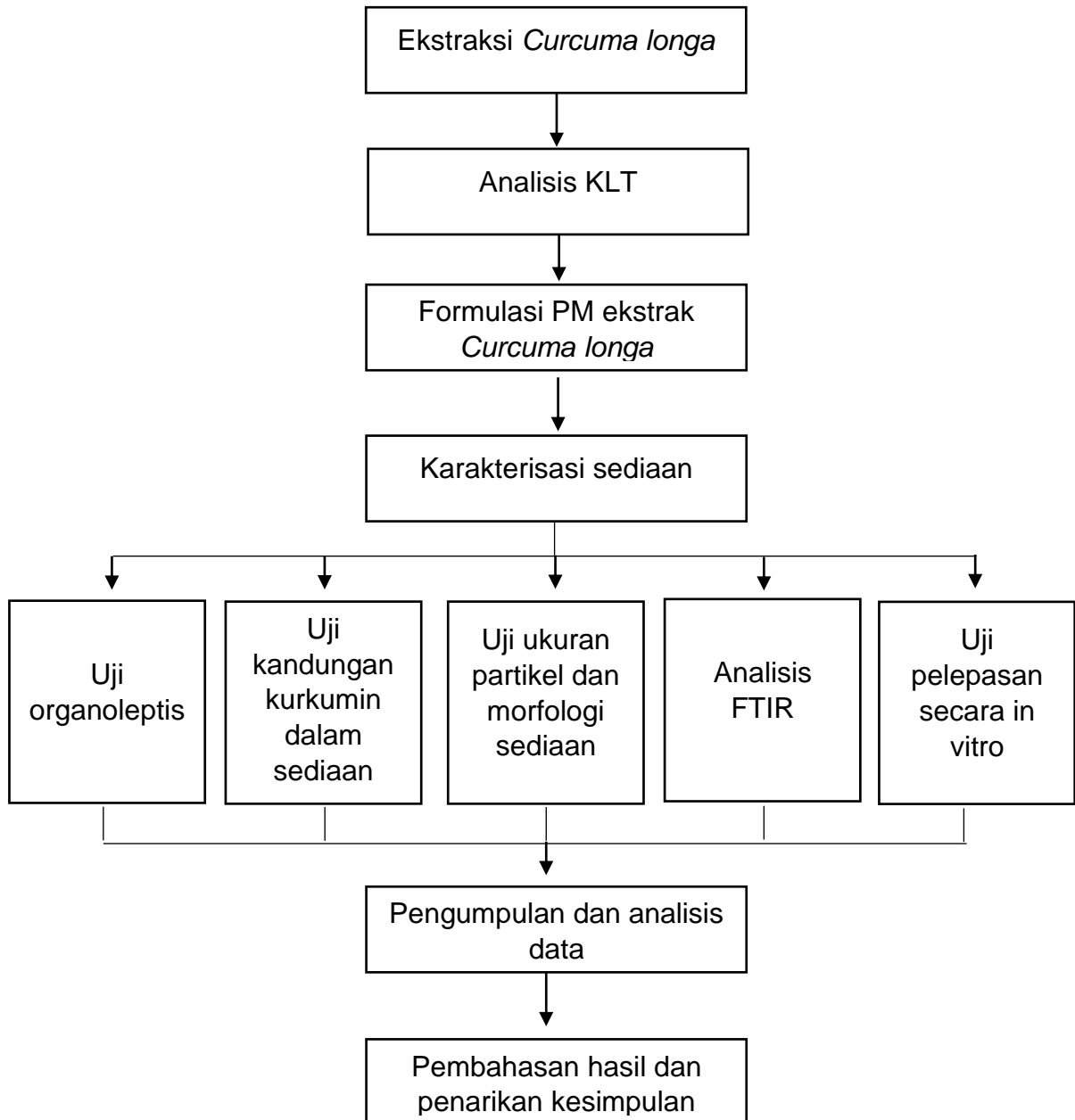
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LAMPIRAN

Lampiran 1. Skema kerja

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              ┌─────────────────────────────┐
              │  Ekstraksi Curcuma longa    │
              └─────────────────────────────┘
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                            ▼
              ┌─────────────────────────────┐
              │        Analisis KLT         │
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              ┌─────────────────────────────┐
              │    Formulasi PM ekstrak     │
              │       Curcuma longa         │
              └─────────────────────────────┘
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                            ▼
              ┌─────────────────────────────┐
              │    Karakterisasi sediaan    │
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| Uji organoleptis | Uji kandungan kurkumin dalam sediaan | Uji ukuran partikel dan morfologi sediaan | Analisis FTIR | Uji pelepasan secara in vitro |

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              ┌─────────────────────────────┐
              │  Pengumpulan dan analisis   │
              │            data             │
              └─────────────────────────────┘
                            │
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              │   Pembahasan hasil dan      │
              │   penarikan kesimpulan      │
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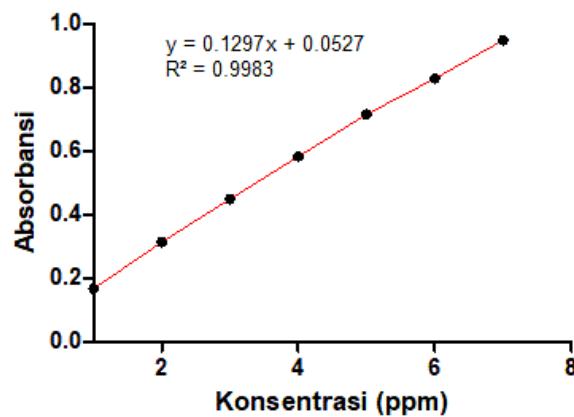
Lampiran 2.   Grafik dan tabel data hasil pengujian

Lampiran 2.1 Hasil panjang gelombang maksimum dan kurva baku
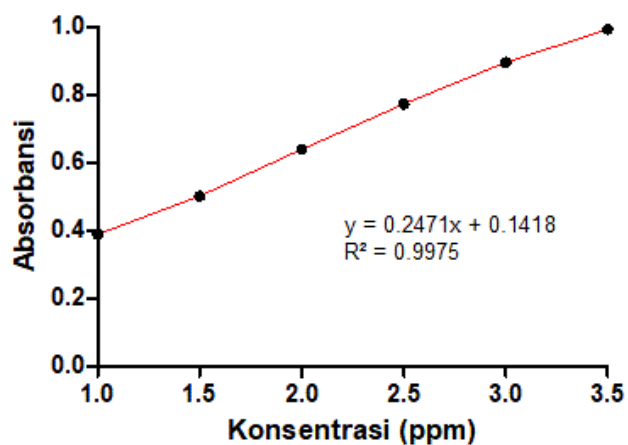
kurkumin

