

ภาคผนวก

ภาคผนวก ก

สูตรสำหรับเจล

สูตรตำรับเจล

ตารางที่ ก-1 สูตรตำรับเจล acrylates/C10-30 Alkyl Acrylate Crosspolymer
(carbopol ultrez 10) เตรียมปริมาณ 100 กรัม

ลำดับ	สารเคมีที่ใช้		หน้าที่	% ที่ใช้ (w/w)
	trade name	INCI name		
1	aqua	aqua	Diluent	97.75
2	carbopol ultrez 10	Acrylates/C10-30 Alkyl Acrylate Crosspolymer	Thickener	0.25
3	TEA	triethanolamine	Neutralizer	1.5
4	uniphen P23	phenoxyethanol methylparaben ethylparaben butylparaben และ propylparaben	Preservative	0.5

ตารางที่ ก-2 สูตรตำรับเจล acrylate copolymer เตรียมปริมาณ 100 กรัม

ลำดับ	สารเคมีที่ใช้		หน้าที่	% ที่ใช้ (w/w)
	trade name	INCI name		
1	aqua	aqua	Diluent	89.5
2	himosap Gas 100	acrylate copolymer	Thickener	10
3	uniphen P23	phenoxyethanol methylparaben ethylparaben butylparaben และ propylparaben	Preservative	0.5

ตารางที่ ก-3 สูตรตำรับเจล xanthan gum เตรียมปริมาณ 100 กรัม

ลำดับ	สารเคมีที่ใช้		หน้าที่	% ที่ใช้ (w/w)
	trade name	INCI name		
1	aqua	aqua	Diluent	97.7
2	xanthan gum	xanthan gum	Thickener	1.8
3	uniphen P23	phenoxyethanol methylparaben ethylparaben butylparaben และ propylparaben	Preservative	0.5

ตารางที่ ก-4 สูตรตำรับเจล carboxy methyl cellulose (CMC) เตรียมปริมาณ 100 กรัม

ลำดับ	สารเคมีที่ใช้		หน้าที่	% ที่ใช้ (w/w)
	trade name	INCI name		
1	aqua	aqua	Diluent	97.7
2	blanose CMC	carboxy methyl cellulose	Thickener	1.8
3	uniphen P23	phenoxyethanol methylparaben ethylparaben butylparaben และ propylparaben	Preservative	0.5

ภาคผนวก ข

ข้อมูลทางสถิติ

ตำรับ Carbopol ultrez 10 กับน้ำ DI

สภาวะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	27646.57	27392.32
Variance	195080.3	859407.2
Observations	4	4
Pearson Correlation	0.619735	
Hypothesized Mean Difference	0	
df	3	
t Stat	0.687536	
P(T<=t) one-tail	0.270565	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.541131	
t Critical two-tail	3.182446	

สภาวะแสง

	Variable 1	Variable 2
Mean	27646.57	27544.2
Variance	195080.3	1622299
Observations	4	4
Pearson Correlation	0.751036	
Hypothesized Mean Difference	0	
df	3	
t Stat	0.207616	
P(T<=t) one-tail	0.424412	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.848824	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	27646.57	27417.34
Variance	195080.3	659095.6
Observations	4	4
Pearson Correlation	-0.44212	
Hypothesized Mean Difference	0	
df	3	
t Stat	0.423613	
P(T<=t) one-tail	0.350193	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.700385	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	27646.57	26930.77
Variance	195080.3	358025.6
Observations	4	4
Pearson Correlation	-0.64681	
Hypothesized Mean Difference	0	
df	3	
t Stat	1.513246	
P(T<=t) one-tail	0.113714	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.227428	
t Critical two-tail	3.182446	

ตำรับ Carbopol ultrez 10 กับน้ำ RO

สภาวะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	27341.53	27045.39
Variance	6974.871	397429.3
Observations	4	4
Pearson Correlation	-0.18381	
Hypothesized Mean Difference	0	
df	3	
t Stat	0.909844	
P(T<=t) one-tail	0.214993	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.429985	
t Critical two-tail	3.182446	

สภาวะแสง

	Variable 1	Variable 2
Mean	27341.53	26884.03
Variance	6974.871	108208.9
Observations	4	4
Pearson Correlation	-0.85057	
Hypothesized Mean Difference	0	
df	3	
t Stat	2.27391	
P(T<=t) one-tail	0.053768	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.107537	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	27341.53	26917.35
Variance	6974.871	783922.9
Observations	4	4
Pearson Correlation	-0.20199	
Hypothesized Mean Difference	0	
df	3	
t Stat	0.936423	
P(T<=t) one-tail	0.209068	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.418135	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	27341.53	26584.23
Variance	6974.871	2181791
Observations	4	4
Pearson Correlation	-0.37921	
Hypothesized Mean Difference	0	
df	3	
t Stat	1.00255	
P(T<=t) one-tail	0.194975	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.389949	
t Critical two-tail	3.182446	

