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APPENDICES

APPENDIX A

Standard Mangostin

Standard Mangostin

Standard mangostin used in this study derived from Hiranras (2001) and could be prepared as follows:

1. Extraction

The fruit hulls of *Garcinia mangostana* were extracted by maceration method with hexane and ethyl acetate. The ethyl acetate extract was evaporated using rotary evaporator at 40 °C. The crude extract was crystallized and used for further isolation.

2. Isolation

The crude ethyl acetate extract was chromatographed on silica gel using quick column chromatographic method and eluted with ethyl acetate/hexane (0-25%) mixtures of increasing polarity to give 24 fractions. Each fraction was evaporated using rotary evaporator and was monitored by TLC (Alumina sheet silica gel 60F 254) using ethyl acetate/hexane (3:1) mixture as the developing solvent and detected under UV light at wavelength 254 nm. The fractions which showed the same TLC characteristic were combined and allowed to crystallize.

3. Identification

The isolated mangostin was identified and characterized by spectroscopic method including mass spectrometry (MS) and nuclear magnetic resonance (NMR).

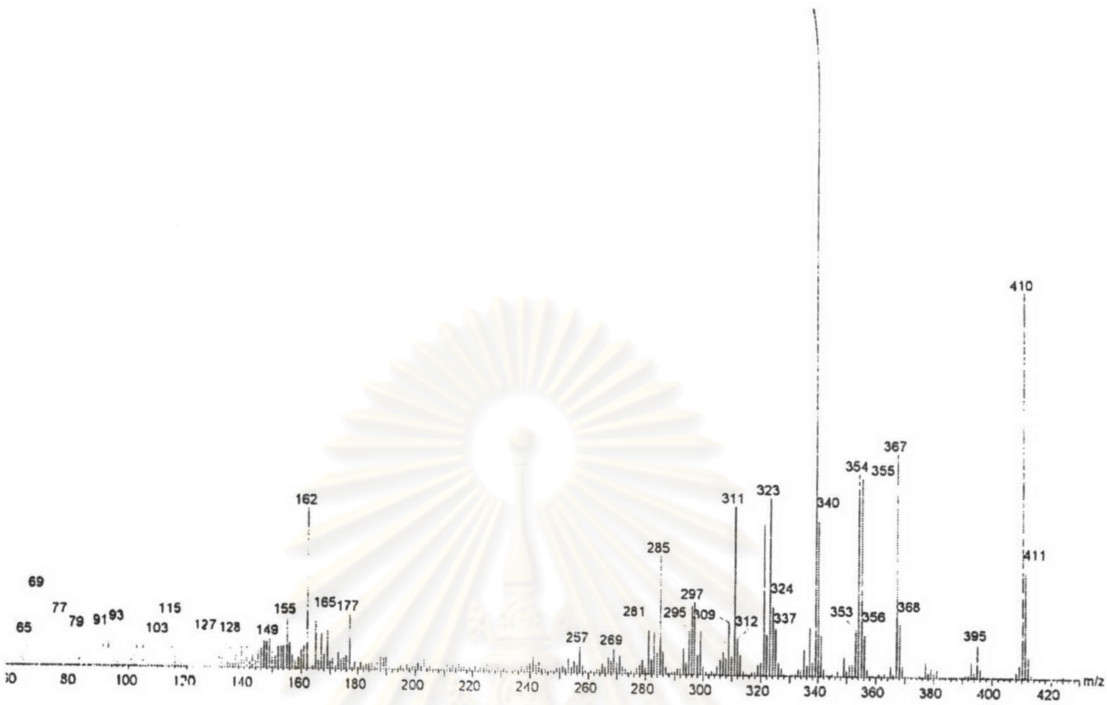

Figure A1 MS spectra of standard mangostin

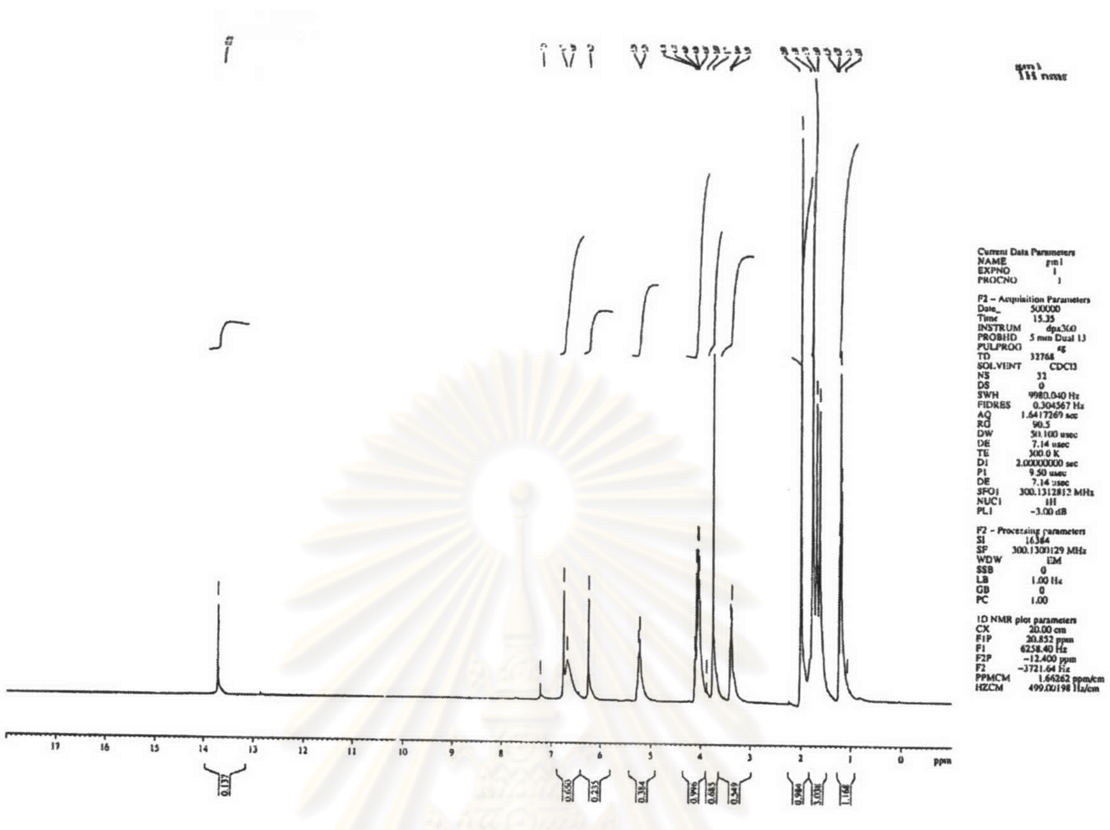

Figure A2 H NMR spectra of standard mangostin

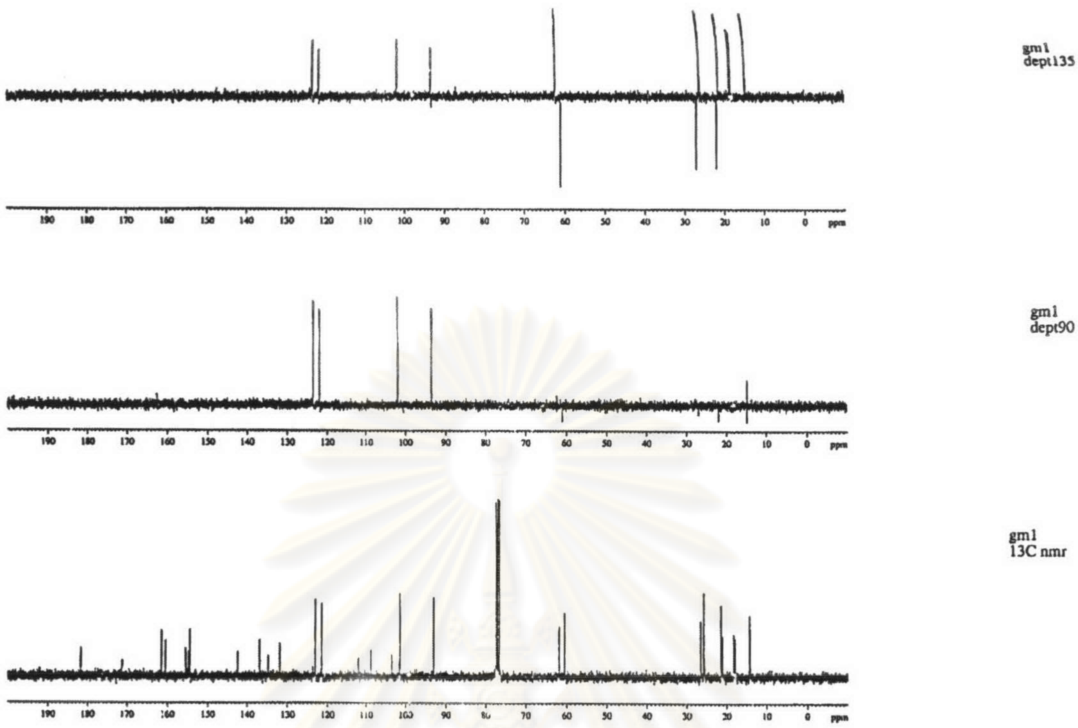

Figure A3 C NMR spectra of standard mangostin

APPENDIX B

Ingredient Properties

Glyceryl monooleate

1. General Characteristics

Glyceryl monooleate is a mixture of the glycerides of oleic acid and other fatty acids, consisting mainly of the monooleate. It is a yellow to yellow-brown oily liquid or paste with a characteristic odor. Glyceryl monooleate is generally regarded as a nonirritant and nontoxic excipient. It is included in the FDA Inactive Ingredients Guide (oral capsules and tablets) and in nonparenteral medicines licensed in the UK (Kibbe, 2000).

Acid value:	≤ 2.0
HLB value:	3.3 for non-emulsifying grade 4.1 for self-emulsifying grade
Iodine value:	90-100
Saponification value:	160-170 for non-emulsifying grade 150-160 for self-emulsifying grade
Solubility:	soluble in chloroform, ether, mineral oil and vegetable oils; practically insoluble in water

2. Applications

Glyceryl monooleate is a polar lipid which swells in water to give several phases with different rheological properties. It is available in both non-emulsifying and self-emulsifying grades, the self-emulsifying grade containing about 5% of an anionic surfactant. The non-emulsifying grade is used in topical formulations as an emollient and as an emulsifying agent for water in oil emulsions. It is also a stabilizer for oil in water emulsions. The self-emulsifying grade is used as a primary emulsifier for oil in water systems.

Glyceryl monooleate gels in excess water, forming a highly ordered cubic phase which can be used to sustain the release of various drugs (Kibbe, 2000).

Sesame oil

1. General Characteristics

Refined sesame oil is a clear, pale yellow colored liquid with a slight, pleasant odor and a bland taste. It solidifies to a soft mass at about -4 °C. A typical analysis of refined sesame oil indicates the composition of the acids, present as glycerides, to be: arachidic acid 0.8%; linoleic acid 40.4%; oleic acid 45.4%; palmitic acid 9.1%; and stearic acid 4.3%. Sesamin, a complex cyclic ether, and sesamolin, a glycoside, are also present in small amounts. Note that other reported analyzes may vary slightly from that above (Kibbe, 2000; Budavari, 2001).

Acid value:	≤ 0.2
Iodine value:	103-122
Saponification value:	188-193
Solubility:	insoluble in water; practically insoluble in ethanol; miscible with carbon disulfide, chloroform, ether, hexane and light petroleum

2. Applications