Gambar 17. Panjang gelombang maksimum kurkumin dalam metanol

Gambar 18. Kurva baku kurkumin dalam metanol

Gambar 19. Panjang gelombang maksimum kurkumin dalam PVA 1%

Gambar 20. Kurva baku kurkumin dalam PVA 1%

Lampiran 2. 2 Ukuran partikel

Tabel 5. Hasil rata-rata ukuran partikel

Formula	Rata-rata ukuran partikel (µm)	SD
F1	11.667	3.56
F2	5.669	1.13
F3	3.977	1.02

Lampiran 2.3 Efisiensi penjerapan

Tabel 6. Hasil efisiensi penjerapan kurkumin

Formula	ABS	Conc	Conc x fp	Conc kurkumin (ekstrak)	%EE	Rata-rata	SD
F1	0.455	1.2675	5.0700	457	98.89	98.8835	0.007651991
	0.456	1.2715	5.0861		98.88		
	0.460	1.2877	5.1509		98.87		
F2	0.644	2.0323	8.1295	457	98.22	98.2187	0.003339603
	0.644	2.0323	8.1295		98.22		
	0.646	2.0404	8.1618		98.21		
F3	0.658	2.0890	16.7122	457	96.34	96.3430	1.42109E-14
	0.658	2.0890	16.7122		96.34		
	0.658	2.0890	16.7122		96.34		

Lampiran 2.4 Hasil uji FTIR
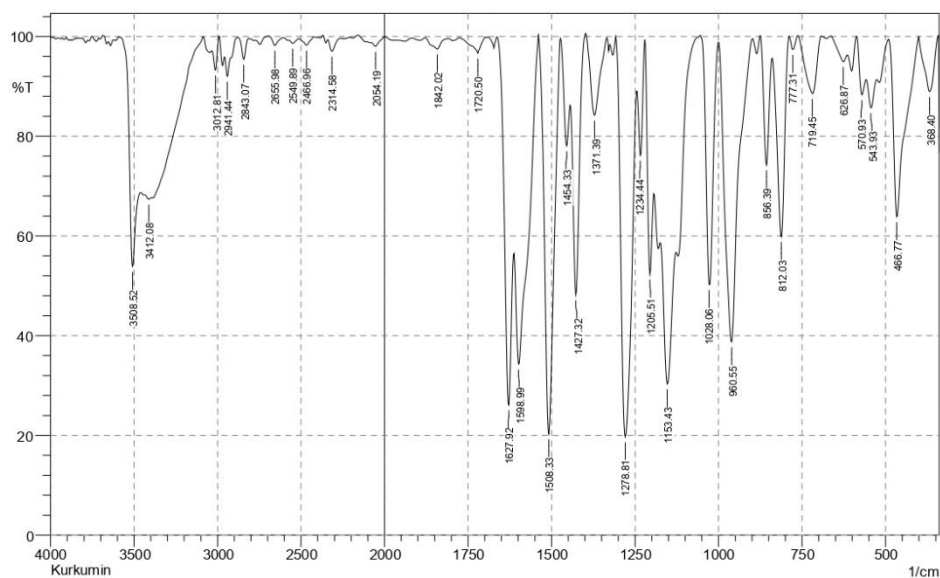
No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	368.4	88.94	11.044	401.19	343.33	1.612	1.606
2	466.77	63.842	35.478	489.92	403.12	7.083	6.807
3	543.93	85.677	5.661	557.43	526.57	1.64	0.426
4	570.93	88.309	6.715	586.36	559.36	1.018	0.446
5	626.87	94.931	2.249	663.51	615.29	0.627	0.236
6	719.45	88.567	11.459	761.88	694.37	1.918	1.932
7	777.31	97.365	2.708	788.89	763.81	0.143	0.151
8	812.03	59.869	38.117	839.03	788.89	5.23	4.763
9	856.39	74.247	23.217	873.75	840.96	2.269	1.899
10	960.55	38.744	60.307	999.13	898.83	15.77	15.4
11	1028.06	50.255	49.249	1053.13	1001.06	6.226	6.102
12	1153.43	30.304	27.37	1172.72	1128.36	16.546	5.889
13	1205.51	52.34	29.903	1219.01	1193.94	4.791	2.483
14	1234.44	76.185	17.162	1244.09	1220.94	1.637	1.068
15	1278.81	19.707	74.84	1305.81	1246.02	20.166	18.493
16	1371.39	84.199	15.905	1396.46	1334.74	2.245	2.255
17	1427.32	48.194	42.737	1442.75	1398.39	6.102	4.752
18	1454.33	78.064	12.569	1473.62	1444.68	1.89	0.874
19	1508.33	20.322	78.775	1537.27	1475.54	17.005	16.76
20	1598.99	34.313	30.252	1612.49	1539.2	17.763	8.979
21	1627.92	26.137	42.231	1662.64	1614.42	12.606	6.545
22	1720.5	96.665	3.172	1774.51	1697.36	0.512	0.447
23	1842.02	97.48	2.17	1878.67	1811.16	0.406	0.305
24	2054.19	98.016	1.164	2083.12	2000.18	0.422	0.19
25	2314.58	97.037	2.396	2339.65	2260.57	0.528	0.351
26	2466.96	98.244	1.492	2513.25	2422.59	0.382	0.276
27	2549.89	98.61	0.744	2573.04	2513.25	0.251	0.093
28	2655.98	98.2	1.741	2698.41	2605.83	0.304	0.275
29	2843.07	95.405	4.269	2877.79	2814.14	0.565	0.477
30	2941.44	92	4.618	2956.87	2877.79	1.319	0.598
31	3012.81	93.252	5.337	3034.03	2991.59	0.758	0.494
32	3412.08	67.359	0.543	3435.22	3394.72	6.874	0.072
33	3508.52	53.86	26.001	3591.46	3462.22	14.795	5.437

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Gambar 21. Hasil FTIR kurkumin