ตำรับ Carbopol ultrez 10 กับน้ำแร่

สภาวะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	24475.24	24039.99
Variance	187662.2	37287.75
Observations	4	4
Pearson Correlation	-0.89717	
Hypothesized Mean Difference	0	
df	3	
t Stat	1.421422	
P(T<=t) one-tail	0.125158	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.250316	
t Critical two-tail	3.182446	

สภาวะแสง

	Variable 1	Variable 2
Mean	24475.24	22231.01
Variance	187662.2	315.3963
Observations	4	4
Pearson Correlation	0.612118	
Hypothesized Mean Difference	0	
df	3	
t Stat	10.62199	
P(T<=t) one-tail	0.000892	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.001783	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	24475.24	22700.13
Variance	187662.2	3101065
Observations	4	4
Pearson Correlation	0.012408	
Hypothesized Mean Difference	0	
df	3	
t Stat	1.96334	
P(T<=t) one-tail	0.07219	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.144381	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	24475.24	22811.7
Variance	187662.2	482995.2
Observations	4	4
Pearson Correlation	0.530482	
Hypothesized Mean Difference	0	
df	3	
t Stat	5.613862	
P(T<=t) one-tail	0.005587	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.011173	
t Critical two-tail	3.182446	

ตำรับ Carbopol ultrez 10 กับน้ำประปา

สภาวะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	27501.11	20940.03
Variance	2266.286	38511.65
Observations	4	4
Pearson Correlation	-0.369887	
Hypothesized Mean Difference	0	
df	3	
t Stat	60.089	
P(T<=t) one-tail	0.000005077	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.00001015	
t Critical two-tail	3.182446	

สภาวะแสง

	Variable 1	Variable 2
Mean	27501.11	26334.36
Variance	2266.286	522090.5
Observations	4	4
Pearson Correlation	-0.69511	
Hypothesized Mean Difference	0	
df	3	
t Stat	3.084894	
P(T<=t) one-tail	0.026964	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.053929	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	27501.11	23513.65
Variance	2266.286	1938638
Observations	4	4
Pearson Correlation	0.09189	
Hypothesized Mean Difference	0	
df	3	
t Stat	5.742369	
P(T<=t) one-tail	0.005244	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.010488	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	27501.11	24293.19
Variance	2266.286	350306.5
Observations	4	4
Pearson Correlation	0.250367	
Hypothesized Mean Difference	0	
df	3	
t Stat	11.028	
P(T<=t) one-tail	0.000798	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.001597	
t Critical two-tail	3.182446	

สำหรับ acrylate copolymer กับน้ำ DI

สถานะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	14045.35	13718.65
Variance	70874.4	42565.2
Observations	4	4
Pearson Correlation	-0.72364	
Hypothesized Mean Difference	0	
df	3	
t Stat	1.487551	
P(T<=t) one-tail	0.116797	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.233593	
t Critical two-tail	3.182446	

สถานะแสง

	Variable 1	Variable 2
Mean	14045.35	14033.63
Variance	70874.4	36048.93
Observations	4	4
Pearson Correlation	0.32471	
Hypothesized Mean Difference	0	
df	3	
t Stat	0.08614	
P(T<=t) one-tail	0.468391	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.936782	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	14045.35	14417.18
Variance	70874.4	108231.2
Observations	4	4
Pearson Correlation	-0.44082	
Hypothesized Mean Difference	0	
df	3	
t Stat	-1.46886	
P(T<=t) one-tail	0.119097	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.238193	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	14045.35	14088.65
Variance	70874.4	120747.7
Observations	4	4
Pearson Correlation	-0.57349	
Hypothesized Mean Difference	0	
df	3	
t Stat	-0.15872	
P(T<=t) one-tail	0.441986	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.883973	
t Critical two-tail	3.182446	

ตำรับ acrylate copolymer กับน้ำ RO

สภาวะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	12877.02	12613.62
Variance	239151.1	372133.2
Observations	4	4
Pearson Correlation	-0.07052	
Hypothesized Mean Difference	0	
df	3	
t Stat	0.651728	
P(T<=t) one-tail	0.280526	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.561053	
t Critical two-tail	3.182446	