The major use of sesame oil in pharmaceutical formulations is as a solvent in the preparation of sustained release intramuscular injections of steroids or other oil soluble drug substances. In addition, sesame oil may be used as a solvent in the preparation of subcutaneous injections, oral capsules, rectal capsules and ophthalmic preparations. It may also be used in the formulation of suspensions and emulsions. Multiple emulsion formulations, in which sesame oil was one of the oil phases incorporated, have been investigated as a prolonged release system for rifampicin. Sesame oil has also been used in the preparation of liniments, pastes, ointments and soaps.

Sesame oil is additionally used as an edible oil and in the preparation of oleomargarine (Kibbe, 2000; Budavari, 2001).

Soybean oil

1. General Characteristics

The USP describes soybean oil as the refined fixed oil obtained from the seeds of the soya plant *Glycine soja*. Soybean oil is a clear, pale yellow colored, odorless or almost odorless liquid, with a bland taste that solidifies at -10 to -16 °C. A typical analysis of refined soybean oil indicates the composition of the acids, present as glycerides, to be: linoleic acid 50-57%; linolenic acid 5-10%; oleic acid 17-26%; palmitic acid 9-13%; and stearic acid 3-6%. Other acids are present in trace quantities (Kibbe, 2000; Budavari, 2001).

Acid value:	0.3-3.0
Iodine value:	127-138
Saponification value:	189-195
Solubility:	practically insoluble in ethanol and water; miscible with carbon disulfide, chloroform, ether and light petroleum

2. Applications

In pharmaceutical preparations, soybean oil emulsions are primarily used as a fat source in total parenteral nutrition (TPN) regimens. Although other oils, such as peanut oil, have been used for this purpose, soybean oil is now preferred since it is associated with fewer adverse reactions. Emulsions containing soybean oil have also been used as vehicles for the oral and intravenous administration of drugs. In addition, soybean oil has been included in formulations of liposome.

Soybean oil may also be used in cosmetics and is consumed as an edible oil. As soybean oil has emollient properties, it is used as a bath additive in the treatment of dry skin conditions (Kibbe, 2000; Budavari, 2001).

Olive oil

1. General Characteristics

Olive oil is a fixed oil obtained from the fruits of the cultivated olive tree *Olea europaea*. Olive oil is a clear, pale yellow or light greenish-yellow colored liquid with a pleasing delicate flavor. It begins to get turbid at 5 to 10 °C and forms a whitish granular mass below 0 °C. A typical analysis of olive oil indicates the composition of the acids, present as glycerides, to be: arachidic acid 0.9%; linoleic acid 4.0%; oleic acid 83.5%; palmitic acid 9.4%; and stearic acid 2.0%. Minor constituents are squalene, up to 0.7%, phytosterol and tocopherols about 0.2% (Budavari, 2001).

Acid value:	0.2-2.8
Iodine value:	79-90
Saponification value:	187-196
Solubility:	slightly soluble in ethanol; miscible with carbon disulfide, chloroform and ether

2. Applications

Olive oil is generally used as food in salads, with sardines, for cooking and baking. It has also been used in cosmetics and pharmaceutical preparations. In addition, olive oil may be used in the manufacture of soaps, textile lubricants and sulfonated oils (Budavari, 2001).

APPENDIX C

Data of Ternary Phase Diagram

Table C1 Data of ternary phase diagram from glyceryl monooleate-sesame oil-water system

No.	Sesame oil	Water	Glyceryl monooleate	Phase	Description
1	2	0	98	1	isotropic
2	2	5	93	1	lamellar[1]
3	2	10	88	1	lamellar[1]
4	2	15	83	1	lamellar[1]
5	2	20	78	1	lamellar[1]
6	2	25	73	1	isotropic
7	2	30	68	1	isotropic
8	2	35	63	1	isotropic
9	2	40	58	2	isotropic
10	4	0	96	1	isotropic
11	4	5	91	1	lamellar[1]
12	4	10	86	1	lamellar[1]
13	4	15	81	1	lamellar[1]
14	4	20	76	1	lamellar[1]
15	4	25	71	1	isotropic
16	4	30	66	1	isotropic
17	4	35	61	2	isotropic
18	4	40	56	2	isotropic
19	6	0	94	1	isotropic
20	6	5	89	1	isotropic
21	6	10	84	1	reversed hexagonal[2]
22	6	15	79	1	reversed hexagonal[2]
23	6	20	74	1	reversed hexagonal[2]
24	6	25	69	1	reversed hexagonal[2]
25	6	30	64	1	reversed hexagonal[2]
26	6	35	59	2	reversed hexagonal[2]
27	6	40	54	2	reversed hexagonal[2]

Table C1 Data of ternary phase diagram from glyceryl monooleate-sesame oil-water system (continued)

