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APPENDICES

APPENDIX A

Physicochemical properties of substances

1. Soybean oil (Kibbe,2000)

1.1 Chemical name

Soybean oil

1.2 Appearance

Soybean oil is a clear pale yellow colored, odorless or almost odorless liquid with a bland taste that solidifies at -10 to –16 °C.

1.3 Solubility

Soybean oil is a practically insoluble in ethanol (95%) and water; miscible with carbon disulfide, chloroform, ether and light petroleum.

1.4 Purity

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.

1.5 Applications in pharmaceutical formation

In pharmaceutical preparations, soybean oil emulsion is primary used as a fat source in total parenteral nutrition (TPN) regimens. Although other oils, such as peanut oils have been used for this propose, soybean oil is now preferred since it is associated with fewer adverse reactions. Emulsions containing soybean oil have also been used as vehicle for oral and intravenous administration of drugs; drug substance that have been incorporated into such emulsions included amphotericin, retinoids, vitamin, poorly soluble steriods and fluorocarbons.

1.6 Safety

Soybean oil is widely used intramuscularly as a drug vehicle or as a component of emulsions used in parenteral nutrition regimens; it is also consumed as edible oil. Generally, soybean oil is regarded as an essential nontoxic and nonirritant material. However, serious adverse reactions to soybean oil emulsions administerd parenterally have been reported. These conclude cases of hypersensitivity, CNS reactions and fat embolism.

LD_{50} (mouse, IV) : 22.1 g/kg
LD_{50} (rat, IV) : 16.5 g/kg

1.7 Regulatory status

Included in the FDA Inactive Ingredients Guide (IV injections, oral capsules and topical preparations). Included in non-parenteral and parenteral medicines licensed in the UK.

2. Tween 80 (Kibbe, 2000)

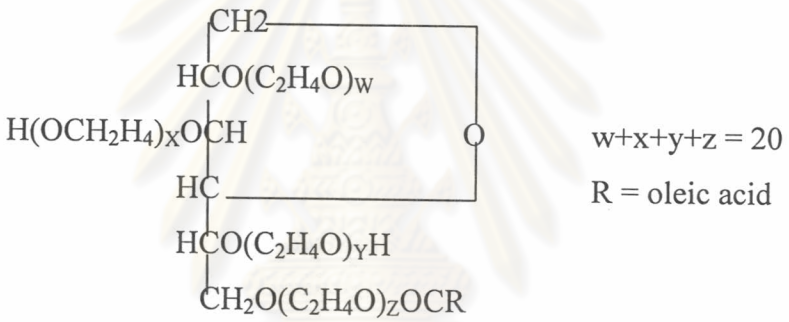
2.1 Chemical name

Polyoxyethylene 20 sorbitan momooleate

2.2 Molecular formula

$C_{64}H_{124}O_{26}$ (MW =1310)

2.3 Chemical structure



2.4 Appearance

Tween 80 is clear yellow oily liquid with a faint characteristic odor, somewhat bitter taste. It has a HLB value of 15

2.5 Solubility

Tween 80 is soluble in water and ethanol, insoluble in mineral oil and vegetable oil

2.6 Applications in pharmaceutical formulation

Polysorbates containning 20 units of oxyethylene are hydrophillic non-ionic surfactants, which are used widely as emulsifying agents in the preparation of stable o/w pharmaceutical emulsions. They may also be used as solubilizing agents for a variety of substances including in oil and oil-soluble vitamins, and as wetting agent in the formulation of oral and parenteral suspensions.

2.7 Safety

Tween 80 is widely used in cosmetics, food products, and oral parenteral and topical formulation and is generally regarded as nontoxic and non irritant material. The WHO has set an estimated acceptable daily intake for tween 80, calculated as total polysorbate ester at up to 25 mg/kg

LD_{50} (mouse, oral) : 25 g/kg
LD_{50} (rat, IV) : 1.22 g/kg

2.8 Regulatory status

Polysorbate 80 is included in the FDA Inactive Ingredients Giude (IV, IM, oral, rectal, topical and vaginal preparations). Polysorbates are included in non-parenteral and parenteral medicines licensed in the UK.

3. Cremophor

3.1 Chemical nature

Cremophor EL is a nonionic solubilizer and emulsifier made by reacting caster oil with ethylene oxide in a molar ratio of 1:35.

3.2 Composition

The main component of Cremophor EL is glycerol polyethylene glycol Ricinoleate. Together with fatty acid esters of polyethylene glycol, this forms the hydrophobic part of the product. The smaller hydrophilic part consists of free polyethylene glycols and ethoxylates glycerol

3.3 Description

Cremophor EL is a pale yellow oily liquid that is clear at temperatures above 26C. It has a faint but characteristic odour. The hydrophilic-lipophilic balance (HLB) lies between 12 and 14. The critical micelle concentration (CMC) lies at approx. 0.02%

3.4 Solubility

Cremophor EL forms clear solution in water. It is also soluble in many organic solvents, e.g. ethyl alcohol ,n-propyl alcohol, isopropyl alcohol, ethyl acetate, chloroform, carbon tetrachloride, trichloroethylene , toluene and xylene. In contrast to anionic emulsifying agents, Cremophor EL becomes less soluble in water at higher temperatures. Thus, aqueous solutions become turbid at certain temperature. Cremophor EL is miscible with all the other Cremophor grades and,on heating, also with fatty acids,fatty alcohols and certain animal and vegetable oils. It is thus miscible with oleic and stearic acids, dodacyl and octadecyl alcohols, castor oil, and a number of lipid-soluble substances.

3.5 Stability

Cremophor EL is stable for at least 2 years if stored in the unopened original containers at room temperature (max.25°C). In aqueous solutions, Cremophor EL is stable towards electrolytes, e.g. acids and salts, provided that their concentration is not too high. Mercury (II) chloride is an exception, as it forms a precipitate with the product. Similarly, some organic substances may cause precipitation at certain concentrations, especially compounds containing phenolic hydroxyl groups, e.g. phenol, tannin and resorcinol. Cremophor EL can be sterilized by heating in an autoclave for 30 minutes at 120 °C. This may give it a deeper shade. To avoid saponification, Cremophor EL should not be heated together with very acidic or basic substances.

3.6 Application

Cremophor EL is recommended as a solubilizer and emulsifier in many Different branches of industry. It is particularly suitable for the production of liquid preparations. The form in which a hydrophobic substance is a distributed in a liquid depends largely on its properties and on the amount of Cremophor EL used. It has been found that. As a rule, if Cremophor EL is present in excess, clear or opalescent liquids are obtained. However, if the proportion of Cremophor EL is reduced to 5-10% of the water insoluble substance, conditions exist for the formation of an emulsion.

3.7 Pharmaceutical preparation

Cremophor EL emulsifies or solubilizes the fat-soluble vitamins A, D, E and K in aqueous solutions for oral and topical administration. In aqueous alcoholic solutions it very readily solubilizes essential oils. Aqueous solutions of hydrophobic drugs (e.g. Miconazole, Hexedetine, Clotrimazole, Benzocaine) can also be prepared with Cremophor EL

3.8 Toxicology

Cremophor EL is tolerated extremely well, as tests with single and repeated oral dosed and exposure tests on the skin and mucous membranes.

3.9 Packaging

60 kg and 120 kg. Removable head steel drums with a Lupolen® inliner with its own lid.

3.10 Storage

Cremophor EL should be stored in tightly closed containers protected from light. Prolonged storage is not recommended unless the containers are completely full.

3.11 Safety data sheet

A safety data sheet is available for Cremophor EL

4. Lutrol F 127 (Poloxamer 407)

4.1 Structure

Polyoxyethylene-polyoxypropylene block copolymer of the general structure.

4.2 CFTA name

Poloxamer 407

4.3 Description

White, coarse-grained powder with a waxy consistency. The product contains BHT. The methods of determination can be obtained from the European Pharmacopoeia and the monograph "Poloxamer" from the USP/NF. The product fulfils the requirements of this monograph. Moreover,it corresponds to the draft monograph of the European Pharmacopoeia.

4.4 Solubility

Lutrol F127 is soluble in water, ethanol(95%) and isopropanol. It is insoluble in ether, paraffin and fatty oils.

4.5 Applications

Lutrol F127 is used as a thickening agent and gel former, as a co-emulsifier and consistency enhancer in creams and liquid emulsions. It is also used as a solubilizer for certain active substances, for example, nifedipine, naproxen, and fenticonazole, and for essential oils in pharmaceutical and cosmetic preparations. Lutrol F127 is suitable, moreover, for the formulation of those active materials that respond to neutralization with reduced solubility. Owing to its ability to affect viscocity, Lutrol F127 is soluble as a stabilizer for topically and orally administered suspensions. Furthermore, Lutrol F127 is used in toothpastes, gargles and mouthwashes.

4.6 Rheological properties

Dilute aqueous solutions exhibit Newtonian flow properties that give way to plastic flow properties with pronounced fluid flow limits at concentration above ca. Lutrol F127 gels are thermo-reversible. They exhibit a marked viscocity maximum in the 30-60 C range. The sol-gel transition temperaturesof aqueous Lutrol F127 solution of different concentrations,and their viscocity as a function of temperature are shown.

5. Lutrol F-68

5.1 Chemical nature

Polyoxyehtylene-polyoxypropylene block copolymer of the general formula. The proportion by weight of polyoxyehtylene is approx. 80%

5.2 INCI name

Poloxamer 188

5.3 Description

White to slightly yellowish waxy substance in the form of micropearls; weak odour.

5.4 Solubility

Lutrol F 68 is readily soluble in ethanol, dissolves readily in water to give an opalescent solution, and is insoluble in diethyl ether, paraffin and fatty oils.
Solubility in selected organic solvents

Methylene chloride	approx 35%
Chloroform	approx 40%
Acetonitrile	approx 20%
Acetone	approx 2%
Ethyl acetate	approx 1.5%

5.5 Fields of application

Lutrol F 68 is used as an emulsufier and solubilizer, also in parenteral application. Its solubilizing effect does not depend on the formation of micelles. Further, Lutrol F 68 is used as a dispersing and wetting agent for the preparation of solid dispersions and to improve the solubility, absorption and bioavailability of low-solubility drugs in solid oral dosage forms. Melt granulation and spray granulation can also be used for this purpose. In addition, Lutrol F 68 can also be used as a coemulsifier in creams and amulsions, as a suspension stabilizer and as a tablet lubricant.

5.6 Rheological properties

Aqueous solutions of Lutrol F 68 display Newtonian flow properties that change to plastic flow properties above a concentration of approx 60%. Aqueous solutions containing more than 20% Lutrol F 68 are thermoreversible, i.e. they demonstrate a viscosity minimum between 20 and 40C and a viscosity maximum between 60 and 75 C. Repeated heating and cooling does not affect this property.