สภาวะแสง

	Variable 1	Variable 2
Mean	12877.02	12850
Variance	239151.1	867850
Observations	4	4
Pearson Correlation	0.489831	
Hypothesized Mean Difference	0	
df	3	
t Stat	0.06649	
P(T<=t) one-tail	0.475585	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.951171	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	12877.02	13353.58
Variance	239151.1	1024942
Observations	4	4
Pearson Correlation	0.306664	
Hypothesized Mean Difference	0	
df	3	
t Stat	-0.97255	
P(T<=t) one-tail	0.201254	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.402508	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	12877.02	12997.33
Variance	239151.1	1094890
Observations	4	4
Pearson Correlation	-0.76133	
Hypothesized Mean Difference	0	
df	3	
t Stat	-0.16553	
P(T<=t) one-tail	0.439528	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.879056	
t Critical two-tail	3.182446	

ตำรับ acrylate copolymer กับน้ำแร่

สภาวะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	16189.41	19286.17
Variance	1682804	110569.1
Observations	4	4
Pearson Correlation	-0.42128	
Hypothesized Mean Difference	0	
df	3	
t Stat	-4.21727	
P(T<=t) one-tail	0.012183	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.024366	
t Critical two-tail	3.182446	

สภาวะแสง

	Variable 1	Variable 2
Mean	16189.41	14602.01
Variance	1682804	7318.423
Observations	4	4
Pearson Correlation	-0.989	
Hypothesized Mean Difference	0	
df	3	
t Stat	2.29743	
P(T<=t) one-tail	0.052618	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.105236	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	16189.41	20072.41
Variance	1682804	3117638
Observations	4	4
Pearson Correlation	-0.51482	
Hypothesized Mean Difference	0	
df	3	
t Stat	-2.90253	
P(T<=t) one-tail	0.031187	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.062374	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	16189.41	16611.42
Variance	1682804	1322955
Observations	4	4
Pearson Correlation	0.666279	
Hypothesized Mean Difference	0	
df	3	
t Stat	-0.83674	
P(T<=t) one-tail	0.232075	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.46415	
t Critical two-tail	3.182446	

ตำรับ acrylate copolymer กับน้ำประปา

สภาวะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	13114.88	17876.28
Variance	114127.1	3847615
Observations	4	4
Pearson Correlation	-0.347	
Hypothesized Mean Difference	0	
df	3	
t Stat	-4.5287	
P(T<=t) one-tail	0.010072	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.020143	
t Critical two-tail	3.182446	

สภาวะแสง

	Variable 1	Variable 2
Mean	13114.88	11865.59
Variance	114127.1	680478.4
Observations	4	4
Pearson Correlation	-0.25261	
Hypothesized Mean Difference	0	
df	3	
t Stat	2.583411	
P(T<=t) one-tail	0.040769	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.081538	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	13114.88	18341
Variance	114127.1379	20607.85
Observations	4	4
Pearson Correlation	-0.39631891	
Hypothesized Mean Difference	0	
df	3	
t Stat	-25.1169462	
P(T<=t) one-tail	0.00006919	
t Critical one-tail	2.353363435	
P(T<=t) two-tail	0.000138388	
t Critical two-tail	3.182446305	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	13114.88	16243.65
Variance	114127.1	12503.78
Observations	4	4
Pearson Correlation	-0.32048	
Hypothesized Mean Difference	0	
df	3	
t Stat	-16.1116	
P(T<=t) one-tail	0.00026	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.00052	
t Critical two-tail	3.182446	

ตำรับ Xanthan gum กับน้ำ DI

สถานะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	9932.958	9889.712
Variance	16140.26	23903.06
Observations	4	4
Pearson Correlation	0.756616	
Hypothesized Mean Difference	0	
df	3	
t Stat	0.85137	
P(T<=t) one-tail	0.228563	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.457126	
t Critical two-tail	3.182446	

สถานะแสง

	Variable 1	Variable 2
Mean	9932.958	9518.041
Variance	16140.26	118411.5
Observations	4	4
Pearson Correlation	-0.05763	
Hypothesized Mean Difference	0	
df	3	
t Stat	2.221071	
P(T<=t) one-tail	0.056465	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.112931	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	9932.958	9791.369
Variance	16140.26	107621.1
Observations	4	4
Pearson Correlation	0.162534	
Hypothesized Mean Difference	0	
df	3	
t Stat	0.852983	
P(T<=t) one-tail	0.228179	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.456358	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	9932.958	9951.41
Variance	16140.26	416079.5
Observations	4	4
Pearson Correlation	-0.04751	
Hypothesized Mean Difference	0	
df	3	
t Stat	-0.05564	
P(T<=t) one-tail	0.479564	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.959129	
t Critical two-tail	3.182446	