No.	Sesame oil	Water	Glyceryl monooleate	Phase	Description
28	8	0	92	1	isotropic
29	8	5	87	1	isotropic
30	8	10	82	1	reversed hexagonal[2]
31	8	15	77	1	reversed hexagonal[2]
32	8	20	72	1	reversed hexagonal[2]
33	8	25	67	1	reversed hexagonal[2]
34	8	30	62	1	reversed hexagonal[2]
35	8	35	57	1	reversed hexagonal[2]
36	8	40	52	2	reversed hexagonal[2]
37	10	0	90	1	isotropic
38	10	5	85	1	isotropic
39	10	10	80	1	reversed hexagonal[2]
40	10	15	75	1	reversed hexagonal[2]
41	10	20	70	1	reversed hexagonal[2]
42	10	25	65	1	reversed hexagonal[2]
43	10	30	60	1	reversed hexagonal[2]
44	10	35	55	1	reversed hexagonal[2]
45	10	40	50	2	reversed hexagonal[2]
46	12	0	88	1	isotropic
47	12	5	83	1	isotropic
48	12	10	78	1	reversed hexagonal[2]
49	12	15	73	1	reversed hexagonal[2]
50	12	20	68	1	reversed hexagonal[2]
51	12	25	63	1	reversed hexagonal[2]
52	12	30	58	1	reversed hexagonal[2]
53	12	35	53	2	reversed hexagonal[2]
54	12	40	48	2	reversed hexagonal[2]

Table C1 Data of ternary phase diagram from glyceryl monooleate-sesame oil-water system (continued)

No.	Sesame oil	Water	Glyceryl monooleate	Phase	Description
55	15	0	85	1	isotropic
56	15	5	80	1	isotropic
57	15	10	75	1	reversed hexagonal[2]
58	15	15	70	1	reversed hexagonal[2]
59	15	20	65	1	isotropic
60	15	25	60	1	isotropic
61	15	30	55	1	isotropic
62	15	35	50	2	isotropic
63	15	40	45	2	isotropic
64	20	0	80	1	isotropic
65	20	5	75	1	isotropic
66	20	10	70	1	isotropic
67	20	15	65	1	isotropic
68	20	20	60	1	isotropic
69	20	25	55	1	isotropic
70	20	30	50	1	isotropic
71	20	35	45	1	isotropic
72	20	40	40	2	isotropic

1 = similar to Figure 35 (a) in Physical Characterization

2 = similar to Figure 36 (a) in Physical Characterization

Table C2 Data of ternary phase diagram from glyceryl monooleate-soybean oil-water system

No.	Soybean oil	Water	Glyceryl monooleate	Phase	Description
1	2	0	98	1	isotropic
2	2	5	93	1	lamellar[1]
3	2	10	88	1	lamellar[1]
4	2	15	83	1	lamellar[1]
5	2	20	78	1	lamellar[1]
6	2	25	73	1	isotropic
7	2	30	68	1	isotropic
8	2	35	63	2	isotropic
9	2	40	58	2	isotropic
10	4	0	96	1	isotropic
11	4	5	91	1	lamellar[1]
12	4	10	86	1	lamellar[1]
13	4	15	81	1	lamellar[1]
14	4	20	76	1	lamellar[1]
15	4	25	71	1	isotropic
16	4	30	66	1	isotropic
17	4	35	61	2	isotropic
18	4	40	56	2	isotropic
19	6	0	94	1	isotropic
20	6	5	89	1	isotropic
21	6	10	84	1	isotropic
22	6	15	79	1	isotropic
23	6	20	74	1	reversed hexagonal[2]
24	6	25	69	1	reversed hexagonal[2]
25	6	30	64	1	reversed hexagonal[2]
26	6	35	59	2	reversed hexagonal[2]
27	6	40	54	2	reversed hexagonal[2]

Table C2 Data of ternary phase diagram from glyceryl monooleate-soybean oil-water system (continued)

No.	Soybean oil	Water	Glyceryl monooleate	Phase	Description
28	8	0	92	1	isotropic
29	8	5	87	1	isotropic
30	8	10	82	1	reversed hexagonal[2]
31	8	15	77	1	reversed hexagonal[2]
32	8	20	72	1	reversed hexagonal[2]
33	8	25	67	1	reversed hexagonal[2]
34	8	30	62	1	reversed hexagonal[2]
35	8	35	57	2	reversed hexagonal[2]
36	8	40	52	2	reversed hexagonal[2]
37	10	0	90	1	isotropic
38	10	5	85	1	isotropic
39	10	10	80	1	reversed hexagonal[2]
40	10	15	75	1	reversed hexagonal[2]
41	10	20	70	1	reversed hexagonal[2]
42	10	25	65	1	reversed hexagonal[2]
43	10	30	60	1	reversed hexagonal[2]
44	10	35	55	2	reversed hexagonal[2]
45	10	40	50	2	reversed hexagonal[2]
46	12	0	88	1	isotropic
47	12	5	83	1	isotropic
48	12	10	78	1	reversed hexagonal[2]
49	12	15	73	1	reversed hexagonal[2]
50	12	20	68	1	reversed hexagonal[2]
51	12	25	63	1	reversed hexagonal[2]
52	12	30	58	1	reversed hexagonal[2]
53	12	35	53	2	reversed hexagonal[2]
54	12	40	48	2	reversed hexagonal[2]

Table C2 Data of ternary phase diagram from glyceryl monooleate-soybean oil-water system (continued)

No.	Soybean oil	Water	Glyceryl monooleate	Phase	Description
55	15	0	85	1	isotropic
56	15	5	80	1	isotropic
57	15	10	75	1	isotropic
58	15	15	70	1	isotropic
59	15	20	65	1	isotropic
60	15	25	60	1	isotropic
61	15	30	55	1	isotropic
62	15	35	50	2	isotropic
63	15	40	45	2	isotropic
64	20	0	80	1	isotropic
65	20	5	75	1	isotropic
66	20	10	70	1	isotropic
67	20	15	65	1	isotropic
68	20	20	60	1	isotropic
69	20	25	55	1	isotropic
70	20	30	50	1	isotropic
71	20	35	45	2	isotropic
72	20	40	40	2	isotropic

1 = similar to Figure 35 (b) in Physical Characterization

2 = similar to Figure 36 (b) in Physical Characterization

Table C3 Data of ternary phase diagram from glyceryl monooleate-olive oil-water system

No.	Olive oil	Water	Glyceryl monooleate	Phase	Description
1	2	0	98	1	isotropic
2	2	5	93	1	lamellar[1]
3	2	10	88	1	lamellar[1]
4	2	15	83	1	lamellar[1]
5	2	20	78	1	isotropic
6	2	25	73	1	isotropic
7	2	30	68	2	isotropic
8	2	35	63	2	isotropic
9	2	40	58	2	isotropic
10	4	0	96	1	isotropic
11	4	5	91	1	lamellar[1]
12	4	10	86	1	lamellar[1]
13	4	15	81	1	lamellar[1]
14	4	20	76	1	isotropic
15	4	25	71	1	isotropic
16	4	30	66	2	isotropic
17	4	35	61	2	isotropic
18	4	40	56	2	isotropic
19	6	0	94	1	isotropic
20	6	5	89	1	isotropic
21	6	10	84	1	isotropic
22	6	15	79	1	reversed hexagonal[2]
23	6	20	74	1	reversed hexagonal[2]
24	6	25	69	1	reversed hexagonal[2]
25	6	30	64	2	reversed hexagonal[2]
26	6	35	59	2	reversed hexagonal[2]
27	6	40	54	2	reversed hexagonal[2]

Table C3 Data of ternary phase diagram from glyceryl monooleate-olive oil-water system (continued)