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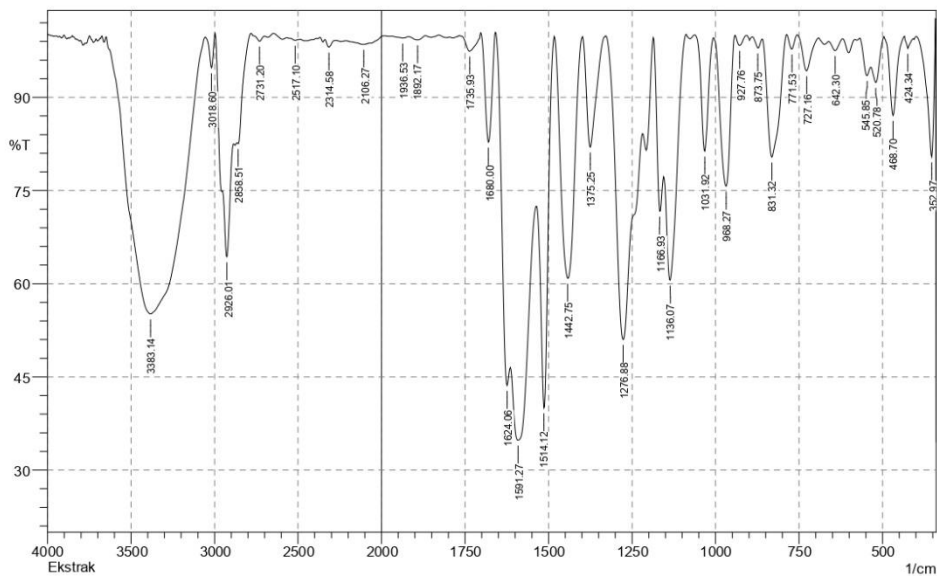
No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	352.97	80.425	17.181	397.34	343.33	2.109	1.73
2	424.34	97.894	1.799	433.98	406.98	0.14	0.097
3	468.7	87.094	12.669	495.71	435.91	1.42	1.358
4	520.78	92.391	4.175	534.28	495.71	0.819	0.355
5	545.85	93.502	2.993	567.07	534.28	0.651	0.239
6	642.3	97.519	1.678	661.58	619.15	0.297	0.152
7	727.16	94.283	5.577	756.1	690.52	0.747	0.699
8	771.53	97.76	2.343	786.96	756.1	0.145	0.158
9	831.32	80.394	19.193	858.32	786.96	3.682	3.59
10	873.75	97.961	1.582	891.11	860.25	0.158	0.099
11	927.76	98.349	1.621	941.26	906.54	0.13	0.126
12	968.27	75.698	24.024	1004.91	943.19	3.82	3.74
13	1031.92	81.347	18.456	1060.85	1006.84	1.97	1.925
14	1136.07	60.577	22.633	1153.43	1089.78	7.4	3.905
15	1166.93	71.679	14.335	1184.29	1155.36	2.879	1.1
16	1276.88	51.002	41.567	1327.03	1219.01	15.995	11.846
17	1375.25	81.995	17.823	1398.39	1328.95	2.654	2.606
18	1442.75	60.869	38.739	1481.33	1400.32	9.172	9.035
19	1514.12	40.028	43.587	1535.34	1483.26	9.845	6.326
20	1591.27	34.809	19.494	1614.42	1537.27	25.981	7.97
21	1624.06	43.623	12.97	1656.85	1616.35	8.384	1.597
22	1680	82.799	17.539	1701.22	1658.78	1.752	1.815
23	1735.93	97.428	2.635	1759.08	1703.14	0.358	0.385
24	1892.17	99.263	0.604	1917.24	1869.02	0.102	0.073
25	1936.53	99.546	0.26	1969.32	1917.24	0.072	0.031
26	2106.27	98.522	0.318	2212.35	2067.69	0.78	0.101
27	2314.58	98.101	1.138	2339.65	2276	0.362	0.147
28	2517.1	99.169	0.263	2567.25	2488.17	0.218	0.034
29	2731.2	99.035	0.978	2781.35	2700.34	0.136	0.16
30	2858.51	82.558	1.392	2864.29	2783.28	2.753	0.134
31	2926.01	64.305	13.723	2953.02	2887.44	9.322	2.509
32	3018.6	94.767	5.321	3055.24	2997.38	0.596	0.597
33	3383.14	55.132	44.574	3649.32	3057.17	84.844	84.079

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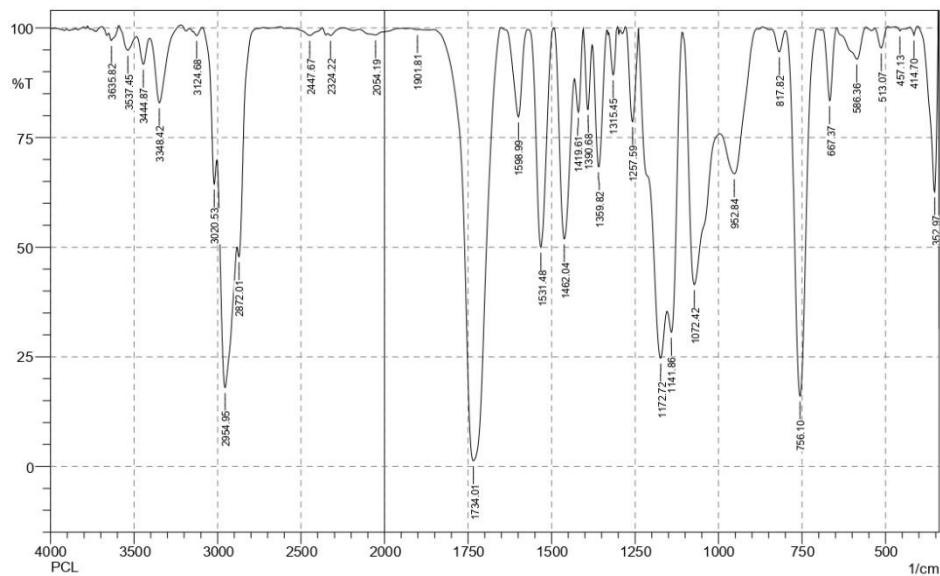**Gambar 22. Hasil FTIR ekstrak kunyit**