ตำรับ Xanthan gum กับน้ำ RO

สถานะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	9869.178	9474.663
Variance	1280.407	113129.3
Observations	4	4
Pearson Correlation	-0.33977	
Hypothesized Mean Difference	0	
df	3	
t Stat	2.253558	
P(T<=t) one-tail	0.054788	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.109577	
t Critical two-tail	3.182446	

สถานะแสง

	Variable 1	Variable 2
Mean	9869.178	9461.313
Variance	1280.407	40567.18
Observations	4	4
Pearson Correlation	-0.59362	
Hypothesized Mean Difference	0	
df	3	
t Stat	3.63339	
P(T<=t) one-tail	0.017954	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.035908	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	9869.178	9721.387
Variance	1280.407	7073.654
Observations	4	4
Pearson Correlation	-0.97652	
Hypothesized Mean Difference	0	
df	3	
t Stat	2.477696	
P(T<=t) one-tail	0.044726	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.089452	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	9869.178	9672.986
Variance	1280.407	28980.32
Observations	4	4
Pearson Correlation	-0.88769	
Hypothesized Mean Difference	0	
df	3	
t Stat	1.936063	
P(T<=t) one-tail	0.074141	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.148282	
t Critical two-tail	3.182446	

ตำรับ Xanthan gum กับน้ำแร่

สภาวะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	9961.268	9146.989
Variance	312562.4	420706.8
Observations	4	4
Pearson Correlation	-0.59372	
Hypothesized Mean Difference	0	
df	3	
t Stat	1.509563	
P(T<=t) one-tail	0.11415	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.228301	
t Critical two-tail	3.182446	

สภาวะแสง

	Variable 1	Variable 2
Mean	9961.268	7746.692
Variance	312562.4	1640.437
Observations	4	4
Pearson Correlation	-0.22027	
Hypothesized Mean Difference	0	
df	3	
t Stat	7.779086	
P(T<=t) one-tail	0.00221	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.00442	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	9961.268	8448.064
Variance	312562.4	1738501
Observations	4	4
Pearson Correlation	-0.7694	
Hypothesized Mean Difference	0	
df	3	
t Stat	1.695688	
P(T<=t) one-tail	0.094258	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.188515	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	9961.268	9504.79
Variance	312562.4	2775.86
Observations	4	4
Pearson Correlation	-0.29572	
Hypothesized Mean Difference	0	
df	3	
t Stat	1.582646	
P(T<=t) one-tail	0.105828	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.211656	
t Critical two-tail	3.182446	

ตำรับ Xanthan gum กับน้ำประปา

สภาวะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	13173.31	10079.75
Variance	50221.23	16830.61
Observations	4	4
Pearson Correlation	-0.94178	
Hypothesized Mean Difference	0	
df	3	
t Stat	17.72722	
P(T<=t) one-tail	0.000196	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.000391	
t Critical two-tail	3.182446	

สภาวะแสง

	Variable 1	Variable 2
Mean	13173.31	10415.52
Variance	50221.23	38594.77
Observations	4	4
Pearson Correlation	-0.00159	
Hypothesized Mean Difference	0	
df	3	
t Stat	18.49281	
P(T<=t) one-tail	0.000173	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.000345	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	13173.31	9486.249
Variance	50221.23	16154.1
Observations	4	4
Pearson Correlation	-0.581466	
Hypothesized Mean Difference	0	
df	3	
t Stat	23.37762	
P(T<=t) one-tail	0.0000857	
t Critical one-tail	2.3533634	
P(T<=t) two-tail	0.0001715	
t Critical two-tail	3.1824463	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	13173.31	10217.98
Variance	50221.23	853187.1
Observations	4	4
Pearson Correlation	0.101374	
Hypothesized Mean Difference	0	
df	3	
t Stat	6.368287	
P(T<=t) one-tail	0.003918	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.007837	
t Critical two-tail	3.182446	

ตำรับ carboxy methyl cellulose (CMC) กับน้ำ DI

สภาวะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	17081.1	16899.4
Variance	8684.989	86983.4
Observations	4	4
Pearson Correlation	0.64863	
Hypothesized Mean Difference	0	
df	3	
t Stat	1.483399	
P(T<=t) one-tail	0.117303	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.234607	
t Critical two-tail	3.182446	