No.	Olive oil	Water	Glyceryl monooleate	Phase	Description
28	8	0	92	1	isotropic
29	8	5	87	1	isotropic
30	8	10	82	1	reversed hexagonal[2]
31	8	15	77	1	reversed hexagonal[2]
32	8	20	72	1	reversed hexagonal[2]
33	8	25	67	1	reversed hexagonal[2]
34	8	30	62	1	reversed hexagonal[2]
35	8	35	57	2	reversed hexagonal[2]
36	8	40	52	2	reversed hexagonal[2]
37	10	0	90	1	isotropic
38	10	5	85	1	isotropic
39	10	10	80	1	reversed hexagonal[2]
40	10	15	75	1	reversed hexagonal[2]
41	10	20	70	1	reversed hexagonal[2]
42	10	25	65	1	reversed hexagonal[2]
43	10	30	60	1	reversed hexagonal[2]
44	10	35	55	2	reversed hexagonal[2]
45	10	40	50	2	reversed hexagonal[2]
46	12	0	88	1	isotropic
47	12	5	83	1	isotropic
48	12	10	78	1	reversed hexagonal[2]
49	12	15	73	1	reversed hexagonal[2]
50	12	20	68	1	reversed hexagonal[2]
51	12	25	63	1	reversed hexagonal[2]
52	12	30	58	1	reversed hexagonal[2]
53	12	35	53	2	reversed hexagonal[2]
54	12	40	48	2	reversed hexagonal[2]

Table C3 Data of ternary phase diagram from glyceryl monooleate-olive oil-water system (continued)

No.	Olive oil	Water	Glyceryl monooleate	Phase	Description
55	15	0	85	1	isotropic
56	15	5	80	1	isotropic
57	15	10	75	1	isotropic
58	15	15	70	1	isotropic
59	15	20	65	1	isotropic
60	15	25	60	1	isotropic
61	15	30	55	2	isotropic
62	15	35	50	2	isotropic
63	15	40	45	2	isotropic
64	20	0	80	1	isotropic
65	20	5	75	1	isotropic
66	20	10	70	1	isotropic
67	20	15	65	1	isotropic
68	20	20	60	1	isotropic
69	20	25	55	1	isotropic
70	20	30	50	2	isotropic
71	20	35	45	2	isotropic
72	20	40	40	2	isotropic

1 = similar to Figure 35 (c) in Physical Characterization

2 = similar to Figure 36 (c) in Physical Characterization

APPENDIX D

Data of *In vitro* Release Study

Table D1 The percentage release of mangostin from monoglyceride-based drug delivery system containing 8% of sesame oil (formulation 1)

Time (hr)	% Cumulative release				Mean	SD
	n_1	n_2	n_3	n_4		
1	24.91	22.51	24.31	24.01	23.94	1.02
3	39.48	34.69	35.69	36.18	36.51	2.07
6	54.95	48.65	48.87	49.84	50.58	2.96
9	65.54	59.08	61.74	63.35	62.43	2.72
12	72.79	67.21	67.74	71.03	69.69	2.67
24	86.88	81.40	86.80	85.98	85.27	2.61
36	93.98	88.02	88.38	91.99	90.59	2.88
48	94.53	92.08	91.97	95.68	93.57	1.84

Table D2 The percentage release of mangostin from monoglyceride-based drug delivery system containing 8% of soybean oil (formulation 2)

Time (hr)	% Cumulative release				Mean	SD
	n_1	n_2	n_3	n_4		
1	20.52	20.02	23.59	20.23	21.09	1.68
3	31.24	30.50	32.57	28.78	30.77	1.58
6	46.31	47.02	49.54	44.21	46.77	2.20
9	58.89	61.50	62.47	58.64	60.38	1.90
12	65.14	66.07	68.75	65.36	66.33	1.66
24	82.22	83.28	85.69	81.26	83.11	1.91
36	88.59	90.35	91.51	88.27	89.68	1.52
48	91.76	92.69	93.31	91.21	92.24	0.94

Table D3 The percentage release of mangostin from monoglyceride-based drug delivery system containing 8% of olive oil (formulation 3)

Time (hr)	% Cumulative release				Mean	SD
	n_1	n_2	n_3	n_4		
1	14.68	12.51	12.62	14.83	13.66	1.27
3	27.95	27.95	26.68	29.23	27.95	1.04
6	45.91	43.10	43.95	46.02	44.75	1.45
9	62.94	56.87	55.03	60.71	58.89	3.59
12	69.51	64.02	66.33	71.05	67.73	3.16
24	85.07	80.12	81.80	84.26	82.81	2.27
36	92.07	88.84	85.21	90.97	89.27	3.02
48	93.64	91.01	89.64	93.58	91.97	1.98

Table D4 The percentage release of mangostin from monoglyceride-based drug delivery system containing 12% of sesame oil (formulation 4)

Time (hr)	% Cumulative release				Mean	SD
	n_1	n_2	n_3	n_4		
1	26.41	27.00	30.21	26.71	27.58	1.77
3	37.98	37.58	40.88	37.14	38.40	1.69
6	50.85	49.37	53.69	51.12	51.26	1.79
9	63.02	65.97	66.28	63.29	64.64	1.72
12	72.01	73.69	76.34	72.58	73.66	1.92
24	89.74	91.34	92.25	87.64	90.24	2.02
36	92.57	93.51	93.89	91.48	92.86	1.08
48	94.48	94.75	95.03	93.56	94.46	0.64

Table D5 The percentage release of mangostin from monoglyceride-based drug delivery system containing 12% of soybean oil (formulation 5)

Time (hr)	% Cumulative release				Mean	SD
	n_1	n_2	n_3	n_4		
1	24.41	25.28	24.35	27.22	25.32	1.34
3	34.98	35.58	35.88	37.14	35.90	0.91
6	48.85	49.37	51.69	52.31	50.56	1.70
9	61.07	62.84	64.03	63.29	62.81	1.26
12	70.65	71.69	74.48	73.47	72.57	1.72
24	87.86	89.42	91.01	91.35	89.91	1.60
36	91.63	92.14	93.89	92.48	92.54	0.97
48	93.75	93.87	94.97	93.65	94.06	0.61

Table D6 The percentage release of mangostin from monoglyceride-based drug delivery system containing 12% of olive oil (formulation 6)

Time (hr)	% Cumulative release				Mean	SD
	n_1	n_2	n_3	n_4		
1	17.07	16.77	15.94	17.65	16.86	0.71
3	27.19	28.31	29.84	27.34	28.17	1.22
6	46.04	46.20	47.71	45.19	46.29	1.05
9	59.60	60.64	62.51	60.23	60.75	1.25
12	71.85	70.13	72.29	72.68	71.74	1.12
24	87.49	86.93	90.08	90.54	88.76	1.81
36	90.78	91.47	93.51	92.94	92.18	1.27
48	92.56	93.04	94.61	95.03	93.81	1.19

APPENDIX E

Statistical Analysis Data

Table E1 One-way analysis of variance on the viscosity value of monoglyceride-based drug delivery system

ANOVA

Viscosity

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	617764.5	5	123552.895	53.111	.000
Within Groups	27915.598	12	2326.300		
Total	645680.1	17			

Table E2 Multiple Comparisons on the viscosity value of monoglyceride-based drug delivery system

Multiple Comparisons

Dependent Variable: Viscosity
LSD

(I) Formulation	(J) Formulation	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	2	-89.38000*	39.38104	.042	-175.1839	-3.5761
	3	161.32000*	39.38104	.001	75.5161	247.1239
	4	318.28000*	39.38104	.000	232.4761	404.0839
	5	348.80000*	39.38104	.000	262.9961	434.6039
	6	412.02000*	39.38104	.000	326.2161	497.8239
2	1	89.38000*	39.38104	.042	3.5761	175.1839
	3	250.70000*	39.38104	.000	164.8961	336.5039
	4	407.66000*	39.38104	.000	321.8561	493.4639
	5	438.18000*	39.38104	.000	352.3761	523.9839
	6	501.40000*	39.38104	.000	415.5961	587.2039
3	1	-161.32000*	39.38104	.001	-247.1239	-75.5161
	2	-250.70000*	39.38104	.000	-336.5039	-164.8961
	4	156.96000*	39.38104	.002	71.1561	242.7639
	5	187.48000*	39.38104	.000	101.6761	273.2839
	6	250.70000*	39.38104	.000	164.8961	336.5039
4	1	-318.28000*	39.38104	.000	-404.0839	-232.4761
	2	-407.66000*	39.38104	.000	-493.4639	-321.8561
	3	-156.96000*	39.38104	.002	-242.7639	-71.1561
	5	30.52000	39.38104	.453	-55.2839	116.3239
	6	93.74000*	39.38104	.035	7.9361	179.5439
5	1	-348.80000*	39.38104	.000	-434.6039	-262.9961
	2	-438.18000*	39.38104	.000	-523.9839	-352.3761
	3	-187.48000*	39.38104	.000	-273.2839	-101.6761
	4	-30.52000	39.38104	.453	-116.3239	55.2839
	6	63.22000	39.38104	.134	-22.5839	149.0239
6	1	-412.02000*	39.38104	.000	-497.8239	-326.2161
	2	-501.40000*	39.38104	.000	-587.2039	-415.5961
	3	-250.70000*	39.38104	.000	-336.5039	-164.8961
	4	-93.74000*	39.38104	.035	-179.5439	-7.9361
	5	-63.22000	39.38104	.134	-149.0239	22.5839

*. The mean difference is significant at the .05 level.