APPENDIX B

The diffusion of drug from microemulsion gel system

Table b1 The diffusion of metronidazole from formulation 1/6 , [IPM:T_{80}:W, IPM:T_{80} =1:9, 7%water]

Time (hrs)	% Drug diffusion				
	n1	n2	n3	mean	SD
0.5	7.19	5.51	6.17	6.29	0.84
1	10.87	8.74	9.74	9.78	1.07
1.5	13.82	11.56	13.11	12.83	1.16
2	17.78	14.74	17.05	16.53	1.59
2.5	20.80	17.01	19.93	19.25	1.99
3	23.65	19.75	23.36	22.25	2.17
4	28.78	24.61	28.55	27.31	2.35
6	39.06	35.40	39.65	38.04	2.31
8	50.71	47.29	49.81	49.27	1.77
10	59.84	55.42	59.77	58.34	2.53
12	70.82	67.87	71.05	69.91	1.78
18	84.17	83.03	84.43	83.88	0.75
24	90.49	89.61	89.92	90.01	0.45

Table b2 The diffusion of metronidazole from formulation 2/4, [CO:C_{EL}:W:PG (4:1), 3:7, 25% water].

Time (hrs)	% Drug diffusion				
	n1	n2	n3	mean	SD
0.5	6.54	5.30	5.93	5.92	0.62
1	11.90	9.44	9.93	10.42	1.30
1.5	17.35	12.92	13.59	14.62	2.39
2	21.22	15.95	16.56	17.91	2.89
2.5	23.74	18.81	19.59	20.71	2.65
3	26.64	21.67	22.44	23.58	2.68
4	32.41	26.73	28.16	29.10	2.95
6	39.18	35.50	37.43	37.37	1.84
8	48.26	49.95	47.14	48.45	1.41
10	62.25	58.15	57.51	59.31	2.57
12	69.91	66.02	66.98	67.64	2.03
18	80.89	77.87	76.70	78.49	2.16
24	85.61	82.42	84.21	84.08	1.60

Table b3 The diffusion of metronidazole from formulation 3/1, [IPM:T_{80}:L_{68}:W,(T_{80}:L_{68} = 2:1),3:4.67:2.33, 25% water].

Time (hrs)	% Drug diffusion				
	n1	n2	n3	mean	SD
0.5	7.89	7.05	7.91	7.62	0.49
1	10.62	9.76	10.45	10.28	0.45
1.5	12.76	11.71	12.64	12.37	0.58
2	15.44	14.28	15.50	15.07	0.69
2.5	17.47	16.37	17.77	17.20	0.74
3	19.48	18.40	19.81	19.23	0.74
4	22.45	24.92	23.10	23.49	1.28
6	28.36	29.94	29.47	29.26	0.81
8	33.11	34.33	34.51	33.99	0.77
10	37.88	38.51	39.66	38.69	0.90
12	43.34	42.34	44.10	43.26	0.88
18	55.76	54.94	56.85	55.85	0.96
24	65.27	65.51	66.46	65.75	0.63

Table b4 The diffusion of metronidazole from formulation 3/4 ,
[IPM:T_{80}:L_{68}:W, (T_{80}:L_{68} =2:1), 2: 5.33 :2.67 , 20% water].

Time (hrs)	% Drug diffusion				
	n1	n2	n3	mean	SD
0.5	5.40	6.06	4.16	5.21	0.97
1	10.26	9.94	8.90	9.70	0.71
1.5	14.79	13.33	13.72	13.95	0.75
2	17.56	15.48	16.15	16.40	1.06
2.5	20.94	18.33	19.20	19.49	1.33
3	23.77	20.68	21.84	22.10	1.56
4	27.21	26.97	28.99	27.73	1.10
6	38.91	36.83	36.69	37.48	1.24
8	49.78	45.89	48.84	48.17	2.03
10	59.38	56.83	59.50	58.57	1.51
12	67.58	64.76	67.43	66.59	1.59
18	81.16	78.74	81.85	80.58	1.63
24	85.20	82.80	85.49	84.50	1.48

Table b5 The diffusion of metronidazole from formulation 3/5 ,
[IPM:T_{80}:L_{68}:W,(T_{80}:L_{68} =2:1), 2: 5.33: 2.67 , 25% water].

Time (hrs)	% Drug diffusion				
	n1	n2	n3	mean	SD
0.5	3.63	3.49	4.32	3.81	0.45
1	7.40	6.96	8.17	7.51	0.61
1.5	10.76	10.09	11.71	10.85	0.81
2	13.69	13.23	14.77	13.90	0.79
2.5	17.02	16.10	17.42	16.85	0.68
3	20.06	18.55	19.99	19.53	0.85
4	25.59	23.78	25.85	25.07	1.13
6	35.58	32.55	35.95	34.69	1.87
8	44.15	42.30	46.32	44.26	2.01
10	53.33	51.86	55.26	53.48	1.71
12	62.99	59.66	64.15	62.27	2.33
18	76.16	75.70	78.69	76.85	1.61
24	84.24	84.29	84.43	84.32	0.10

Table b6 The diffusion of metronidazole from formulation 4/3,
[IPM : C_{EL} : W: PG (4:1), 3:7 , 25%water]

Time (hrs)	% Drug diffusion				
	n1	n2	n3	mean	SD
0.5	6.33	3.94	4.58	4.95	1.24
1	10.96	7.74	8.40	9.04	1.70
1.5	14.58	11.35	12.34	12.75	1.66
2	17.47	14.80	16.11	16.12	1.33
2.5	20.10	17.61	19.69	19.13	1.34
3	22.28	20.39	23.03	21.90	1.36
4	26.67	26.32	28.75	27.25	1.31
6	33.89	36.44	37.59	35.97	1.89
8	41.45	44.24	44.61	43.43	1.73
10	48.61	48.52	51.79	49.64	1.86
12	53.03	54.96	55.30	54.43	1.22
18	66.35	69.96	67.49	67.93	1.84
24	77.41	79.53	80.49	79.14	1.57

Table b7 The diffusion of metronidazole from formulation 5/2 [IPM : C_{RH}: W: PG (4:1), 4:6 , 20%water]

Time (hrs)	% Drug diffusion				
	n1	n2	n3	mean	SD
0.5	6.69	6.63	6.73	6.68	0.05
1	10.50	10.43	10.54	10.49	0.06
1.5	13.20	13.12	13.41	13.24	0.15
2	15.52	15.44	15.60	15.52	0.08
2.5	18.10	17.52	18.17	17.93	0.36
3	20.51	19.57	20.77	20.29	0.63
4	23.68	22.86	23.89	23.48	0.54
6	29.38	28.52	29.57	29.16	0.56
8	33.78	32.79	33.81	33.46	0.58
10	38.23	37.26	37.75	37.75	0.49
12	43.20	44.71	42.42	43.45	1.16
18	57.11	56.88	56.34	56.78	0.40
24	70.33	70.76	74.38	71.82	2.23

Table b8 The diffusion of metronidazole from formulation 5/3 [IPM : C_{RH}: W: PG (4:1), 4:6 , 15%water].

Time (hrs)	% Drug diffusion				
	n1	n2	n3	mean	SD
0.5	7.09	7.05	7.71	7.28	0.37
1	9.25	9.18	9.64	9.36	0.24
1.5	11.32	11.27	11.04	11.21	0.15
2	13.64	13.58	12.75	13.32	0.50
2.5	16.12	15.34	14.75	15.40	0.69
3	17.63	17.04	16.48	17.05	0.58
4	23.28	22.66	22.12	22.69	0.58
6	32.78	32.10	32.02	32.30	0.42
8	40.12	39.42	38.98	39.51	0.58
10	46.73	46.00	45.61	46.12	0.57
12	52.73	51.99	52.65	52.46	0.41
18	60.64	59.86	60.27	60.26	0.39
24	68.86	68.07	68.44	68.46	0.40

Table b9 The diffusion of metronidazole from formulation 6/1, [IPM : T_{80} : C_{EL} : W, 3 : 3.5 : 3.5 , water 15%]

Time (hrs)	% Drug diffusion				
	n1	n2	n3	mean	SD
0.5	5.72	5.55	5.93	5.73	0.19
1	8.69	8.85	9.30	8.95	0.31
1.5	12.08	12.49	13.51	12.69	0.74
2	14.32	15.16	15.91	15.13	0.80
2.5	16.08	17.61	17.71	17.13	0.91
3	18.14	20.31	19.73	19.39	1.13
4	22.39	24.61	23.34	23.45	1.12
6	29.67	31.30	28.81	29.93	1.26
8	35.45	36.40	33.26	35.04	1.61
10	40.37	41.07	36.98	39.47	2.19
12	44.19	44.78	40.53	43.17	2.30
18	53.84	53.89	50.53	52.75	1.92
24	62.14	61.70	59.96	61.26	1.15

Table b10 The diffusion of metronidazole from formulation 6/4, [IPM : T_{80} : C_{EL} : W, 1 : 4.5 : 4.5 , water 20%]

Time (hrs)	% Drug diffusion				
	n1	n2	n3	mean	SD
0.5	5.82	6.03	4.38	5.41	0.90
1	9.92	10.26	8.19	9.46	1.11
1.5	13.22	13.53	11.75	12.83	0.95
2	15.66	15.98	14.18	15.27	0.96
2.5	18.28	18.55	16.87	17.90	0.90
3	21.00	21.30	19.52	20.61	0.95
4	27.61	28.30	25.79	27.24	1.30
6	36.42	36.66	36.65	36.58	0.14
8	46.40	45.77	44.68	45.62	0.87
10	56.48	53.57	55.07	55.04	1.45
12	66.13	63.36	64.12	64.54	1.43
18	82.68	81.83	80.64	81.72	1.03
24	86.31	84.90	84.12	85.11	1.11

Table b11 The diffusion of metronidazole from formulation 7/1 [IPM : T_{80} : B_{35} : W, 3 : 3.5 : 3.5 , water 15%].

Time (hrs)	% Drug diffusion				
	n1	n2	n3	mean	SD
0.5	4.97	4.96	5.56	5.16	0.35
1	7.25	7.23	8.30	7.59	0.61
1.5	9.91	9.87	10.65	10.14	0.44
2	11.64	11.60	12.33	11.86	0.41
2.5	13.04	13.00	13.68	13.24	0.38
3	14.70	14.66	15.29	14.88	0.35
4	17.40	17.38	17.84	17.54	0.26
6	21.72	21.78	22.29	21.93	0.31
8	25.35	25.55	26.04	25.65	0.36
10	28.72	28.88	29.20	28.93	0.25
12	31.84	32.02	32.37	32.08	0.27
18	40.84	41.01	41.28	41.04	0.22
24	48.43	48.74	49.85	49.01	0.75

Table b12 The diffusion of metronidazole from formulation 8/1, [SBO : T_{80} : W, 1:9 , water 7%].

Time (hrs)	% Drug diffusion				
	n1	n2	n3	mean	SD
0.5	8.98	6.75	7.93	7.88	1.12
1	13.51	10.15	11.15	11.60	1.73
1.5	16.30	13.52	14.93	14.92	1.39
2	19.55	17.57	18.95	18.69	1.01
2.5	22.70	20.38	21.65	21.58	1.17
3	26.00	23.56	25.08	24.88	1.23
4	32.05	30.32	32.20	31.53	1.04
6	44.89	43.48	45.01	44.46	0.85
8	57.54	54.03	54.48	55.35	1.91
10	67.19	64.23	65.13	65.51	1.51
12	73.45	75.22	74.78	74.48	0.92
18	83.46	87.64	86.06	85.72	2.12
24	91.29	92.51	90.26	91.36	1.13

Table b13 In vitro diffusion of 1.5% w/w of metronidazole from various MEG base and liquid crystal system.