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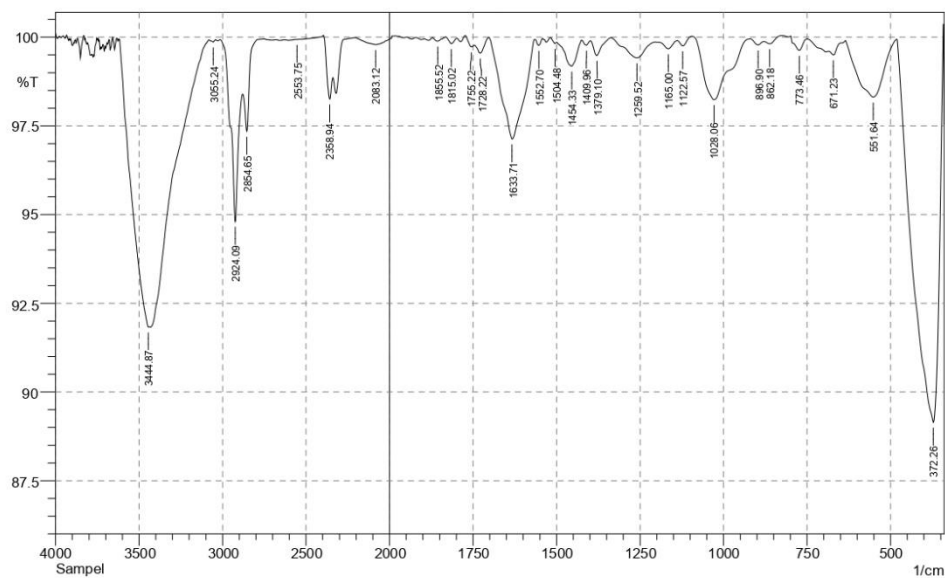
No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	372.26	89.146	10.525	480.28	343.33	4.176	4.036
2	551.64	98.313	1.61	634.58	482.2	0.66	0.609
3	671.23	99.5	0.189	684.73	648.08	0.057	0.013
4	773.46	99.626	0.363	798.53	750.31	0.044	0.042
5	862.18	99.813	0.119	879.54	825.53	0.021	0.012
6	896.9	99.781	0.129	920.05	879.54	0.026	0.011
7	1028.06	98.242	1.757	1095.57	920.05	0.641	0.634
8	1122.57	99.755	0.196	1139.93	1095.57	0.024	0.017
9	1165	99.673	0.21	1197.79	1139.93	0.054	0.023
10	1259.52	99.419	0.496	1336.67	1203.58	0.185	0.142
11	1379.1	99.486	0.44	1398.39	1336.67	0.065	0.05
12	1409.96	99.775	0.132	1425.4	1398.39	0.019	0.008
13	1454.33	99.182	0.713	1500.62	1425.4	0.153	0.116
14	1504.48	99.822	0.06	1517.98	1500.62	0.009	0.002
15	1552.7	99.766	0.186	1566.2	1541.12	0.015	0.01
16	1633.71	97.13	2.835	1703.14	1566.2	0.93	0.91
17	1728.22	99.553	0.31	1745.58	1703.14	0.05	0.028
18	1755.22	99.723	0.139	1774.51	1745.58	0.02	0.008
19	1815.02	99.818	0.167	1832.38	1799.59	0.014	0.012
20	1855.52	99.886	0.11	1870.95	1832.38	0.01	0.01
21	2083.12	99.792	0.221	2208.49	1992.47	0.121	0.129
22	2358.94	98.256	1.013	2395.59	2339.65	0.255	0.121
23	2553.75	99.934	0.005	2561.47	2542.18	0.005	0
24	2854.65	97.348	1.458	2879.72	2785.21	0.429	0.084
25	2924.09	94.81	4.07	3014.74	2881.65	1.266	0.778
26	3055.24	99.865	0.061	3082.25	3041.74	0.018	0.005
27	3444.87	91.828	0.273	3616.53	3439.08	3.975	0.632

Comment;

Sampel

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No. of Scans;

Resolution;

Apodization;

**Gambar 23. Hasil FTIR *Porous microsphere* (PM) ekstrak kunyit**

No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	352.97	62.605	34.211	403.12	343.33	4.438	3.958
2	414.7	98.347	1.941	426.27	403.12	0.041	0.07
3	457.13	99.32	0.663	472.56	447.49	0.016	0.02
4	513.07	95.407	4.705	532.35	493.78	0.36	0.379
5	586.36	92.875	7.251	646.15	559.36	1.398	1.437
6	667.37	83.38	16.379	686.66	648.08	1.418	1.379
7	756.1	16.084	83.413	798.53	707.88	23.672	23.48
8	817.82	94.535	4.967	840.96	800.46	0.502	0.418
9	952.84	66.725	17.38	995.27	869.9	11.602	4.63
10	1072.42	41.452	50.191	1107.14	997.2	23.224	16.26
11	1141.86	30.587	21.379	1153.43	1109.07	12.946	3.532
12	1172.72	24.676	23.799	1240.23	1155.36	27.082	7.411
13	1257.59	78.642	19.777	1276.88	1242.16	2.06	1.831
14	1315.45	89.306	10.272	1328.95	1301.95	0.677	0.627
15	1359.82	68.354	28.945	1377.17	1334.74	3.747	3.318
16	1390.68	81.384	16.435	1404.18	1379.1	1.311	1.069
17	1419.61	80.747	12.648	1431.18	1406.11	1.511	0.846
18	1462.04	51.884	41.937	1490.97	1433.11	9.145	7.438
19	1531.48	49.998	49.854	1570.06	1492.9	8.872	8.824
20	1598.99	79.717	19.898	1635.64	1571.99	2.71	2.602
21	1734.01	1.267	98.63	1851.66	1651.07	76.858	76.734
22	1901.81	99.619	0.097	1923.03	1896.03	0.03	0.006
23	2054.19	98.415	0.824	2154.49	2015.61	0.687	0.309
24	2324.22	98.287	0.634	2339.65	2245.14	0.312	0.052
25	2447.67	98.29	1.681	2555.68	2372.44	0.618	0.591
26	2872.01	47.859	5.952	2881.65	2760.14	11.289	0.668
27	2954.95	17.971	43.782	3003.17	2883.58	57.702	30.181
28	3020.53	64.419	11.091	3088.03	3005.1	6.591	1.181
29	3124.68	98.24	1.327	3147.83	3089.96	0.241	0.157
30	3348.42	82.917	15.66	3406.29	3221.12	5.618	4.927
31	3444.87	91.712	6.104	3485.37	3408.22	1.726	0.988
32	3537.45	94.893	4.326	3591.46	3487.3	1.356	1.008
33	3635.82	97.148	2.154	3653.18	3593.38	0.459	0.372