Table E3 One-way analysis of variance on the viscosity value of low-viscous state formulation

ANOVA

viscosityL

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3541.537	5	708.307	222.867	.000
Within Groups	38.138	12	3.178		
Total	3579.675	17			

Table E4 Multiple Comparisons on the viscosity value of low-viscous state formulation

Multiple Comparisons

Dependent Variable: viscosityL
LSD

(I) Formulation	(J) Formulation	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	13.0800000*	1.4556024	.000	9.908515	16.251485
	3	11.2270000*	1.4556024	.000	8.055515	14.398485
	4	28.1765000*	1.4556024	.000	25.005015	31.347985
	5	37.2235000*	1.4556024	.000	34.052015	40.394985
	6	37.3325000*	1.4556024	.000	34.161015	40.503985
2	1	-13.080000*	1.4556024	.000	-16.251485	-9.908515
	3	-1.8530000	1.4556024	.227	-5.024485	1.318485
	4	15.0965000*	1.4556024	.000	11.925015	18.267985
	5	24.1435000*	1.4556024	.000	20.972015	27.314985
	6	24.2525000*	1.4556024	.000	21.081015	27.423985
3	1	-11.227000*	1.4556024	.000	-14.398485	-8.055515
	2	1.8530000	1.4556024	.227	-1.318485	5.024485
	4	16.9495000*	1.4556024	.000	13.778015	20.120985
	5	25.9965000*	1.4556024	.000	22.825015	29.167985
	6	26.1055000*	1.4556024	.000	22.934015	29.276985
4	1	-28.176500*	1.4556024	.000	-31.347985	-25.005015
	2	-15.096500*	1.4556024	.000	-18.267985	-11.925015
	3	-16.949500*	1.4556024	.000	-20.120985	-13.778015
	5	9.0470000*	1.4556024	.000	5.875515	12.218485
	6	9.1560000*	1.4556024	.000	5.984515	12.327485
5	1	-37.223500*	1.4556024	.000	-40.394985	-34.052015
	2	-24.143500*	1.4556024	.000	-27.314985	-20.972015
	3	-25.996500*	1.4556024	.000	-29.167985	-22.825015
	4	-9.0470000*	1.4556024	.000	-12.218485	-5.875515
	6	.1090000	1.4556024	.942	-3.062485	3.280485
6	1	-37.332500*	1.4556024	.000	-40.503985	-34.161015
	2	-24.252500*	1.4556024	.000	-27.423985	-21.081015
	3	-26.105500*	1.4556024	.000	-29.276985	-22.934015
	4	-9.1560000*	1.4556024	.000	-12.327485	-5.984515
	5	-.1090000	1.4556024	.942	-3.280485	3.062485

*. The mean difference is significant at the .05 level.

Table E5 One-way analysis of variance on the percentage of drug release from monoglyceride-based drug delivery system containing triglyceride: monoglyceride: water in the ratio of 8:62:30 (formulation 1-3)

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Time1	Between Groups	225.166	2	112.583	61.782	.000
	Within Groups	16.400	9	1.822		
	Total	241.566	11			
Time3	Between Groups	152.136	2	76.068	28.936	.000
	Within Groups	23.660	9	2.629		
	Total	175.796	11			
Time6	Between Groups	70.154	2	35.077	6.701	.017
	Within Groups	47.115	9	5.235		
	Total	117.269	11			
Time9	Between Groups	25.276	2	12.638	1.585	.257
	Within Groups	71.782	9	7.976		
	Total	97.058	11			
Time12	Between Groups	22.828	2	11.414	1.725	.232
	Within Groups	59.554	9	6.617		
	Total	82.382	11			
Time24	Between Groups	14.317	2	7.159	1.377	.301
	Within Groups	46.780	9	5.198		
	Total	61.097	11			
Time36	Between Groups	3.655	2	1.827	.277	.764
	Within Groups	59.314	9	6.590		
	Total	62.968	11			
Time48	Between Groups	5.836	2	2.918	1.071	.383
	Within Groups	24.524	9	2.725		
	Total	30.359	11			

Table E6 Multiple comparisons on the percentage of drug release from monoglyceride-based drug delivery system containing triglyceride: monoglyceride: water in the ratio of 8:62:30 (formulation 1-3)

Multiple Comparisons

LSD

Dependent Variable	(I) Formulation	(J) Formulation	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Time1	1	2	2.84500*	.95453	.015	.6857	5.0043
		3	10.27500*	.95453	.000	8.1157	12.4343
	2	1	-2.84500*	.95453	.015	-5.0043	-.6857
		3	7.43000*	.95453	.000	5.2707	9.5893
	3	1	-10.27500*	.95453	.000	-12.4343	-8.1157
		2	-7.43000*	.95453	.000	-9.5893	-5.2707
Time3	1	2	5.73750*	1.14649	.001	3.1440	8.3310
		3	8.55750*	1.14649	.000	5.9640	11.1510
	2	1	-5.73750*	1.14649	.001	-8.3310	-3.1440
		3	2.82000*	1.14649	.036	.2265	5.4135
	3	1	-8.55750*	1.14649	.000	-11.1510	-5.9640
		2	-2.82000*	1.14649	.036	-5.4135	-.2265
Time6	1	2	3.80750*	1.61787	.043	.1476	7.4674
		3	5.83250*	1.61787	.006	2.1726	9.4924
	2	1	-3.80750*	1.61787	.043	-7.4674	-.1476
		3	2.02500	1.61787	.242	-1.6349	5.6849
	3	1	-5.83250*	1.61787	.006	-9.4924	-2.1726
		2	-2.02500	1.61787	.242	-5.6849	1.6349
Time9	1	2	2.05250	1.99697	.331	-2.4650	6.5700
		3	3.54000	1.99697	.110	-.9775	8.0575
	2	1	-2.05250	1.99697	.331	-6.5700	2.4650
		3	1.48750	1.99697	.475	-3.0300	6.0050
	3	1	-3.54000	1.99697	.110	-8.0575	.9775
		2	-1.48750	1.99697	.475	-6.0050	3.0300
Time12	1	2	3.36250	1.81895	.098	-.7522	7.4772
		3	1.96500	1.81895	.308	-2.1497	6.0797
	2	1	-3.36250	1.81895	.098	-7.4772	.7522
		3	-1.39750	1.81895	.462	-5.5122	2.7172
	3	1	-1.96500	1.81895	.308	-6.0797	2.1497
		2	1.39750	1.81895	.462	-2.7172	5.5122
Time24	1	2	2.15250	1.61211	.215	-1.4943	5.7993
		3	2.45250	1.61211	.163	-1.1943	6.0993
	2	1	-2.15250	1.61211	.215	-5.7993	1.4943
		3	.30000	1.61211	.856	-3.3468	3.9468
	3	1	-2.45250	1.61211	.163	-6.0993	1.1943
		2	-.30000	1.61211	.856	-3.9468	3.3468
Time36	1	2	.91250	1.81527	.627	-3.1939	5.0189
		3	1.32000	1.81527	.486	-2.7864	5.4264
	2	1	-.91250	1.81527	.627	-5.0189	3.1939
		3	.40750	1.81527	.827	-3.6989	4.5139
	3	1	-1.32000	1.81527	.486	-5.4264	2.7864
		2	-.40750	1.81527	.827	-4.5139	3.6989
Time48	1	2	1.32250	1.16723	.286	-1.3180	3.9630
		3	1.59750	1.16723	.204	-1.0430	4.2380
	2	1	-1.32250	1.16723	.286	-3.9630	1.3180
		3	.27500	1.16723	.819	-2.3655	2.9155
	3	1	-1.59750	1.16723	.204	-4.2380	1.0430
		2	-.27500	1.16723	.819	-2.9155	2.3655

*. The mean difference is significant at the .05 level.