Time(hrs)	Average % drug release of metronidazole											
	Formulation											
	Rx1/6	Rx2/4	Rx3/1	Rx3/4	Rx3/5	Rx4/3	Rx5/2	Rx5/3	Rx6/1	Rx6/4	Rx7/1	Rx8/1
0	0	0	0	0	0	0	0	0	0	0	0	0
0.5	6.29	5.92	5.21	7.62	3.81	4.95	6.27	7.28	5.73	5.41	5.16	7.88
1	9.78	10.42	9.70	10.28	7.51	9.04	11.00	9.36	8.95	9.46	7.59	11.60
1.5	12.83	14.62	13.95	12.37	10.85	12.75	14.50	11.21	12.69	12.83	10.14	14.92
2	16.53	17.91	16.40	15.07	13.90	16.12	18.09	13.32	15.13	15.27	11.86	18.69
2.5	19.25	20.71	19.49	17.20	16.85	19.13	21.69	15.40	17.13	17.90	13.24	21.58
3	22.25	23.58	22.10	19.23	19.53	21.90	24.96	17.05	19.39	20.61	14.88	24.88
4	27.31	29.10	27.73	23.49	25.07	27.25	30.11	22.69	23.45	27.24	17.54	31.53
6	38.04	37.37	37.48	29.26	34.69	35.97	38.55	32.30	29.93	36.58	21.93	44.46
8	49.27	48.45	48.17	33.99	44.26	43.43	46.25	39.51	35.04	45.62	25.65	55.35
10	58.34	59.31	58.57	38.69	53.48	49.64	52.49	46.12	39.47	55.04	28.93	65.51
12	69.91	67.64	66.59	43.26	62.27	54.43	60.61	52.46	43.17	64.54	32.08	74.48
18	83.88	78.49	80.58	55.85	76.85	67.93	73.35	60.26	52.75	81.72	41.04	85.72
24	90.01	84.08	84.50	65.75	84.32	79.14	84.46	68.46	61.26	85.11	49.01	91.36

APPENDIX C

Composition of reduced transport fluid (RTF) [a]

Components of reduced transport fluid are comprised of list below;

components	Amount (ml)
1. stock mineral salt solution no.1 [b]	75
2. stock mineral salt solution no.2 [c]	75
3. 0.1M EDTA	10
4. 8% Na_2CO_3	5
5. 1% dithiothreitol (freshly prepared)	20
6. resazurin 0.1% (optional)	1
7. distilled water	814

[a] Formula per liter of RTF; prepared by membrane filter sterilization by using membrane filter (0.22 μm pore size) and dispensed into 16, 125 mm screw-cap tubes (dilution tubes) and by 150 mm 150 test tubes (sample collection tubes). The pH of RTF was decreased to 7 in 48 hrs in the anaerobic glove box atmosphere (85%N_2, 10%H_2, 5%CO_2).

[b] Contained 0.6% K_2HPO_4

[c] Contained 1.2%NaCl, 1.2%$(NH_4)_2$ SO_4 , 0.6%K_2HPO_4 and $MgSO_4$.

Composition of plaque agar

components	Amount (ml)
1. bacto-tryptone	10
2. yeast extract	10
3. $K_2HPO_4.3H_2O$	3.3
4. $MgSO_4.7H_2O$	2.5
5. soluble starch	2
6. glucose	2
7. cysteine HCL	1
8. agar (Jpan agar)	12
9. Distilled water	1000 ml

After autoclaving 4 ml. (1 mg) of menadione solution* and 100 ml of hemolysed calf blood (100 ml blood + 200 ml sterile distilled water are added before pouring onto the plates.

*Menadione solution

Put 1 ampule of phytomenadionium (stable form of menadione, 10 mg/ml) to 39 ml of sterile water. Finally concentration in plaque agar = 1 mg/1000 ml.

Plaque = Plaque agar does not add agar

Composition of Mc Farland No.1

One percentage of Barium chloride ($Bacl_2$) 1 ml and 1% sulfuric acid (H_2SO_4) 99 ml were mixed well and the bottle was tightly wrapped . Keep the bottle far from the light, the solution can be use for six months.

Table c1 Antimicrobial activity of each pharmaceutical excipient inhibition zone.

Group 1 pharmaceutical composition	Mean diameter inhibition zone (mm.)					
	n1	n2	n3	average	SD	average±SD
control group	0.00	0.00	0.00	0.00	0.00	0.00± 0.00
isopropyl myristate	2.00	2.10	2.11	2.07	0.06	2.07± 0.06
castor oil	2.00	2.05	2.08	2.04	0.04	2.04± 0.04
soybean oil	1.00	1.22	1.25	1.16	0.14	1.16± 0.14
tween 80	3.00	3.18	3.10	3.09	0.09	3.09± 0.09
cremophor EL	5.00	5.02	5.10	5.04	0.05	5.04± 0.05
cremophor RH40	2.00	2.05	2.01	2.02	0.03	2.02± 0.03
Brij 35	5.00	5.05	5.01	5.02	0.03	5.02± 0.03
Lutrol F-68	3.00	3.05	3.05	3.03	0.03	3.03± 0.03

Table c2 Antimicrobial activity as of inhibition zone; MEG base.

Group 2	MEG base	Mean diameter inhibition zone (mm.)					
		n1	n2	n3	average	SD	avearge±SD
group	Control group	0.00	0.00	0.00	0.00	0.00	0.00 ± 0.00
Base 2	CO : C_{EL} : W: PG (4:1)	12.00	12.15	12.20	12.12	0.10	12.12± 0.10
Base 3	IPM : T_{80} : L_{68} : W (T_{80}:L_{68} = 2:1)	14.00	14.25	14.20	14.15	0.13	14.15± 0.13
Base 4	IPM : C_{EL} : W: PG (4:1)	12.00	12.10	12.18	12.09	0.09	12.09± 0.09
Base 5	IPM : C_{RH}: W: PG (4:1)	25.00	25.00	25.10	25.03	0.06	25.03± 0.06
Base 6	IPM : T_{80} : C_{EL} : W	11.00	11.00	11.12	11.04	0.07	11.04± 0.07
Base 7	IPM : T_{80} : B_{35} : W	19.00	19.50	19.25	19.25	0.25	19.25± 0.25
Base 8	SBO : T_{80} : W	18.00	18.00	18.20	18.07	0.12	18.07± 0.12

Table c3 Antimicrobial activity of the MEG containing 1.5% w/w metronidazole.

Group 3 1.5% w/w MTZ	System	Ratio of oil:surfactant (% water)	Mean diameter inhibition zone (cm.)											
			freshly prepare				After freeze-thawing				After FDA-stability			
			n1	n2	average	sd	n1	n2	avearage	sd	n1	n2	average	sd
CO : C_{EL} : W: PG (4:1)	2/4)	3:7 (25%)	7.30	7.35	7.33	0.04	7.35	7.35	7.35	0.00	7.60	7.60	7.60	0.00
IPM : T_{80} : L_{68} : W (T_{80}:L_{68} = 2:1)	3/4)	2:5.33:2.6(20%)	7.30	7.50	7.40	0.14	7.50	7.58	7.54	0.06	7.30	7.38	7.34	0.06
IPM : C_{EL} : W: PG (4:1)	4/3)	3:7 (25%)	7.60	7.50	7.55	0.07	-				-			
IPM : C_{RH}: W: PG (4:1)	5/1)	3:7 (14.52%)	7.00	7.00	7.00	0.00	7.60	7.50	7.55	0.07	7.10	7.25	7.18	0.11
	5/2)	4:6 (20%)	7.40	7.38	7.39	0.01	-				-			
IPM : T_{80} : C_{EL} : W	6/4)	1:4.5:4.5 (water20%)	7.10	7.25	7.18	0.11	-				-			
IPM : T_{80} : B_{35} : W	7/1)	3:3.5:3.5 (water15%)	7.35	7.25	7.30	0.07	7.70	7.68	7.69	0.01	7.35	7.40	7.38	0.04

Table c4 The result of ANOVA test of minimum inhibition zone of each component.

Test of Homogeneity of Variances

INHIBIT

Levene Statistic	df1	df2	Sig.
3.290	7	16	.023

(I) component	(J) component	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
IPM	CO	.0267	.04216	1.000	-.2352	.2885
	SBO	.9133	.08628	.020*	.2748	1.5519
	T_{80}	-1.0233	.06280	.002*	-1.4111	-.6355
	C_{EL}	-2.9700	.04655	.000*	-3.2377	-2.7023
	C_{RH}	.0500	.03830	.941	-.2364	.3364
	B_{35}	-2.9500	.03830	.000*	-3.2364	-2.6636
	L_{68}	-.9633	.03887	.002*	-1.2431	-.6836
CO	IPM	-.0267	.04216	1.000	-.2885	.2352
	SBO	.8867	.08219	.030*	.1778	1.5956
	T_{80}	-1.0500	.05706	.004*	-1.4712	-.6288
	C_{EL}	-2.9967	.03844	.000*	-3.2243	-2.7690
	C_{RH}	.0233	.02789	.999	-.1509	.1975
	B_{35}	-2.9767	.02789	.000*	-3.1509	-2.8025
	L_{68}	-.9900	.02867	.000*	-1.1634	-.8166
SBO	IPM	-.9133	.08628	.020*	-1.5519	-.2748
	CO	-.8867	.08219	.030*	-1.5956	-.1778
	T_{80}	-1.9367	.09446	.001*	-2.5245	-1.3488
	C_{EL}	-3.8833	.08452	.001*	-4.5467	-3.2200
	C_{RH}	-.8633	.08028	.038*	-1.6243	-.1024
	B_{35}	-3.8633	.08028	.002*	-4.6243	-3.1024
	L_{68}	-1.8767	.08055	.007*	-2.6291	-1.1242
T_{80}	IPM	1.0233	.06280	.002*	.6355	1.4111
	CO	1.0500	.05706	.004*	.6288	1.4712
	SBO	1.9367	.09446	.001*	1.3488	2.5245
	C_{EL}	-1.9467	.06037	.000*	-2.3415	-1.5519
	C_{RH}	1.0733	.05426	.008*	.6041	1.5426
	B_{35}	-1.9267	.05426	.002*	-2.3959	-1.4574
	L_{68}	.0600	.05467	.976	-.4001	.5201
C_{EL}	IPM	2.9700	.04655	.000*	2.7023	3.2377
	CO	2.9967	.03844	.000*	2.7690	3.2243
	SBO	3.8833	.08452	.001*	3.2200	4.5467
	C_{EL}	1.9467	.06037	.000*	1.5519	2.3415
	C_{RH}	3.0200	.03416	.000*	2.7799	3.2601
	B_{35}	.0200	.03416	1.000	-.2201	.2601
	L_{68}	2.0067	.03480	.000*	1.7716	2.2418
C_{RH}	IPM	-.0500	.03830	.941	-.3364	.2364
	CO	-.0233	.02789	.999	-.1975	.1509
	SBO	.8633	.08028	.038*	.1024	1.6243
	T_{80}	-1.0733	.05426	.008*	-1.5426	-.6041
	C_{EL}	-3.0200	.03416	.000*	-3.2601	-2.7799
	B_{35}	-3.0000	.02160	.000*	-3.1228	-2.8772
	L_{68}	-1.0133	.02261	.000*	-1.1425	-.8842

(I) component	(J) component	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
B_{35}	IPM	2.9500	.03830	.000*	2.6636	3.2364
	CO	2.9767	.02789	.000*	2.8025	3.1509
	SBO	3.8633	.08028	.002*	3.1024	4.6243
	T_{80}	1.9267	.05426	.002*	1.4574	2.3959
	C_{EL}	-.0200	.03416	1.000	-.2601	.2201
	C_{RH}	3.0000	.02160	.000*	2.8772	3.1228
	L_{68}	1.9867	.02261	.000*	1.8575	2.1158
L_{68}	IPM	.9633	.03887	.002*	.6836	1.2431
	CO	.9900	.02867	.000*	.8166	1.1634
	SBO	1.8767	.08055	.007*	1.1242	2.6291
	T_{80}	-.0600	.05467	.976	-.5201	.4001
	C_{EL}	-2.0067	.03480	.000*	-2.2418	-1.7716
	C_{RH}	1.0133	.02261	.000*	.8842	1.1425
	B_{35}	-1.9867	.02261	.000*	-2.1158	-1.8575

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

Table c5 The result of ANOVA test of minimum inhibition zone of each base.