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No. of Scans;

Gambar 24. Hasil FTIR polikaprolakton (PCL)
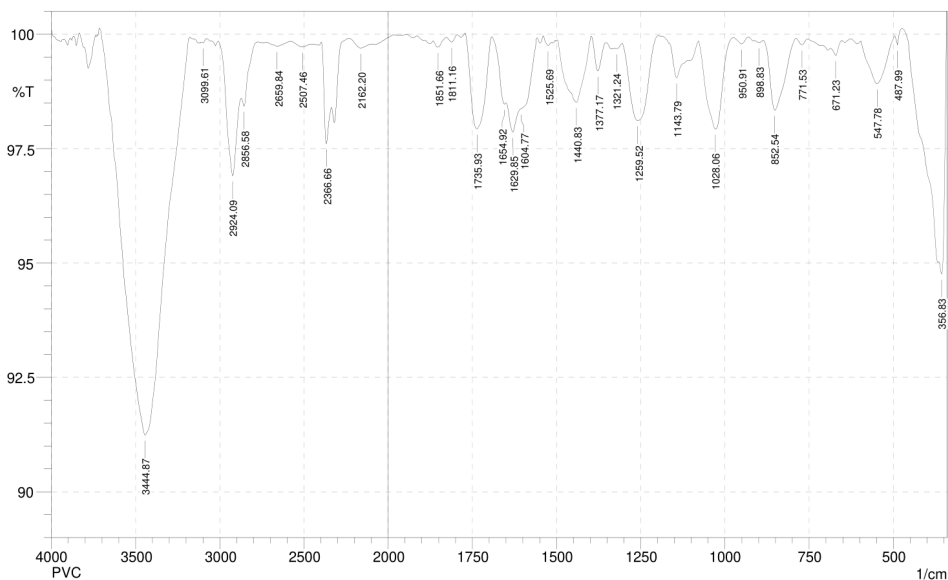
No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	356.83	94.757	2.452	366.48	341.4	0.435	0.196
2	487.99	99.766	0.259	495.71	474.49	0.003	0.008
3	547.78	98.92	0.986	596	495.71	0.281	0.241
4	671.23	99.54	0.226	686.66	651.94	0.048	0.014
5	771.53	99.77	0.132	788.89	754.17	0.024	0.009
6	852.54	98.34	1.539	887.26	788.89	0.368	0.319
7	898.83	99.819	0.044	914.26	887.26	0.019	0.003
8	950.91	99.79	0.146	974.05	931.62	0.026	0.014
9	1028.06	97.928	1.964	1078.21	974.05	0.489	0.441
10	1143.79	99.051	0.615	1165	1109.07	0.158	0.065
11	1259.52	98.113	1.758	1303.88	1197.79	0.503	0.451
12	1321.24	99.687	0.03	1327.03	1303.88	0.028	0.002
13	1377.17	99.194	0.694	1398.39	1354.03	0.085	0.063
14	1440.83	98.513	1.408	1496.76	1398.39	0.415	0.378
15	1525.69	99.751	0.141	1539.2	1514.12	0.02	0.009
16	1604.77	98.366	0.061	1606.7	1556.55	0.235	0.048
17	1629.85	97.857	0.58	1651.07	1606.7	0.356	0.052
18	1654.92	98.472	0.168	1691.57	1651.07	0.137	-0.001
19	1735.93	97.929	2.061	1772.58	1691.57	0.43	0.425
20	1811.16	99.828	0.134	1826.59	1795.73	0.015	0.01
21	1851.66	99.718	0.166	1867.09	1826.59	0.033	0.014
22	2162.2	99.699	0.142	2233.57	2102.41	0.128	0.04
23	2366.66	97.61	1.483	2397.52	2337.72	0.41	0.179
24	2507.46	99.726	0.083	2578.83	2455.38	0.123	0.023
25	2659.84	99.738	0.096	2723.49	2578.83	0.134	0.03
26	2856.58	98.43	0.358	2872.71	2771.71	0.336	-0.008
27	2924.09	96.907	2.154	3008.95	2873.94	1.031	0.567
28	3099.61	99.812	0.041	3109.25	3078.39	0.02	0.003
29	3444.87	91.242	8.788	3714.9	3178.69	10.894	10.965

Comment;
PVC

Date/Time; 1/3/2023 10:21:13 AM
No. of Scans;
Resolution;
Apodization;

Gambar 25. Hasil FTIR polivinil alcohol (PVA)

Lampiran 3. Contoh perhitungan

Lampiran 3.1 Perhitungan %rendemen

Perhitungan %rendemen ekstrak

Ekstrak kental   = 45 g

Serbuk kunyit   = 200 g

%rendemen $= \dfrac{ekstrak\ kental\ (g)}{Serbuk\ kunyit\ yang\ digunakan\ (g)} \times \mathbf{100}\%$

$$= \frac{45}{200} \times \mathbf{100}\%$$

$$= 22{,}5\%$$

Lampiran 3.2 Perhitungan nilai Rf

Perhitungan nilai Rf baku kurkumin dan ekstrak

Jarak noda 1   = 1.3 cm

Jarak noda 2   = 2 cm

Jarak noda 3   = 3.1 cm

Jarak tempuh eluen   = 5 cm

Rf noda 1 $= \dfrac{Jarak\ noda\ 1}{Jarak\ tempuh\ eluen}$

$$= \frac{1.3}{5}$$

$$= 0.26$$

Rf noda 2 $= \dfrac{Jarak\ noda\ 2}{Jarak\ tempuh\ eluen}$

$$= \frac{2}{5}$$

$$= 0.4$$

Rf noda 3 $\quad = \dfrac{Jarak\ noda\ 3}{Jarak\ tempuh\ eluen}$

$\quad\quad\quad = \dfrac{3.1}{5}$

$\quad\quad\quad = 0.62$

Lampiran 3.3 Perhitungan kadar kurkuminoid total

Perhitungan kadar kurkuminoid total dalam ekstrak

Persamaan regresi kurva baku y = 0.1297x + 0.0527

Konsentrasi eksrak $\quad$ = 10 ppm

Absorbansi (y) $\quad$ = 0.644

Konsentrasi kurkumin (ekstrak) $= \dfrac{abs - \text{intercept}}{slope}$

$\quad\quad\quad\quad\quad\quad\quad = \dfrac{0.644 - 0,0527}{0,1297}$

$\quad\quad\quad\quad\quad\quad\quad = 4.569\ \text{ppm}$

Kadar kurkuminoid total $\quad = \dfrac{konsentrasi\ kurkumin}{konsentrasi\ ekstrak} \times \mathbf{100}\%$