สภาวะแสง

	Variable 1	Variable 2
Mean	17081.1	16639.33
Variance	8684.989	211573.8
Observations	4	4
Pearson Correlation	0.796602	
Hypothesized Mean Difference	0	
df	3	
t Stat	2.266506	
P(T<=t) one-tail	0.054137	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.108274	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	17081.1	16842.77
Variance	8684.989	241156.9
Observations	4	4
Pearson Correlation	0.809579	
Hypothesized Mean Difference	0	
df	3	
t Stat	1.136997	
P(T<=t) one-tail	0.169069	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.338138	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	17081.1	16924.61
Variance	8684.989	314842.8
Observations	4	4
Pearson Correlation	0.990619	
Hypothesized Mean Difference	0	
df	3	
t Stat	0.667388	
P(T<=t) one-tail	0.276136	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.552272	
t Critical two-tail	3.182446	

ตำรับ carboxy methyl cellulose (CMC) กับน้ำ RO

สภาวะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	17060.7	16726.04
Variance	136313.9	13520.85
Observations	4	4
Pearson Correlation	0.691462	
Hypothesized Mean Difference	0	
df	3	
t Stat	2.225339	
P(T<=t) one-tail	0.056241	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.112483	
t Critical two-tail	3.182446	

สภาวะแสง

	Variable 1	Variable 2
Mean	17060.7	15885.33
Variance	136313.9	37468.04
Observations	4	4
Pearson Correlation	0.785798	
Hypothesized Mean Difference	0	
df	3	
t Stat	9.481669	
P(T<=t) one-tail	0.001244	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.002487	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	17060.7	16534.65
Variance	136313.9	38206.72
Observations	4	4
Pearson Correlation	-0.97959	
Hypothesized Mean Difference	0	
df	3	
t Stat	1.871863	
P(T<=t) one-tail	0.078981	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.157962	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	17060.7	16777.97
Variance	136313.9	50199.69
Observations	4	4
Pearson Correlation	-0.42054	
Hypothesized Mean Difference	0	
df	3	
t Stat	1.117361	
P(T<=t) one-tail	0.172631	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.345261	
t Critical two-tail	3.182446	

ตำรับ carboxy methyl cellulose (CMC) กับน้ำแร่

สภาวะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	14987.37	17384.36
Variance	1423420	7020.274
Observations	4	4
Pearson Correlation	-0.90074	
Hypothesized Mean Difference	0	
df	3	
t Stat	-3.77757	
P(T<=t) one-tail	0.016249	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.032497	
t Critical two-tail	3.182446	

สภาวะแสง

	Variable 1	Variable 2
Mean	14987.37	13378.73
Variance	1423420	192881.6
Observations	4	4
Pearson Correlation	-0.15064	
Hypothesized Mean Difference	0	
df	3	
t Stat	2.415411	
P(T<=t) one-tail	0.047278	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.094557	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	14987.37	19746.09
Variance	1423420	212848.6
Observations	4	4
Pearson Correlation	0.817928	
Hypothesized Mean Difference	0	
df	3	
t Stat	-11.095	
P(T<=t) one-tail	0.000784	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.001569	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	14987.37	17951.05
Variance	1423420	23241.7
Observations	4	4
Pearson Correlation	-0.40592	
Hypothesized Mean Difference	0	
df	3	
t Stat	-4.69433	
P(T<=t) one-tail	0.00914	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.018281	
t Critical two-tail	3.182446	

ตำรับ carboxy methyl cellulose (CMC) กับน้ำประปา

สภาวะอุณหภูมิห้อง

	Variable 1	Variable 2
Mean	18699.77	21616.67
Variance	10917.77	101978.7
Observations	4	4
Pearson Correlation	-0.84644	
Hypothesized Mean Difference	0	
df	3	
t Stat	-14.1748	
P(T<=t) one-tail	0.00038	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.000761	
t Critical two-tail	3.182446	

สภาวะแสง

	Variable 1	Variable 2
Mean	18699.77	11242.93
Variance	10917.77	110718.7
Observations	4	4
Pearson Correlation	0.880251	
Hypothesized Mean Difference	0	
df	3	
t Stat	60.6691	
P(T<=t) one-tail	0.000004933	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.000009866	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิ 50°C

	Variable 1	Variable 2
Mean	18699.77	22348.29
Variance	10917.77	110306.2
Observations	4	4
Pearson Correlation	0.931632	
Hypothesized Mean Difference	0	
df	3	
t Stat	-30.6817	
P(T<=t) one-tail	0.000038032	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.000076063	
t Critical two-tail	3.182446	

สภาวะอุณหภูมิต่ำสลับอุณหภูมิสูง (freeze-thaw cycle)

	Variable 1	Variable 2
Mean	18699.77	22671.56
Variance	10917.77	140074.6
Observations	4	4
Pearson Correlation	0.930454	
Hypothesized Mean Difference	0	
df	3	
t Stat	-28.4027	
P(T<=t) one-tail	0.00004791	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.00009582	
t Critical two-tail	3.182446	