Test of Homogeneity of Variances

INH

Levene Statistic	df1	df2	Sig.
1.189	6	14	.367

(I) BASE	(J) BASE	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Base2	Base3	-2.0333	.09718	.000*	-2.5802	-1.4865
	Base4	.0233	.07951	1.000	-.4151	.4617
	Base5	-12.9167	.06872	.000*	-13.3575	-12.4758
	Base6	1.0767	.07219	.002*	.6477	1.5056
	Base7	-7.1333	.15635	.000*	-8.2724	-5.9943
	Base8	-5.9500	.08975	.000*	-6.4421	-5.4579
Base3	Base2	2.0333	.09718	.000*	1.4865	2.5802
	Base4	2.0567	.09244	.001*	1.5123	2.6010
	Base5	-10.8833	.08333	.000*	-11.4784	-10.2883
	Base6	3.1100	.08622	.000*	2.5424	3.6776
	Base7	-5.1000	.16330	.000*	-6.1701	-4.0299
	Base8	-3.9167	.10138	.000*	-4.4750	-3.3583
Base4	Base2	-.0233	.07951	1.000	-.4617	.4151
	Base3	-2.0567	.09244	.001*	-2.6010	-1.5123
	Base5	-12.9400	.06182	.000*	-13.3130	-12.5670
	Base6	1.0533	.06566	.001*	.6815	1.4252
	Base7	-7.1567	.15344	.001*	-8.3400	-5.9733
	Base8	-5.9733	.08459	.000*	-6.4503	-5.4964
Base5	Base2	12.9167	.06872	.000*	12.4758	13.3575
	Base3	10.8833	.08333	.000*	10.2883	11.4784
	Base4	12.9400	.06182	.000*	12.5670	13.3130
	Base6	13.9933	.05207	.000*	13.7042	14.2825
	Base7	5.7833	.14814	.002*	4.4843	7.0823
	Base8	6.9667	.07454	.000*	6.4656	7.4678
Base6	Base2	-1.0767	.07219	.002*	-1.5056	-.6477
	Base3	-3.1100	.08622	.000*	-3.6776	-2.5424
	Base4	-1.0533	.06566	.001*	-1.4252	-.6815
	Base5	-13.9933	.05207	.000*	-14.2825	-13.7042
	Base7	-8.2100	.14978	.001*	-9.4675	-6.9525
	Base8	-7.0267	.07775	.000*	-7.5086	-6.5447
Base7	Base2	7.1333	.15635	.000*	5.9943	8.2724
	Base3	5.1000	.16330	.000*	4.0299	6.1701
	Base4	7.1567	.15344	.001*	5.9733	8.3400
	Base5	-5.7833	.14814	.002*	-7.0823	-4.4843
	Base6	8.2100	.14978	.001*	6.9525	9.4675
	Base8	1.1833	.15899	.042*	.0758	2.2908
Base8	Base2	5.9500	.08975	.000*	5.4579	6.4421
	Base3	3.9167	.10138	.000*	3.3583	4.4750
	Base4	5.9733	.08459	.000*	5.4964	6.4503
	Base5	-6.9667	.07454	.000*	-7.4678	-6.4656
	Base6	7.0267	.07775	.000*	6.5447	7.5086
	Base7	-1.1833	.15899	.042*	-2.2908	-.0758

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

Table c6 The result of ANOVA test of minimum inhibition zone of individual formulation. (Dunnett T3).

(I) drug load formulation	(J) drug load formulation	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Rx 2/4	Rx 3/4	-.0750	.10308	.992	-2.7690	2.6190
	Rx 4/3	-.2250	.05590	.324	-1.0827	.6327
	Rx 5/1	.3250	.02500	.133	-.5465	1.1965
	Rx 5/2	-.0650	.02693	.595	-.5732	.4432
	Rx 6/4	.1500	.07906	.727	-1.5791	1.8791
	Rx 7/1	.0250	.05590	1.000	-.8327	.8827
Rx 3/4	Rx 2/4	.0750	.10308	.992	-2.6190	2.7690
	Rx 4/3	-.1500	.11180	.886	-1.8654	1.5654
	Rx 5/1	.4000	.10000	.413	-3.0860	3.8860
	Rx 5/2	.0100	.10050	1.000	-3.3178	3.3378
	Rx 6/4	.2250	.12500	.745	-1.1289	1.5789
	Rx 7/1	.1000	.11180	.981	-1.6154	1.8154
Rx 4/3	Rx 2/4	.2250	.05590	.324	-.6327	1.0827
	Rx 3/4	.1500	.11180	.886	-1.5654	1.8654
	Rx 5/1	.5500	.05000	.157	-1.1930	2.2930
	Rx 5/2	.1600	.05099	.495	-1.3056	1.6256
	Rx 6/4	.3750	.09014	.274	-.6881	1.4381
	Rx 7/1	.2500	.07071	.320	-.4463	.9463
Rx 5/1	Rx 2/4	-.3250	.02500	.133	-1.1965	.5465
	Rx 3/4	-.4000	.10000	.413	-3.8860	3.0860
	Rx 4/3	-.5500	.05000	.157	-2.2930	1.1930
	Rx 5/2	-.3900	.01000	**.045***	-.7386	-.0414
	Rx 6/4	-.1750	.07500	.642	-2.7895	2.4395
	Rx 7/1	-.3000	.05000	.284	-2.0430	1.4430
Rx 5/2	Rx 2/4	.0650	.02693	.595	-.4432	.5732
	Rx 3/4	-.0100	.10050	1.000	-3.3378	3.3178
	Rx 4/3	-.1600	.05099	.495	-1.6256	1.3056
	Rx 5/1	.3900	.01000	**.045***	.0414	.7386
	Rx 6/4	.2150	.07566	.547	-2.1959	2.6259
	Rx 7/1	.0900	.05099	.767	-1.3756	1.5556
Rx 6/4	Rx 2/4	-.1500	.07906	.727	-1.8791	1.5791
	Rx 3/4	-.2250	.12500	.745	-1.5789	1.1289
	Rx 4/3	-.3750	.09014	.274	-1.4381	.6881
	Rx 5/1	.1750	.07500	.642	-2.4395	2.7895
	Rx 5/2	-.2150	.07566	.547	-2.6259	2.1959
	Rx 7/1	-.1250	.09014	.878	-1.1881	.9381
Rx 7/1	Rx 2/4	-.0250	.05590	1.000	-.8827	.8327
	Rx 3/4	-.1000	.11180	.981	-1.8154	1.6154
	Rx 4/3	-.2500	.07071	.320	-.9463	.4463
	Rx 5/1	.3000	.05000	.284	-1.4430	2.0430
	Rx 5/2	-.0900	.05099	.767	-1.5556	1.3756
	Rx 6/4	.1250	.09014	.878	-.9381	1.1881

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

Table c7 The result of 2 tailed paired-sample T test of minimum inhibition zone between formulation before and after freeze-thawing stability testing (Formulation 2/4).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 B24 - FT24	-.0250	.03536	.02500	-.3427	.2927	-1.000	1	.500

Table c8 The result of 2 tailed paired-sample T test of minimum inhibition zone between formulation before and after FDA stability testing (Formulation 2/4).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 B24 - FDA24	-.2750	.03536	.02500	-.5927	.0427	-11.000	1	.058

Table c9 The result of 2 tailed paired-sample T test of minimum inhibition zone between formulation before and after freeze-thawing stability testing (Formulation 3/4).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 B34 - FT34	-.1400	.08485	.06000	-.9024	.6224	-2.333	1	.258

Table c10 The result of 2 tailed paired-sample T test of minimum inhibition zone between formulation before and after FDA stability testing (Formulation 3/4).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 B34 - FDA34	.0600	.08485	.06000	-.7024	.8224	1.000	1	.500

Table c11 The result of 2 tailed paired-sample T test of minimum inhibition zone between formulation before and after freeze-thawing stability testing (Formulation 5/1).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 B51 - FT51	-.5500	.07071	.05000	-1.1853	.0853	-11.000	1	.058

Table c12 The result of 2 tailed paired-sample T test of minimum inhibition zone between formulation before and after FDA stability testing (Formulation 5/1).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 B51 - FDA51	-.1750	.10607	.07500	-1.1280	.7780	-2.333	1	.258

Table c13 The result of 2 tailed paired-sample T test of minimum inhibition zone between formulation before and after freeze-thawing stability testing (Formulation 7/1).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 B71 - FT71	-.3900	.05657	.04000	-.8982	.1182	-9.750	1	.065

Table c14 The result of 2 tailed paired-sample T test of minimum inhibition zone between formulation before and after FDA stability testing (Formulation 7/1).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 B71 - FDA71	-.0750	.10607	.07500	-1.0280	.8780	-1.000	1	.500

APPENDIX D

Particle size determination of microemulsion gel

The particle size of microemulsion gel was determined by transmission electron microscopy (TEM) following negative staining. The average particle diameter of each sample was measured from TEM photograph of about 300 particles/formulation. The mean particle diameter was obtained from *SemAfore* version 4.0 program after setting the scale before measuring had performed, the image scale has to be determined. Scaling requires that there is something of accurately known size visible in the image. Usually a size calibration bar ('micron bar') is available in the TEM image. This program was developed for accurate measurement. The average particle size and %frequency of each sample were calculated by program SPSS version 11.0. The results is number based.

The TEM photomicrographs of each formulation both before and after stability testing (freeze-thawing technique) are shown in Figure d1-1,1-2 to d17-1,17-2. The data particle size determination of microemulsion gel are listed in Tables d1 to d 68.