Table E7 One-way analysis of variance on the percentage of drug release from monoglyceride-based drug delivery system containing triglyceride: monoglyceride: water in the ratio of 12:58:30 (formulation 4-6)

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Time1	Between Groups	255.595	2	127.798	70.640	.000
	Within Groups	16.282	9	1.809		
	Total	271.878	11			
Time3	Between Groups	227.302	2	113.651	65.858	.000
	Within Groups	15.531	9	1.726		
	Total	242.833	11			
Time6	Between Groups	57.936	2	28.968	12.047	.003
	Within Groups	21.641	9	2.405		
	Total	79.577	11			
Time9	Between Groups	30.377	2	15.189	7.447	.012
	Within Groups	18.355	9	2.039		
	Total	48.732	11			
Time12	Between Groups	7.394	2	3.697	1.399	.296
	Within Groups	23.781	9	2.642		
	Total	31.176	11			
Time24	Between Groups	4.841	2	2.421	.730	.509
	Within Groups	29.859	9	3.318		
	Total	34.700	11			
Time36	Between Groups	.946	2	.473	.384	.692
	Within Groups	11.096	9	1.233		
	Total	12.042	11			
Time48	Between Groups	.846	2	.423	.574	.583
	Within Groups	6.631	9	.737		
	Total	7.478	11			

Table E8 Multiple comparisons on the percentage of drug release from monoglyceride-based drug delivery system containing triglyceride: monoglyceride: water in the ratio of 12:58:30 (formulation 4-6)

Multiple Comparisons

LSD

Dependent Variable	(I) Formulation	(J) Formulation	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Time1	4	5	2.26750*	.95109	.041	.1160	4.4190
		6	10.72500*	.95109	.000	8.5735	12.8765
	5	4	-2.26750*	.95109	.041	-4.4190	-.1160
		6	8.45750*	.95109	.000	6.3060	10.6090
	6	4	-10.72500*	.95109	.000	-12.8765	-8.5735
		5	-8.45750*	.95109	.000	-10.6090	-6.3060
Time3	4	5	2.50000*	.92889	.025	.3987	4.6013
		6	10.22500*	.92889	.000	8.1237	12.3263
	5	4	-2.50000*	.92889	.025	-4.6013	-.3987
		6	7.72500*	.92889	.000	5.6237	9.8263
	6	4	-10.22500*	.92889	.000	-12.3263	-8.1237
		5	-7.72500*	.92889	.000	-9.8263	-5.6237
Time6	4	5	.70250	1.09649	.538	-1.7779	3.1829
		6	4.97250*	1.09649	.001	2.4921	7.4529
	5	4	-.70250	1.09649	.538	-3.1829	1.7779
		6	4.27000*	1.09649	.004	1.7896	6.7504
	6	4	-4.97250*	1.09649	.001	-7.4529	-2.4921
		5	-4.27000*	1.09649	.004	-6.7504	-1.7896
Time9	4	5	1.83250	1.00982	.103	-.4519	4.1169
		6	3.89500*	1.00982	.004	1.6106	6.1794
	5	4	-1.83250	1.00982	.103	-4.1169	.4519
		6	2.06250	1.00982	.071	-.2219	4.3469
	6	4	-3.89500*	1.00982	.004	-6.1794	-1.6106
		5	-2.06250	1.00982	.071	-4.3469	.2219
Time12	4	5	1.08250	1.14943	.371	-1.5177	3.6827
		6	1.91750	1.14943	.130	-.6827	4.5177
	5	4	-1.08250	1.14943	.371	-3.6827	1.5177
		6	.83500	1.14943	.486	-1.7652	3.4352
	6	4	-1.91750	1.14943	.130	-4.5177	.6827
		5	-.83500	1.14943	.486	-3.4352	1.7652
Time24	4	5	.33250	1.28795	.802	-2.5811	3.2461
		6	1.48250	1.28795	.279	-1.4311	4.3961
	5	4	-.33250	1.28795	.802	-3.2461	2.5811
		6	1.15000	1.28795	.395	-1.7636	4.0636
	6	4	-1.48250	1.28795	.279	-4.3961	1.4311
		5	-1.15000	1.28795	.395	-4.0636	1.7636
Time36	4	5	.32750	.78516	.686	-1.4486	2.1036
		6	.68750	.78516	.404	-1.0886	2.4636
	5	4	-.32750	.78516	.686	-2.1036	1.4486
		6	.36000	.78516	.657	-1.4161	2.1361
	6	4	-.68750	.78516	.404	-2.4636	1.0886
		5	-.36000	.78516	.657	-2.1361	1.4161
Time48	4	5	.39500	.60697	.531	-.9781	1.7681
		6	.64500	.60697	.316	-.7281	2.0181
	5	4	-.39500	.60697	.531	-1.7681	.9781
		6	.25000	.60697	.690	-1.1231	1.6231
	6	4	-.64500	.60697	.316	-2.0181	.7281
		5	-.25000	.60697	.690	-1.6231	1.1231

*. The mean difference is significant at the .05 level.

Table E9 One-way analysis of variance on the coefficient of determination of the kinetic models

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
formulation1	Between Groups	.102	2	.051	98.225	.000
	Within Groups	.005	9	.001		
	Total	.107	11			
formulation2	Between Groups	.097	2	.048	699.960	.000
	Within Groups	.001	9	.000		
	Total	.097	11			
formulation3	Between Groups	.166	2	.083	895.812	.000
	Within Groups	.001	9	.000		
	Total	.166	11			
formulation4	Between Groups	.070	2	.035	601.659	.000
	Within Groups	.001	9	.000		
	Total	.070	11			
formulation5	Between Groups	.077	2	.038	362.975	.000
	Within Groups	.001	9	.000		
	Total	.078	11			
formulation6	Between Groups	.119	2	.059	357.256	.000
	Within Groups	.001	9	.000		
	Total	.120	11			

Table E10 Multiple comparisons on the coefficient of determination of the kinetic models

Multiple Comparisons

LSD

Dependent Variable	(I) kinetic	(J) kinetic	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
formulation1	1	2	.1268571*	.0161009	.000	.090434	.163280
		3	-.0982074*	.0161009	.000	-.134630	-.061785
	2	1	-.1268571*	.0161009	.000	-.163280	-.090434
		3	-.2250645*	.0161009	.000	-.261487	-.188642
	3	1	.0982074*	.0161009	.000	.061785	.134630
		2	.2250645*	.0161009	.000	.188642	.261487
formulation2	1	2	.1274429*	.0058782	.000	.114146	.140740
		3	-.0915110*	.0058782	.000	-.104808	-.078214
	2	1	-.1274429*	.0058782	.000	-.140740	-.114146
		3	-.2189540*	.0058782	.000	-.232251	-.205657
	3	1	.0915110*	.0058782	.000	.078214	.104808
		2	.2189540*	.0058782	.000	.205657	.232251
formulation3	1	2	.1754223*	.0067990	.000	.160042	.190803
		3	-.1098649*	.0067990	.000	-.125245	-.094484
	2	1	-.1754223*	.0067990	.000	-.190803	-.160042
		3	-.2852872*	.0067990	.000	-.300668	-.269907
	3	1	.1098649*	.0067990	.000	.094484	.125245
		2	.2852872*	.0067990	.000	.269907	.300668
formulation4	1	2	.1068111*	.0053876	.000	.094623	.118999
		3	-.0794080*	.0053876	.000	-.091596	-.067220
	2	1	-.1068111*	.0053876	.000	-.118999	-.094623
		3	-.1862191*	.0053876	.000	-.198407	-.174031
	3	1	.0794080*	.0053876	.000	.067220	.091596
		2	.1862191*	.0053876	.000	.174031	.198407
formulation5	1	2	.1159238*	.0072647	.000	.099490	.132358
		3	-.0786245*	.0072647	.000	-.095058	-.062191
	2	1	-.1159238*	.0072647	.000	-.132358	-.099490
		3	-.1945483*	.0072647	.000	-.210982	-.178114
	3	1	.0786245*	.0072647	.000	.062191	.095058
		2	.1945483*	.0072647	.000	.178114	.210982
formulation6	1	2	.1497186*	.0091074	.000	.129116	.170321
		3	-.0913843*	.0091074	.000	-.111987	-.070782
	2	1	-.1497186*	.0091074	.000	-.170321	-.129116
		3	-.2411029*	.0091074	.000	-.261705	-.220501
	3	1	.0913843*	.0091074	.000	.070782	.111987
		2	.2411029*	.0091074	.000	.220501	.261705

*. The mean difference is significant at the .05 level.