$\quad\quad\quad\quad\quad\quad\quad = \dfrac{4.569\ \text{ppm}}{10\ ppm} \times \mathbf{100}\%$

$\quad\quad\quad\quad\quad\quad\quad = 45.7\%$

Lampiran 3.4 Perhitungan %efisiensi penjerapan

Perhitungan %efisiensi penjerapan pada F1

Persamaan regresi kurva baku y = 0.2471x + 0.1418

Absorbansi (y) $\quad$ = 0.456

Faktor pengenceran = 4

Kons. kurkumin $\quad$ = Kons. ekstrak x kadar kurkuminoid total

$\quad\quad\quad\quad\quad$ = 1000 ppm x 45.7%

$\quad\quad\quad\quad\quad$ = 457 ppm

Kons. kurkumin yang tidak terjerap $\quad = \dfrac{abs - \text{intercept}}{slope}$ x fp

$$= \dfrac{0.456 - 0,1418}{0,2471} \times 4$$

$$= 5.086 \text{ ppm}$$

%efisiensi penjerapan $\quad = \dfrac{kons.\ obat - kons.\ obat\ yang\ tidak\ terjerap}{kons.\ obat} \times 100\%$

$$= \dfrac{457\ \text{ppm} - 5.086\ \text{ppm}}{457\ ppm} \times 100\%$$

$$= 98.887\%$$

Lampiran 4. Hasil analisis data secara statistik

Lampiran 4.1 Uji ukuran partikel

Tests of Normality

	Formulasi	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	Df	Sig.
Ukuran	F1 (15 Menit)	.189	10	.200[*]	.954	10	.710
Partikel	F2 (30 Menit)	.168	10	.200[*]	.926	10	.406
	F3 (45 Menit)	.197	10	.200[*]	.953	10	.705

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Ukuran	Based on Mean	14.708	2	27	.000
Partikel	Based on Median	14.499	2	27	.000
	Based on Median and with adjusted df	14.499	2	10.369	.001
	Based on trimmed mean	14.875	2	27	.000

ANOVA

Ukuran Partikel

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	332.439	2	166.220	280.401	.000
Within Groups	16.005	27	.593		
Total	348.445	29			

Multiple Comparisons

Dependent Variable: Ukuran Partikel

	(I) Formulasi	(J) Formulasi	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Tukey HSD	F1 (15 Menit)	F2 (30 Menit)	6.06201*	.34432	.000	5.2083	6.9157
		F3 (45 Menit)	7.75381*	.34432	.000	6.9001	8.6075
	F2 (30 Menit)	F1 (15 Menit)	-6.06201*	.34432	.000	-6.9157	-5.2083
		F3 (45 Menit)	1.69180*	.34432	.000	.8381	2.5455
	F3 (45 Menit)	F1 (15 Menit)	-7.75381*	.34432	.000	-8.6075	-6.9001
		F2 (30 Menit)	-1.69180*	.34432	.000	-2.5455	-.8381
Games-Howell	F1 (15 Menit)	F2 (30 Menit)	6.06201*	.41529	.000	4.9124	7.2116
		F3 (45 Menit)	7.75381*	.41680	.000	6.6028	8.9048
	F2 (30 Menit)	F1 (15 Menit)	-6.06201*	.41529	.000	-7.2116	-4.9124
		F3 (45 Menit)	1.69180*	.09741	.000	1.4428	1.9408
	F3 (45 Menit)	F1 (15 Menit)	-7.75381*	.41680	.000	-8.9048	-6.6028
		F2 (30 Menit)	-1.69180*	.09741	.000	-1.9408	-1.4428

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

Lampiran 4.2 Uji efisiensi penjerapan kurkumin dalam sediaan

Tests of Normality

	Formulasi	Kolmogorov-Smirnov[a] Statistic	Df	Sig.	Shapiro-Wilk Statistic	df	Sig.
%Efisiensi Penjerapan	F1 (15 Menit)	.175	3	.	1.000	3	1.000
	F2 (30 Menit)	.385	3	.	.750	3	.000
	F3 (45 Menit)	.	3	.	.	3	.

a. Lilliefors Significance Correction

Test Statistics[a,b]

	Efisiensi Penjerapan
Kruskal-Wallis H	7.513
Df	2
Asymp. Sig.	.023

a. Kruskal Wallis Test

b. Grouping Variable: Formulasi
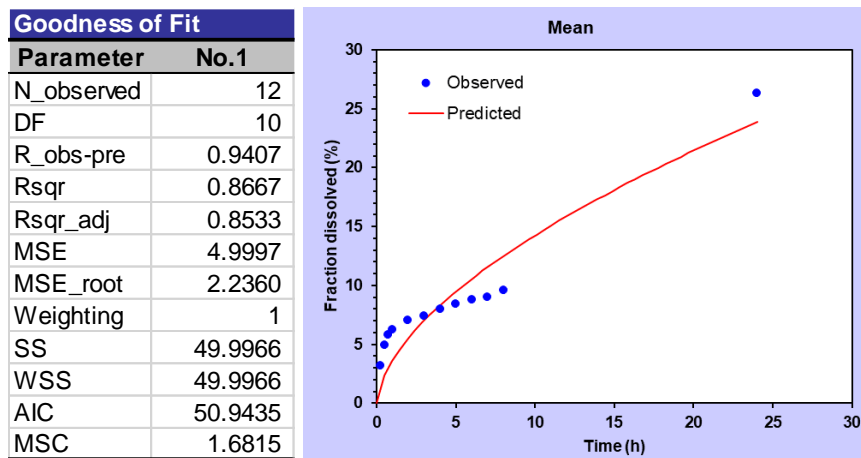
Lampiran 5. Kinetika PM ekstrak kunyit F3