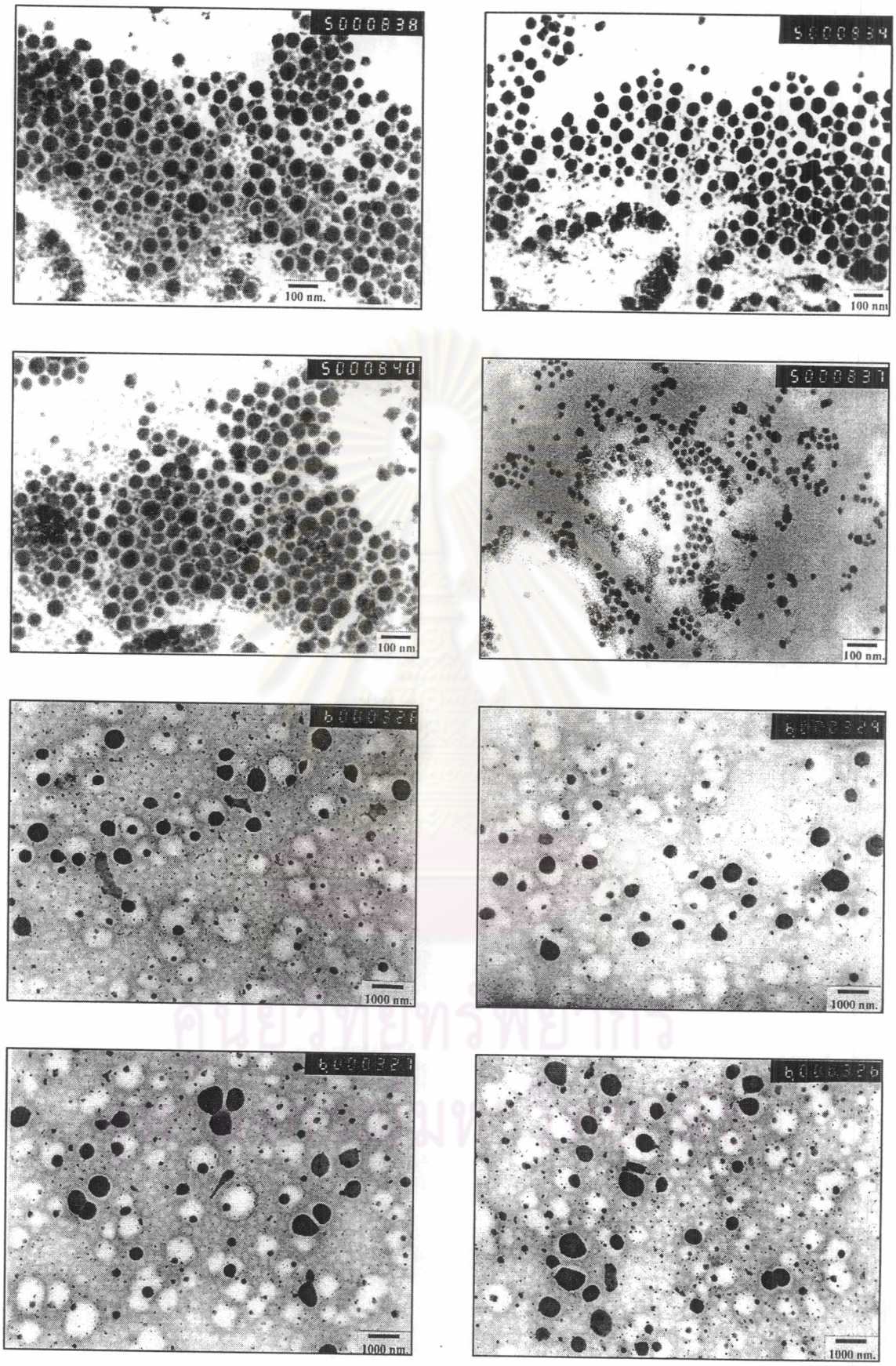


Figure d 1-1 The TEM photomicrograph of formulation (1/1) IPM : T_{80} : W (10%) (IPM:T_{80}=5:5) before stability testing.

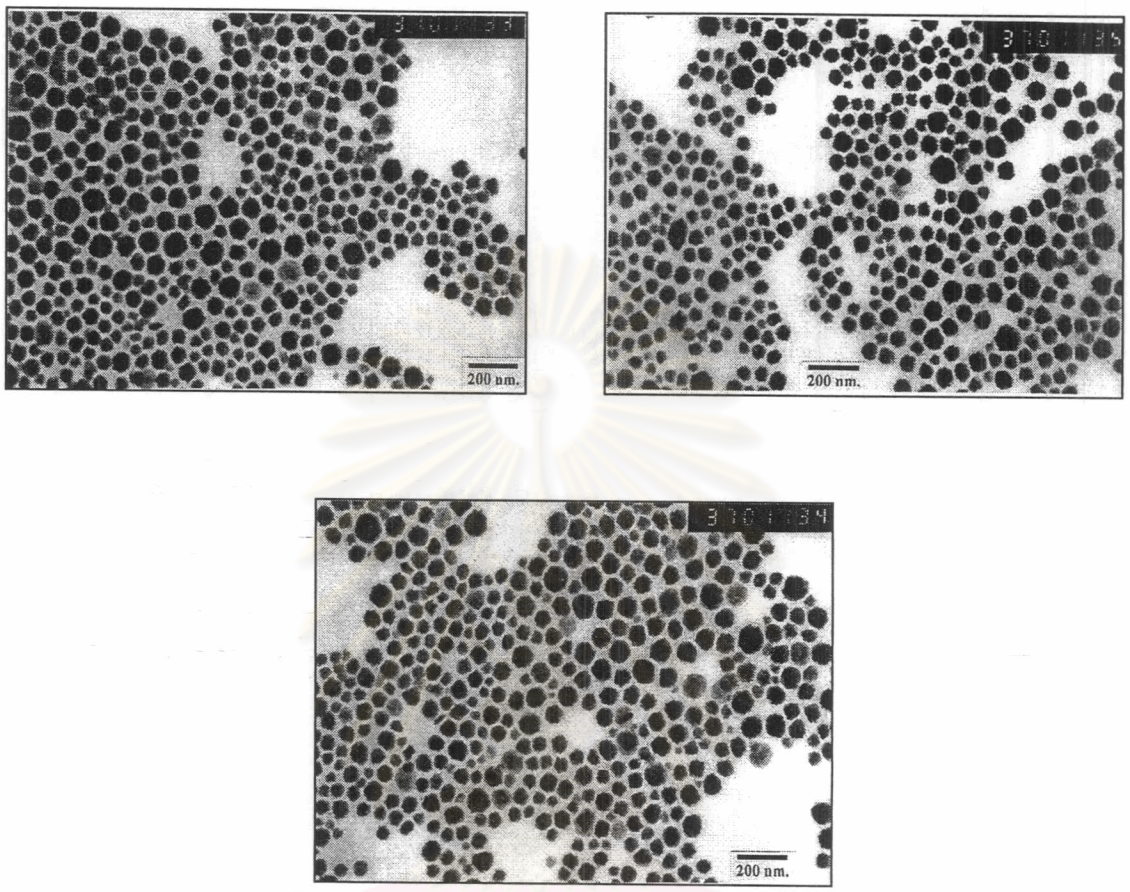


Figure d 1-2 The TEM photomicrograph of formulation (1/1) IPM : T_{80} : W (10%) (IPM:T_{80}=5:5) after stability testing.

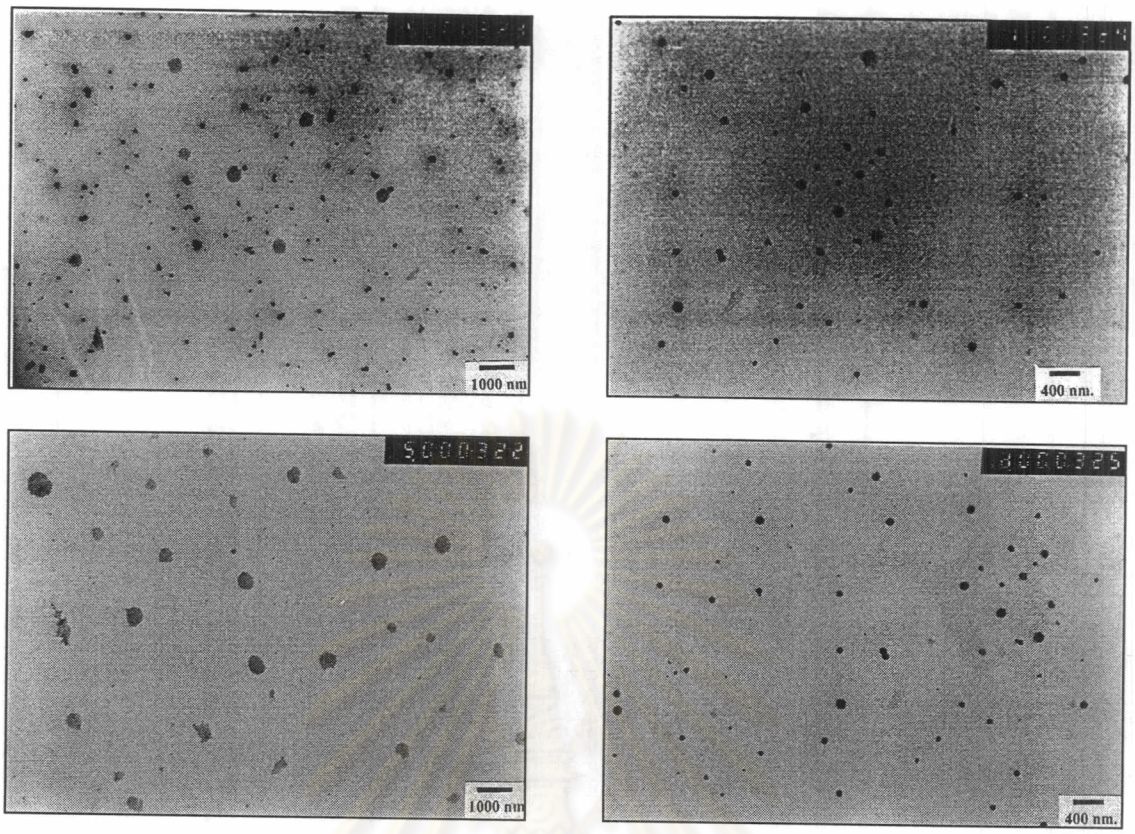


Figure d 2-1 The TEM photomicrograph of formulation (1/3) IPM : T_{80} : W (10%) (IPM:T_{80}=4:6) before stability testing.