* 1 is the zero-order kinetics

* 2 is the first-order kinetics

* 3 is the Higuchi model

Table E11 Analysis of variance by regression on the coefficient of determination of the Higuchi model of formulation 1

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2460.529	1	2460.529	187.365	.000[a]
	Residual	52.529	4	13.132		
	Total	2513.058	5			

a. Predictors: (Constant), x

b. Dependent Variable: y1

Table E12 Analysis of variance by regression on the coefficient of determination of the Higuchi model of formulation 2

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2610.857	1	2610.857	163.415	.000[a]
	Residual	63.907	4	15.977		
	Total	2674.765	5			

a. Predictors: (Constant), x

b. Dependent Variable: y2

Table E13 Analysis of variance by regression on the coefficient of determination of the Higuchi model of formulation 3

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3192.577	1	3192.577	117.507	.000[a]
	Residual	108.677	4	27.169		
	Total	3301.254	5			

a. Predictors: (Constant), x

b. Dependent Variable: y3

Table E14 Analysis of variance by regression on the coefficient of determination of the Higuchi model of formulation 4

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2640.035	1	2640.035	246.000	.000[a]
	Residual	42.927	4	10.732		
	Total	2682.962	5			

a. Predictors: (Constant), x

b. Dependent Variable: y4

Table E15 Analysis of variance by regression on the coefficient of determination of the Higuchi model of formulation 5

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2805.049	1	2805.049	273.185	.000[a]
	Residual	41.072	4	10.268		
	Total	2846.121	5			

a. Predictors: (Constant), x

b. Dependent Variable: y5

Table E16 Analysis of variance by regression on the coefficient of determination of the Higuchi model of formulation 6

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3560.704	1	3560.704	154.625	.000[a]
	Residual	92.112	4	23.028		
	Total	3652.816	5			

a. Predictors: (Constant), x

b. Dependent Variable: y6

Table E17 One-way analysis of variance on the Higuchi release rate constant of monoglyceride-based drug delivery system

ANOVA

K

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	31.062	5	6.212	35.868	.000
Within Groups	3.118	18	.173		
Total	34.179	23			

Table E18 Multiple comparisons on the Higuchi release rate constant of monoglyceride-based drug delivery system

Multiple Comparisons

Dependent Variable: K
LSD

(I) Formulation	(J) Formulation	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	2	-.4874462	.2942802	.115	-1.105706	.130814
	3	-2.2527503*	.2942802	.000	-2.871010	-1.634490
	4	-.5804142	.2942802	.064	-1.198674	.037846
	5	-1.0967948*	.2942802	.002	-1.715055	-.478535
	6	-3.2874222*	.2942802	.000	-3.905682	-2.669162
2	1	.4874462	.2942802	.115	-.130814	1.105706
	3	-1.7653041*	.2942802	.000	-2.383564	-1.147044
	4	-.0929680	.2942802	.756	-.711228	.525292
	5	-.6093486	.2942802	.053	-1.227608	.008911
	6	-2.7999760*	.2942802	.000	-3.418236	-2.181716
3	1	2.2527503*	.2942802	.000	1.634490	2.871010
	2	1.7653041*	.2942802	.000	1.147044	2.383564
	4	1.6723361*	.2942802	.000	1.054076	2.290596
	5	1.1559555*	.2942802	.001	.537696	1.774215
	6	-1.0346719*	.2942802	.002	-1.652932	-.416412
4	1	.5804142	.2942802	.064	-.037846	1.198674
	2	.0929680	.2942802	.756	-.525292	.711228
	3	-1.6723361*	.2942802	.000	-2.290596	-1.054076
	5	-.5163806	.2942802	.096	-1.134640	.101879
	6	-2.7070080*	.2942802	.000	-3.325268	-2.088748
5	1	1.0967948*	.2942802	.002	.478535	1.715055
	2	.6093486	.2942802	.053	-.008911	1.227608
	3	-1.1559555*	.2942802	.001	-1.774215	-.537696
	4	.5163806	.2942802	.096	-.101879	1.134640
	6	-2.1906274*	.2942802	.000	-2.808887	-1.572368
6	1	3.2874222*	.2942802	.000	2.669162	3.905682
	2	2.7999760*	.2942802	.000	2.181716	3.418236
	3	1.0346719*	.2942802	.002	.416412	1.652932
	4	2.7070080*	.2942802	.000	2.088748	3.325268
	5	2.1906274*	.2942802	.000	1.572368	2.808887

*. The mean difference is significant at the .05 level.

Table E19 One-way analysis of variance on the amount of mangostin in the low-viscous state formulation before and after the stability study

ANOVA

stabilityL

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.500	1	.500	12.776	.001
Within Groups	1.331	34	.039		
Total	1.831	35			

Table E20 One-way analysis of variance on the amount of mangostin in the high-viscous liquid crystalline phase formulation before and after the stability study

ANOVA

stabilityH

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.764	1	.764	7.649	.009
Within Groups	3.396	34	.100		
Total	4.160	35			

Table E21 One-way analysis of variance on the amount of mangostin remaining in the low-viscous state formulation

ANOVA

stabilityL

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.050	5	.010	.235	.940
Within Groups	.514	12	.043		
Total	.565	17			

Table E22 Multiple comparisons on the amount of mangostin remaining in the low-viscous state formulation

Multiple Comparisons

Dependent Variable: stabilityL
LSD

(I) Formulation	(J) Formulation	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
1	2	.0220667	.1690250	.898	-.346207	.390341
	3	-.0973667	.1690250	.575	-.465641	.270907
	4	.0290333	.1690250	.866	-.339241	.397307
	5	-.0238333	.1690250	.890	-.392107	.344441
	6	-.1014000	.1690250	.560	-.469674	.266874
2	1	-.0220667	.1690250	.898	-.390341	.346207
	3	-.1194333	.1690250	.493	-.487707	.248841
	4	.0069667	.1690250	.968	-.361307	.375241
	5	-.0459000	.1690250	.791	-.414174	.322374
	6	-.1234667	.1690250	.479	-.491741	.244807
3	1	.0973667	.1690250	.575	-.270907	.465641
	2	.1194333	.1690250	.493	-.248841	.487707
	4	.1264000	.1690250	.469	-.241874	.494674
	5	.0735333	.1690250	.671	-.294741	.441807
	6	-.0040333	.1690250	.981	-.372307	.364241
4	1	-.0290333	.1690250	.866	-.397307	.339241
	2	-.0069667	.1690250	.968	-.375241	.361307
	3	-.1264000	.1690250	.469	-.494674	.241874
	5	-.0528667	.1690250	.760	-.421141	.315407
	6	-.1304333	.1690250	.455	-.498707	.237841
5	1	.0238333	.1690250	.890	-.344441	.392107
	2	.0459000	.1690250	.791	-.322374	.414174
	3	-.0735333	.1690250	.671	-.441807	.294741
	4	.0528667	.1690250	.760	-.315407	.421141
	6	-.0775667	.1690250	.655	-.445841	.290707
6	1	.1014000	.1690250	.560	-.266874	.469674
	2	.1234667	.1690250	.479	-.244807	.491741
	3	.0040333	.1690250	.981	-.364241	.372307
	4	.1304333	.1690250	.455	-.237841	.498707
	5	.0775667	.1690250	.655	-.290707	.445841

Table E23 One-way analysis of variance on the amount of mangostin remaining in the high-viscous liquid crystalline phase formulation

ANOVA

stabilityH

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.037	5	.007	.039	.999
Within Groups	2.288	12	.191		
Total	2.325	17			

Table E24 Multiple comparisons on the amount of mangostin remaining in the high-viscous liquid crystalline phase formulation