Goodness of Fit	
Parameter	**No.1**
N_observed	12
DF	11
R_obs-pre	0.9849
Rsqr	0.6334
Rsqr_adj	0.6334
MSE	12.4954
MSE_root	3.5349
Weighting	1
SS	137.4490
WSS	137.4490
AIC	61.0790
MSC	0.8369
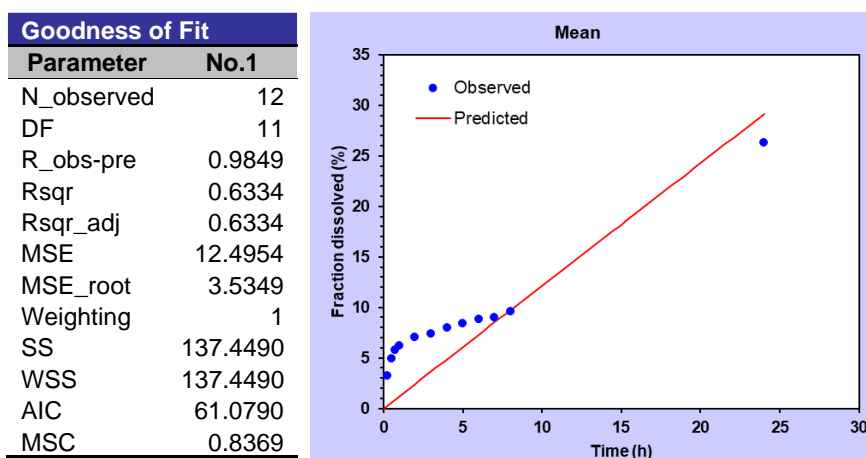
Gambar 26. Hasil analisis model kinetika orde 0 PM ekstrak kunyit F3

Goodness of Fit	
Parameter	**No.1**
N_observed	12
DF	11
R_obs-pre	0.9780
Rsqr	0.6880
Rsqr_adj	0.6880
MSE	10.6361
MSE_root	3.2613
Weighting	1
SS	116.9973
WSS	116.9973
AIC	59.1458
MSC	0.9980
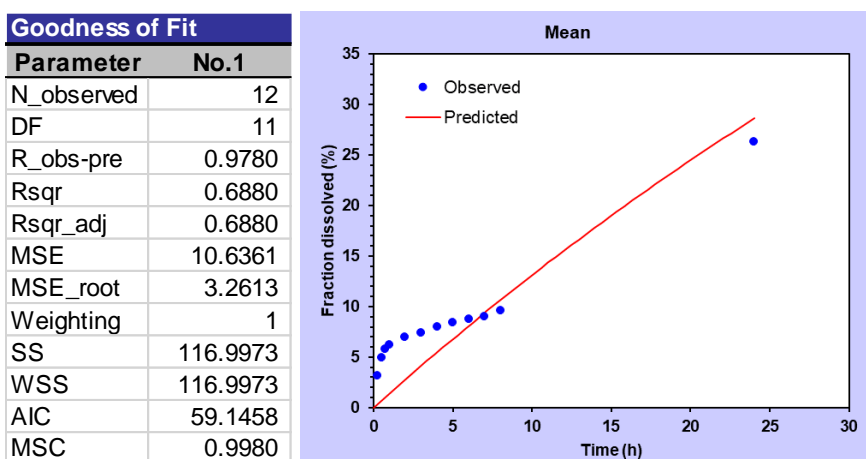
Gambar 27. Hasil analisis model kinetika orde 1 PM ekstrak kunyit F2

Goodness of Fit	
Parameter	**No.1**
N_observed	12
DF	11
R_obs-pre	0.9223
Rsqr	0.8504
Rsqr_adj	0.8504
MSE	5.1000
MSE_root	2.2583
Weighting	1
SS	56.0997
WSS	56.0997
AIC	50.3256
MSC	1.7330
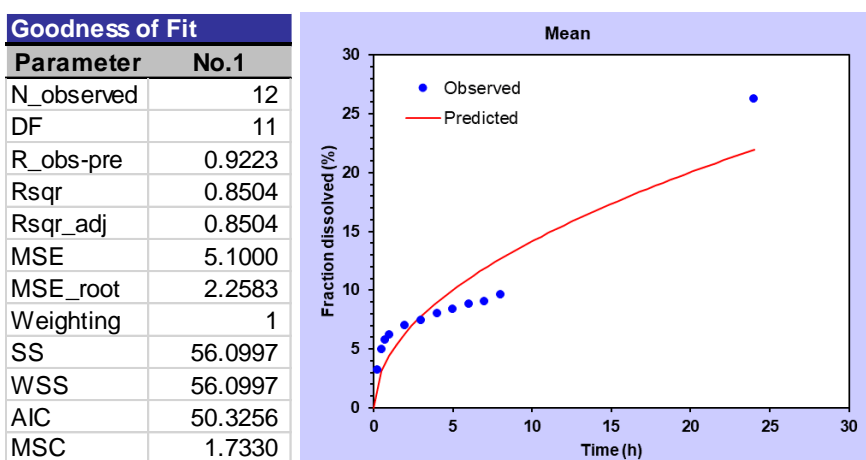
Gambar 28. Hasil analisis model kinetika *higuchi* PM ekstrak kunyit F3

Goodness of Fit	
Parameter	No.1
N_observed	12
DF	10
R_obs-pre	0.9407
Rsqr	0.8667
Rsqr_adj	0.8533
MSE	4.9997
MSE_root	2.2360
Weighting	1
SS	49.9966
WSS	49.9966
AIC	50.9435
MSC	1.6815

Gambar 29. Hasil analisis model kinetika *korsmeyer-peppas* PM ekstrak kunyit F3

| Goodness of Fit	
Parameter	No.1
N_observed	12
DF	11
R_obs-pre	0.9806
Rsqr	0.6715
Rsqr_adj	0.6715
MSE	11.1972
MSE_root	3.3462
Weighting	1
SS	123.1687
WSS	123.1687
AIC	59.7627
MSC	0.9466
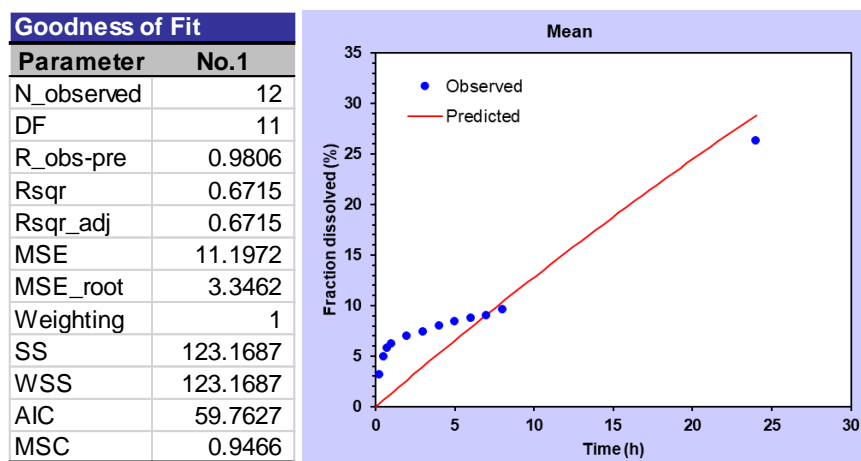
Gambar 30. Hasil analisis model kinetika *hixson-crowell* PM ekstrak kunyit F3