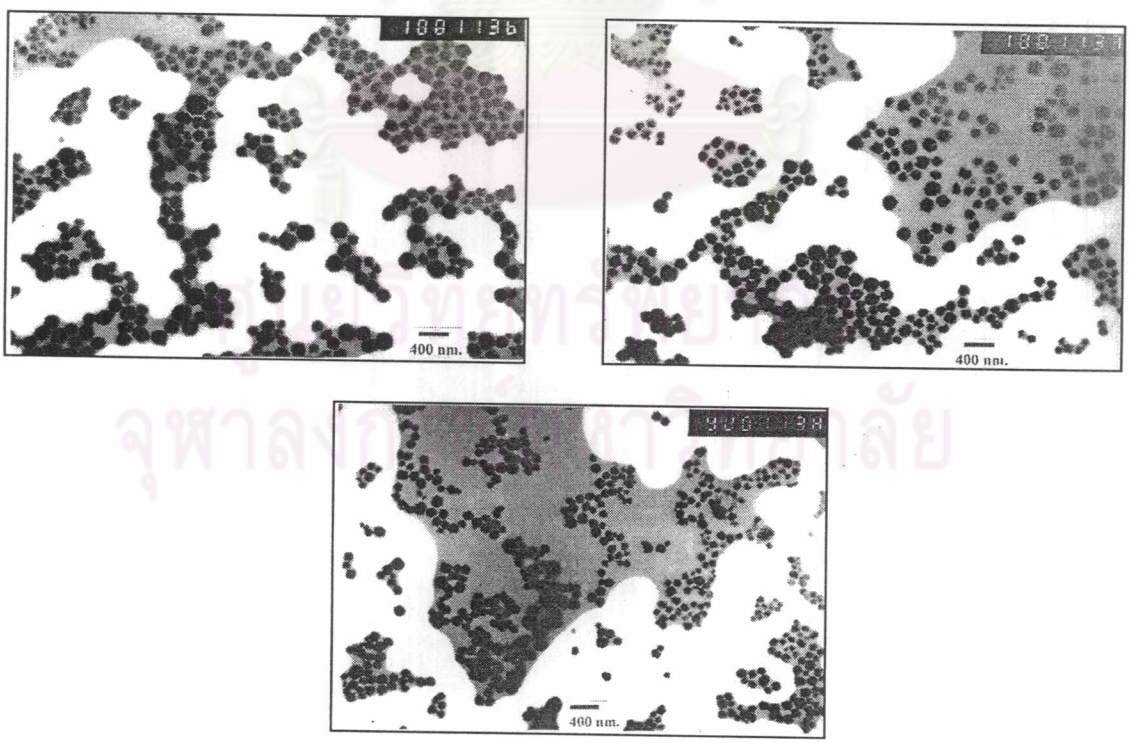


Figure d 2-2 The TEM photomicrograph of formulation (1/3) IPM : T_{80} : W (10%) (IPM:T_{80}=4:6) after stability testing.

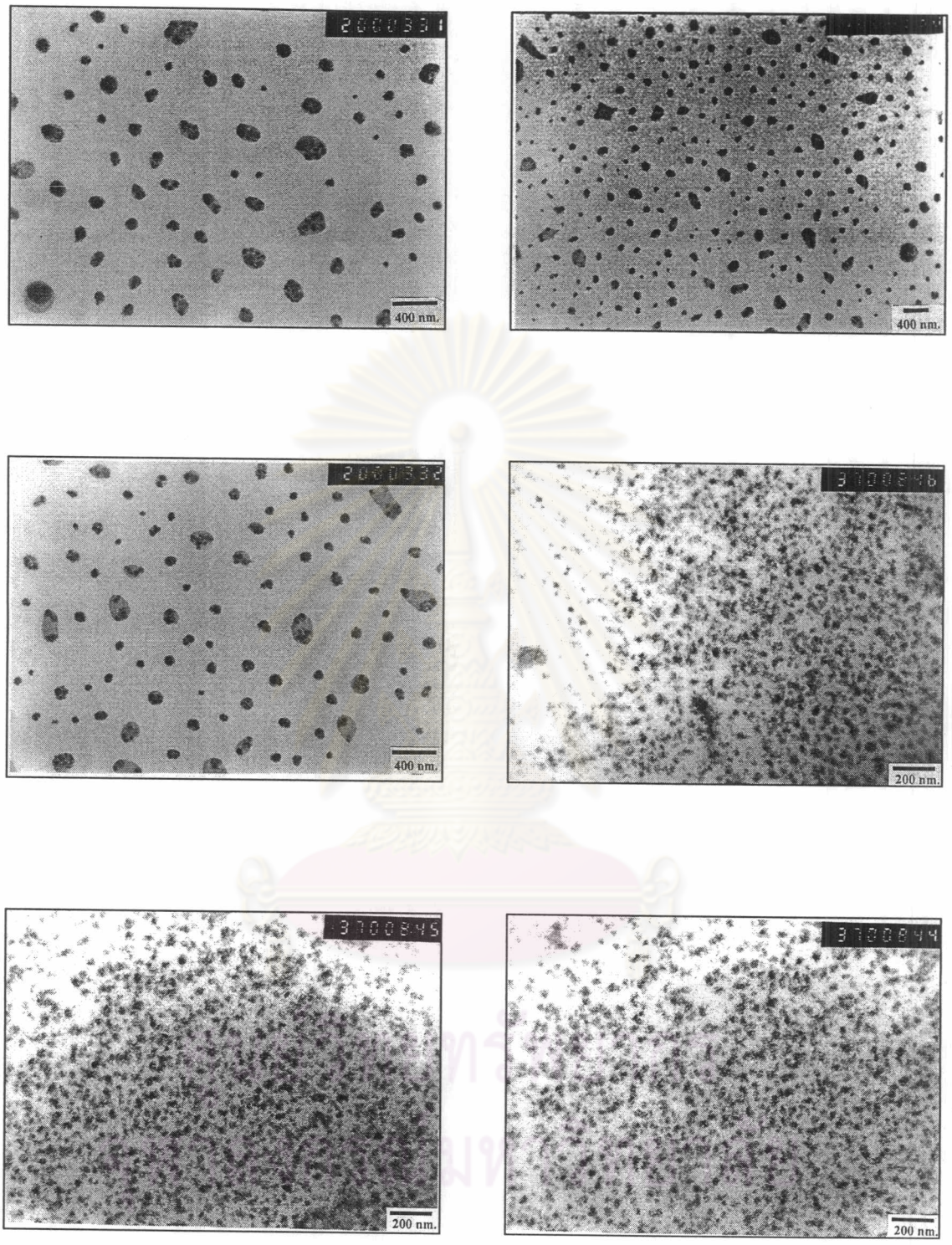


Figure d 3-1 The TEM photomicrograph of formulation (1/5) IPM : T_{80} : W (10%) (IPM:T_{80}=3:7) before stability testing.

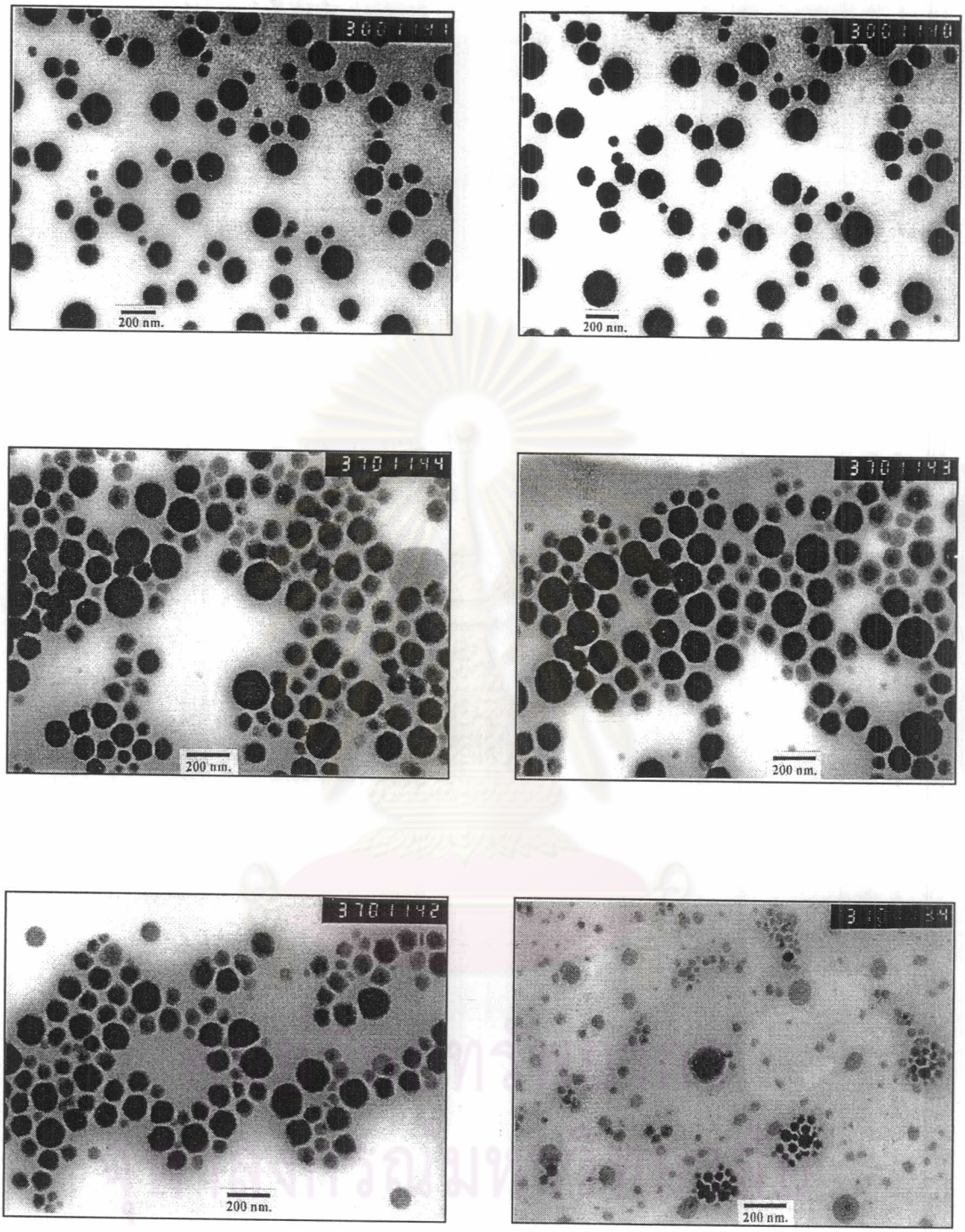


Figure d 3-2 The TEM photomicrograph of formulation (1/5) IPM : T_{80} : W (10%) (IPM:T_{80}=3:7) after stability testing.