Multiple Comparisons

Dependent Variable: stabilityH
LSD

(I) Formulation	(J) Formulation	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
1	2	.0521000	.3565356	.886	-.724724	.828924
	3	.0621333	.3565356	.865	-.714691	.838958
	4	.0568667	.3565356	.876	-.719958	.833691
	5	.0022333	.3565356	.995	-.774591	.779058
	6	.1365000	.3565356	.709	-.640324	.913324
2	1	-.0521000	.3565356	.886	-.828924	.724724
	3	.0100333	.3565356	.978	-.766791	.786858
	4	.0047667	.3565356	.990	-.772058	.781591
	5	-.0498667	.3565356	.891	-.826691	.726958
	6	.0844000	.3565356	.817	-.692424	.861224
3	1	-.0621333	.3565356	.865	-.838958	.714691
	2	-.0100333	.3565356	.978	-.786858	.766791
	4	-.0052667	.3565356	.988	-.782091	.771558
	5	-.0599000	.3565356	.869	-.836724	.716924
	6	.0743667	.3565356	.838	-.702458	.851191
4	1	-.0568667	.3565356	.876	-.833691	.719958
	2	-.0047667	.3565356	.990	-.781591	.772058
	3	.0052667	.3565356	.988	-.771558	.782091
	5	-.0546333	.3565356	.881	-.831458	.722191
	6	.0796333	.3565356	.827	-.697191	.856458
5	1	-.0022333	.3565356	.995	-.779058	.774591
	2	.0498667	.3565356	.891	-.726958	.826691
	3	.0599000	.3565356	.869	-.716924	.836724
	4	.0546333	.3565356	.881	-.722191	.831458
	6	.1342667	.3565356	.713	-.642558	.911091
6	1	-.1365000	.3565356	.709	-.913324	.640324
	2	-.0844000	.3565356	.817	-.861224	.692424
	3	-.0743667	.3565356	.838	-.851191	.702458
	4	-.0796333	.3565356	.827	-.856458	.697191
	5	-.1342667	.3565356	.713	-.911091	.642558

APPENDIX F

HPLC Chromatogram of Stability Study

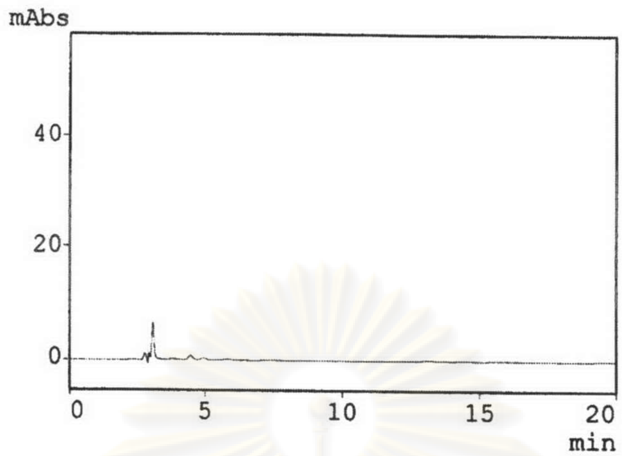

Figure F1 HPLC chromatogram of blank sample with sesame oil

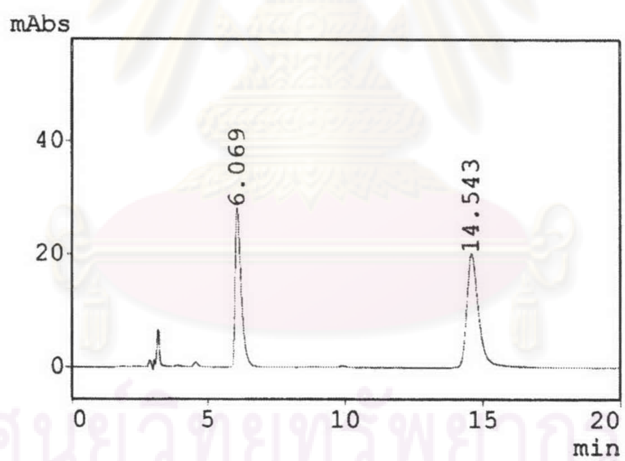

Figure F2 HPLC chromatogram of internal standard and sample with sesame oil

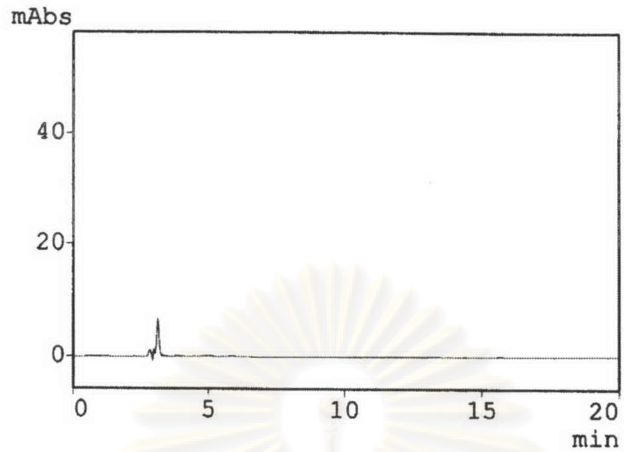

Figure F3 HPLC chromatogram of blank sample with soybean oil

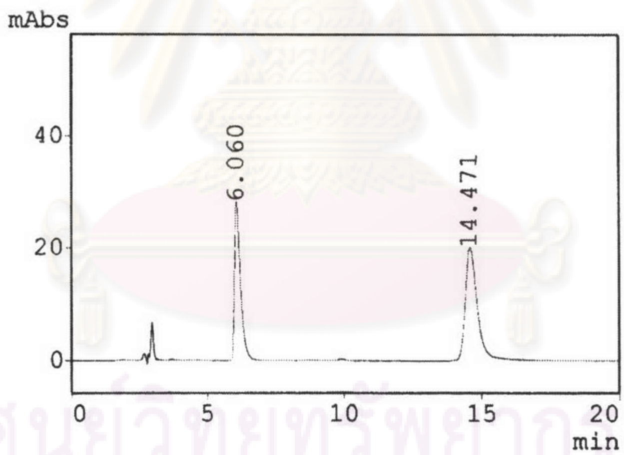

Figure F4 HPLC chromatogram of internal standard and sample with soybean oil

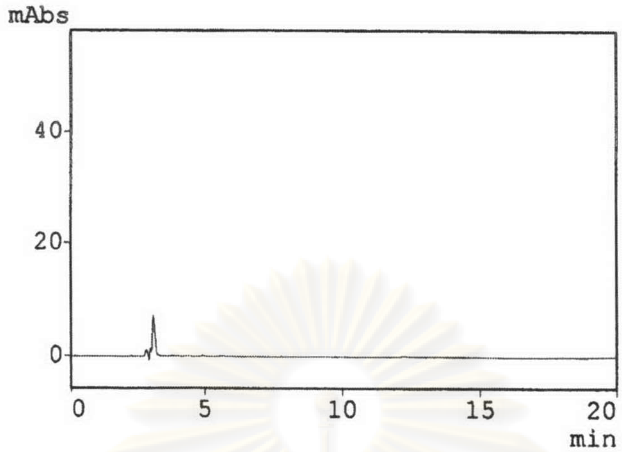

Figure F5 HPLC chromatogram of blank sample with olive oil

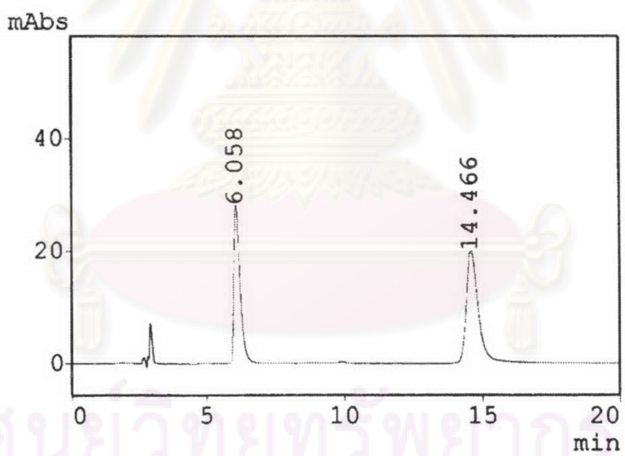

Figure F6 HPLC chromatogram of internal standard and sample with olive oil

VITA

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