Lampiran 6. Dokumentasi penelitian

Gambar 31. Proses penyiapan sampel

Gambar 32. Proses maserasi
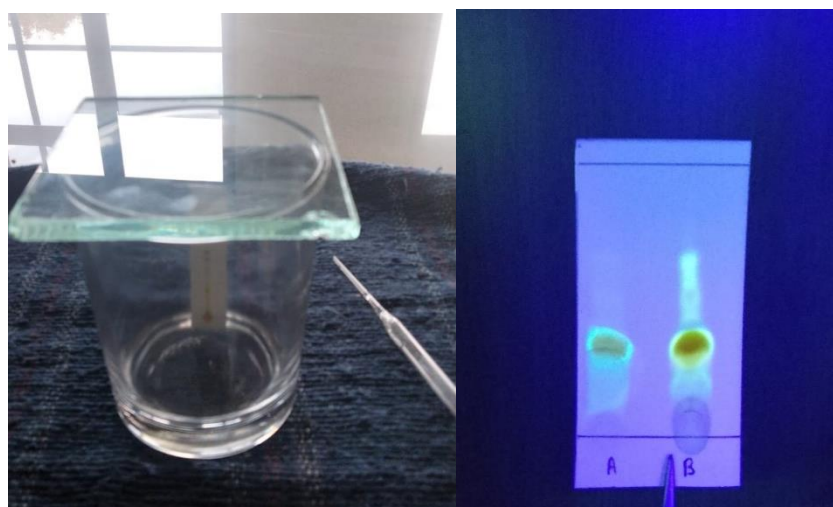
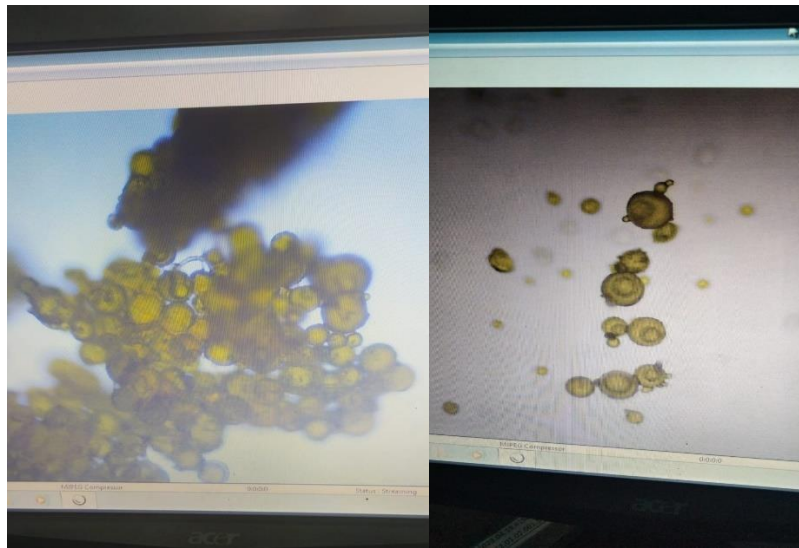**Gambar 33. Analisis dengan kromatografi lapis tipis (KLT)**
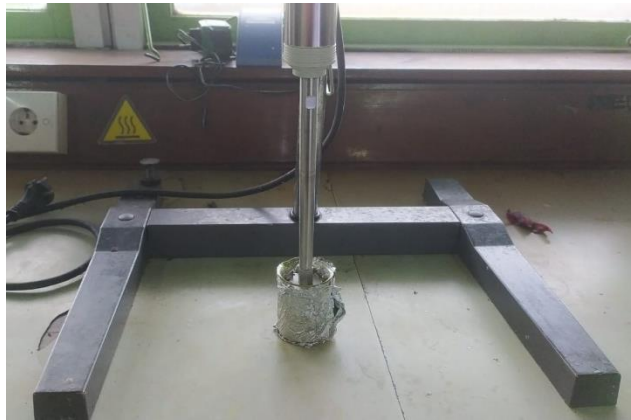
Gambar 34. Formulasi *porous microsphere* (PM) ekstrak kunyit
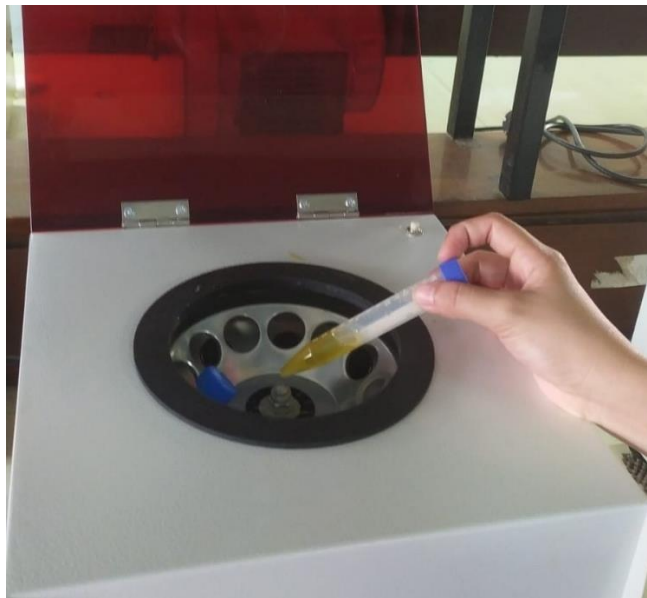
Gambar 35. Tahapan sentrifugasi hasil formulasi

Gambar 36. Hasil PM ekstrak kunyit sebelum dikeringkan

Gambar 37. Karakterisasi PM ekstrak kunyit menggunakan mikroskop

Gambar 38. Analisis dengan spektrofotometer UV/Vis