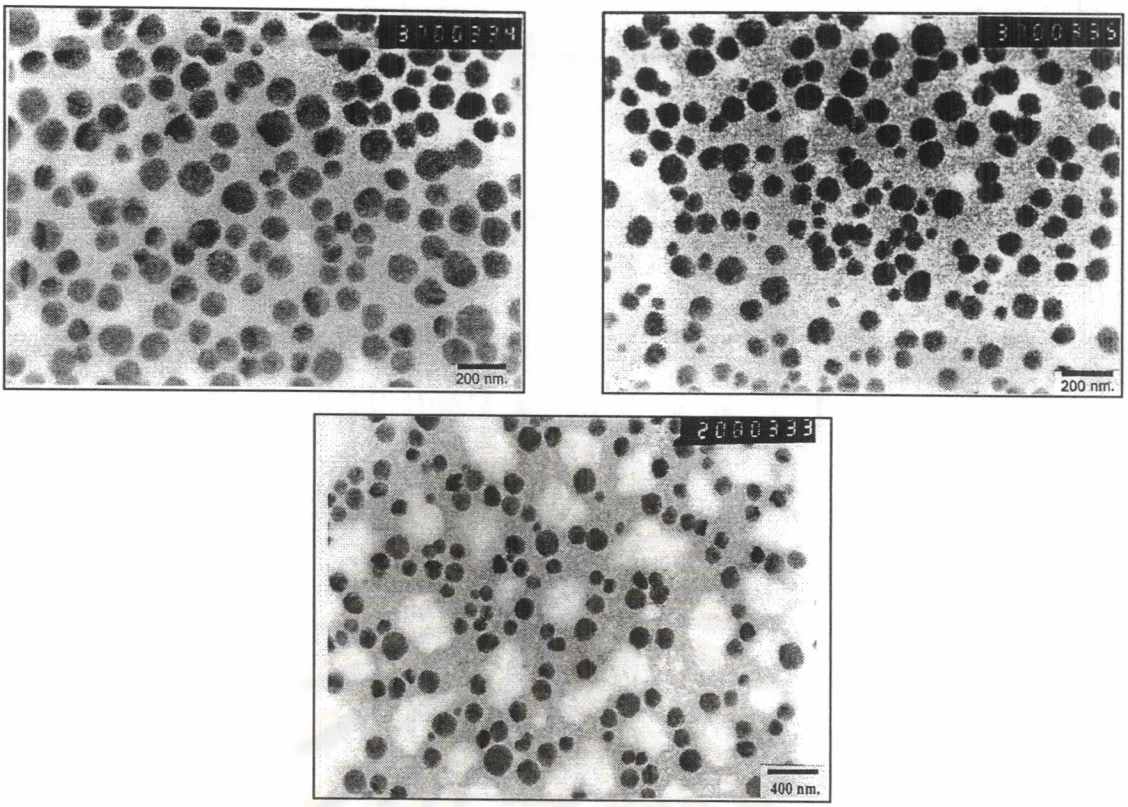


Figure d 4-1 The TEM photomicrograph of formulation (1/6) IPM : T_{80} : W (7%) (IPM:T_{80}=1:9) before stability testing.

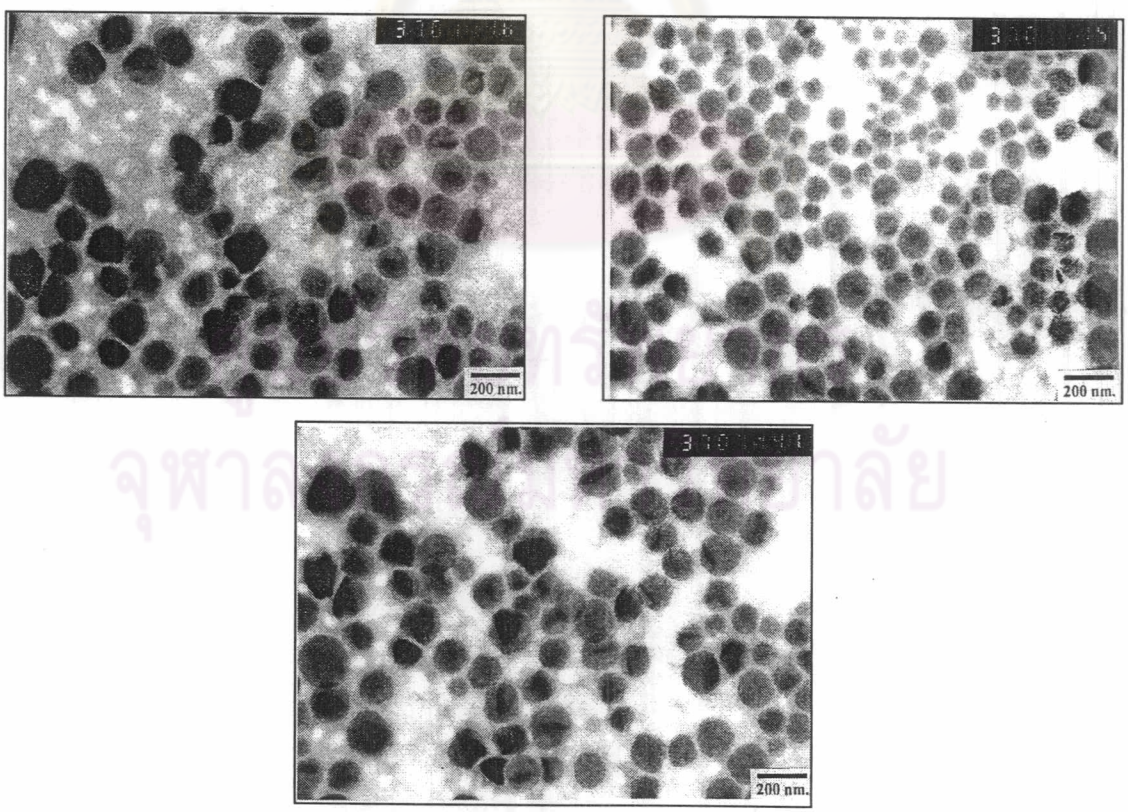


Figure d 4-2 The TEM photomicrograph of formulation (1/6) IPM : T_{80} : W (7%) (IPM:T_{80}=1:9) after stability testing.

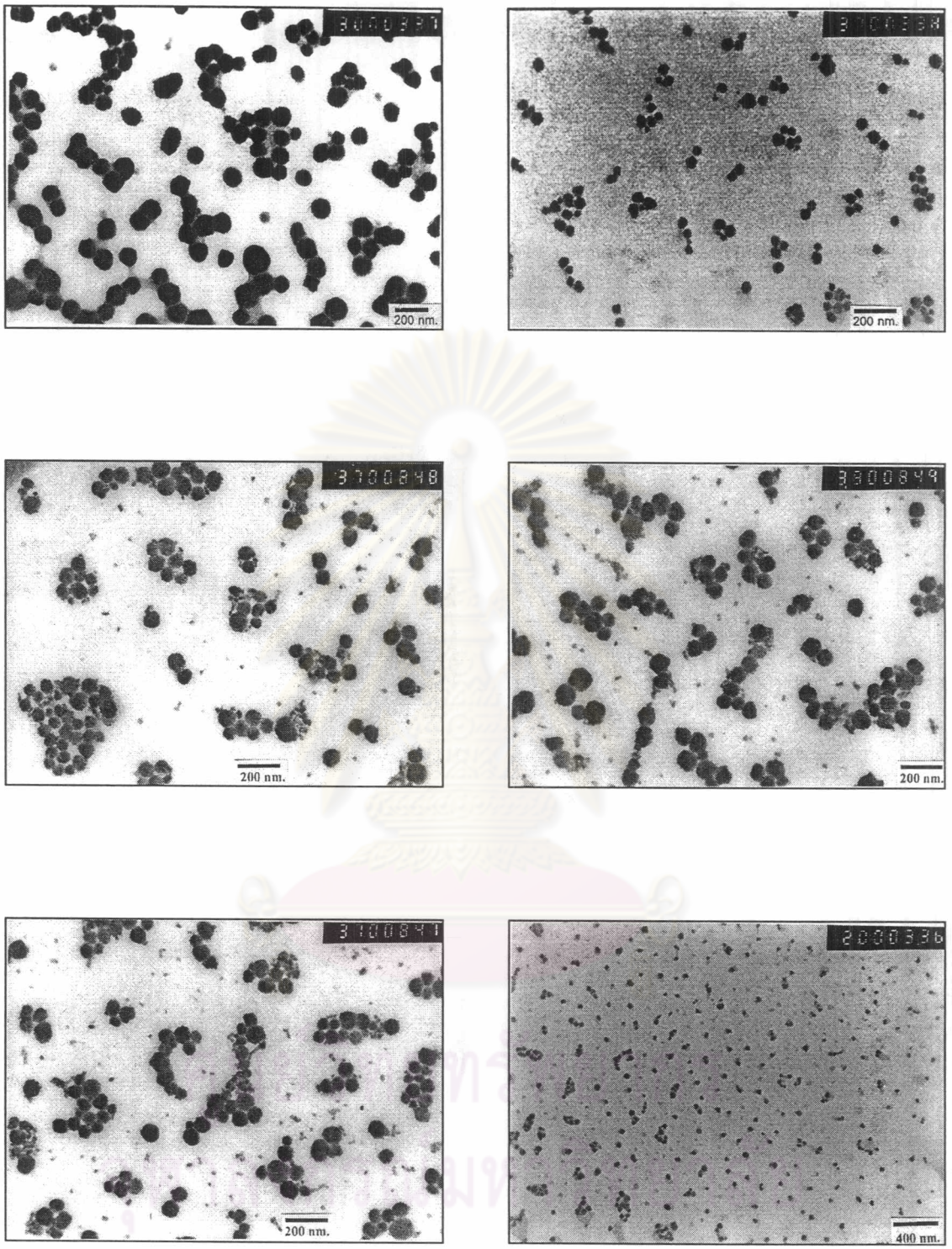


Figure d 5-1 The TEM photomicrograph of formulation (2/1) CO:C_{EL}:W: PG(4:1) (23%) (CO:C_{EL} = 2:8) before stability testing.

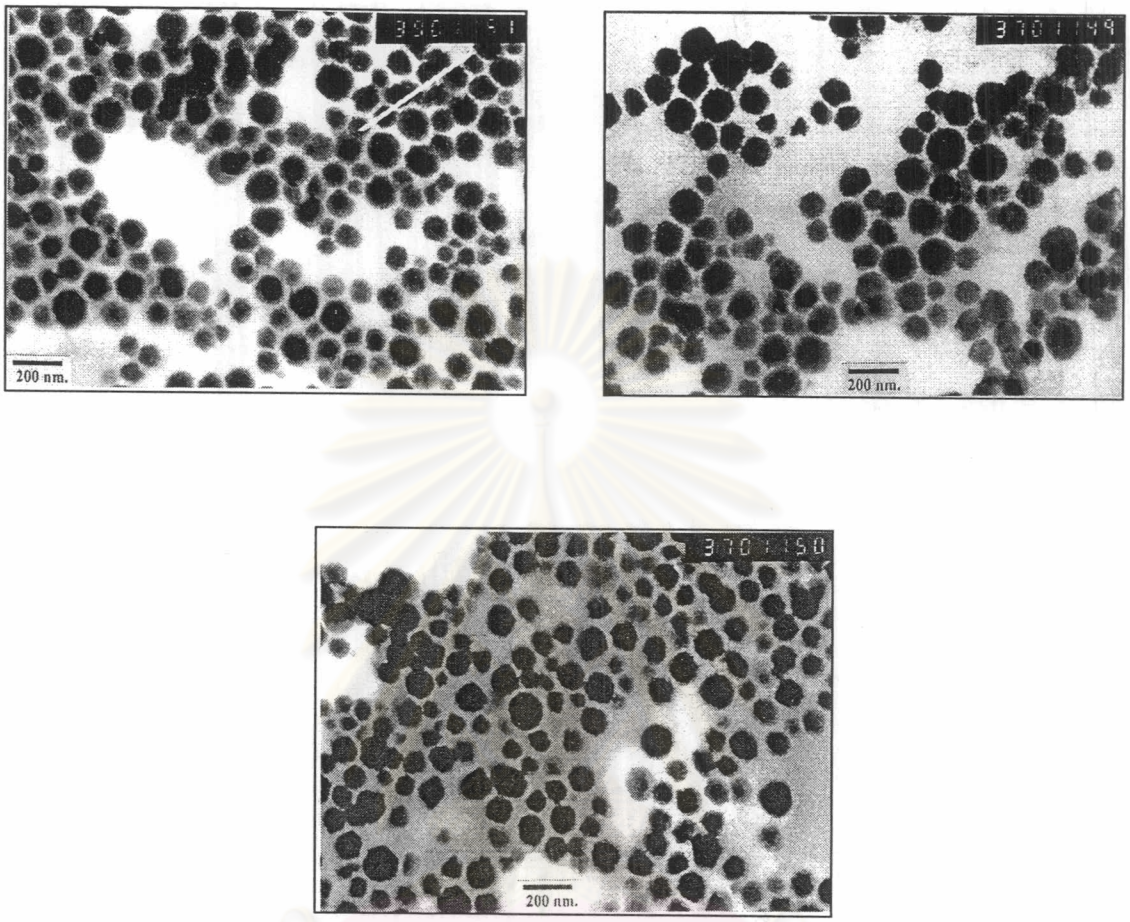


Figure d 5-2 The TEM photomicrograph of formulation (2/1) CO:C_{EL}:W: PG(4:1) (23%) (CO:C_{EL} = 2:8) after stability testing.

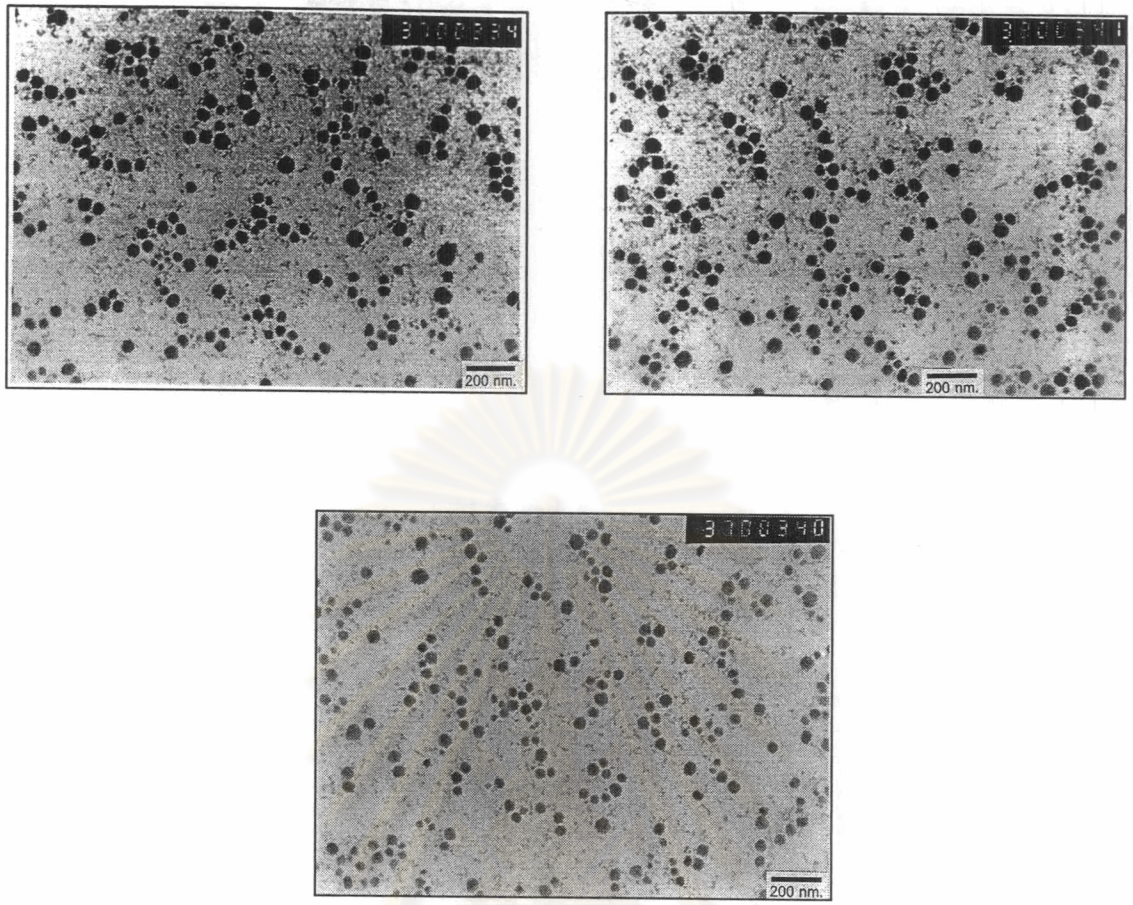


Figure d 6-1 The TEM photomicrograph of formulation (3/1) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=15%) (IPM:T_{80}:L_{68} = 3 : 4.67 : 2.33) before stability testing.

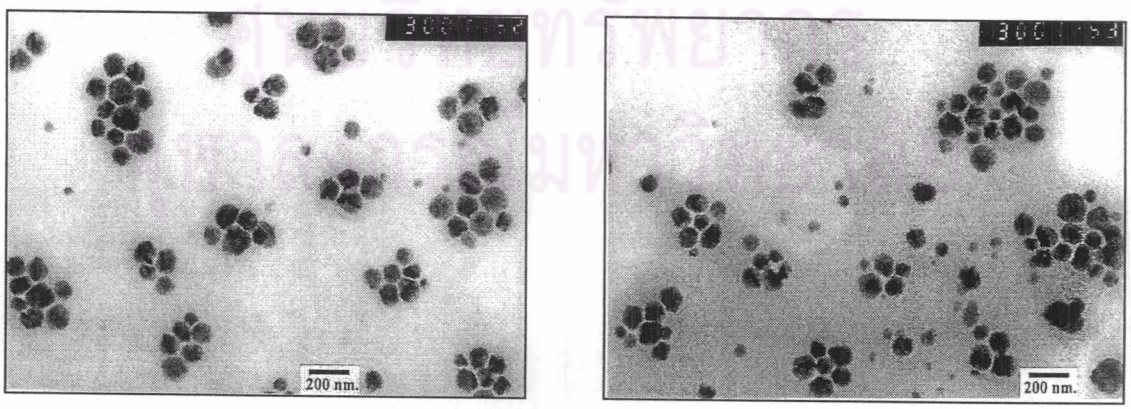


Figure d 6-2 The TEM photomicrograph of formulation (3/1) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=15%) (IPM:T_{80}:L_{68} = 3 : 4.67 : 2.33) after stability testing.

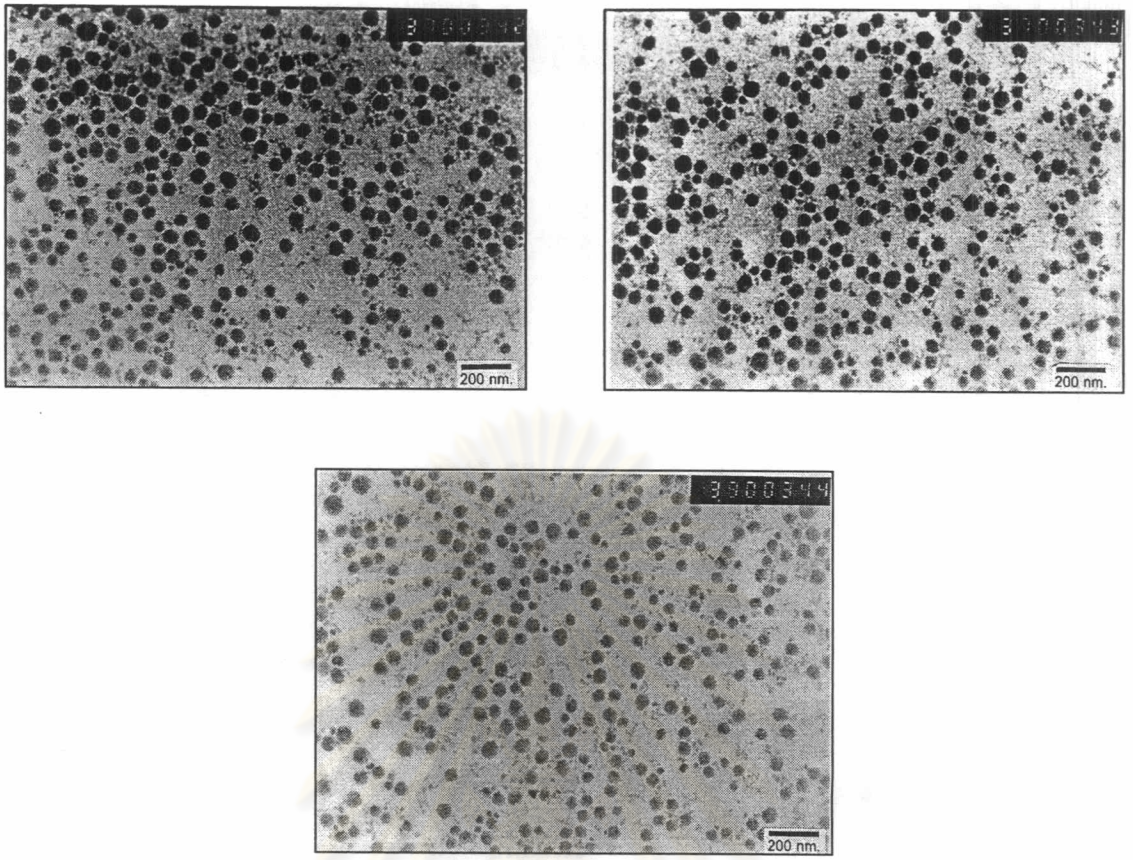


Figure d 7-1 The TEM photomicrograph of formulation (3/2) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=20%) (IPM:T_{80}:L_{68} = 3 : 4.67 : 2.33) before stability testing.

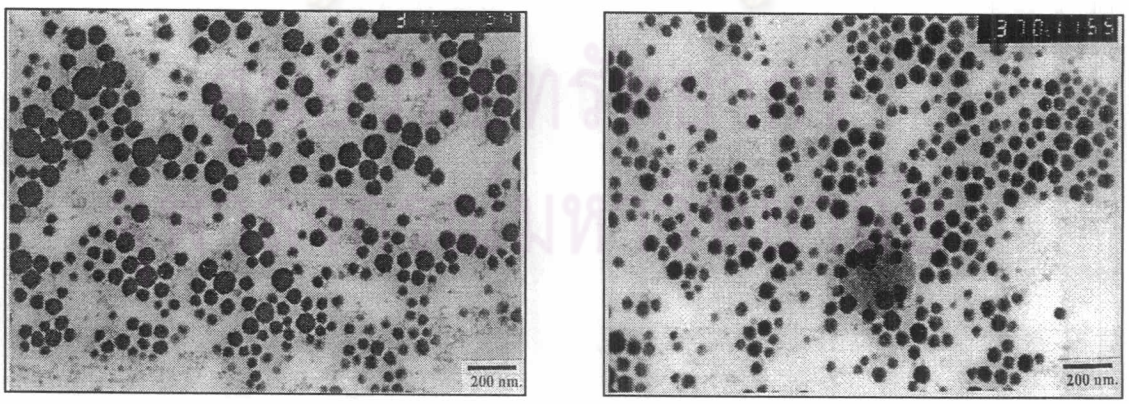


Figure d 7-2 The TEM photomicrograph of formulation (3/2) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=20%) (IPM:T_{80}:L_{68} = 3 : 4.67 : 2.33) after stability testing.

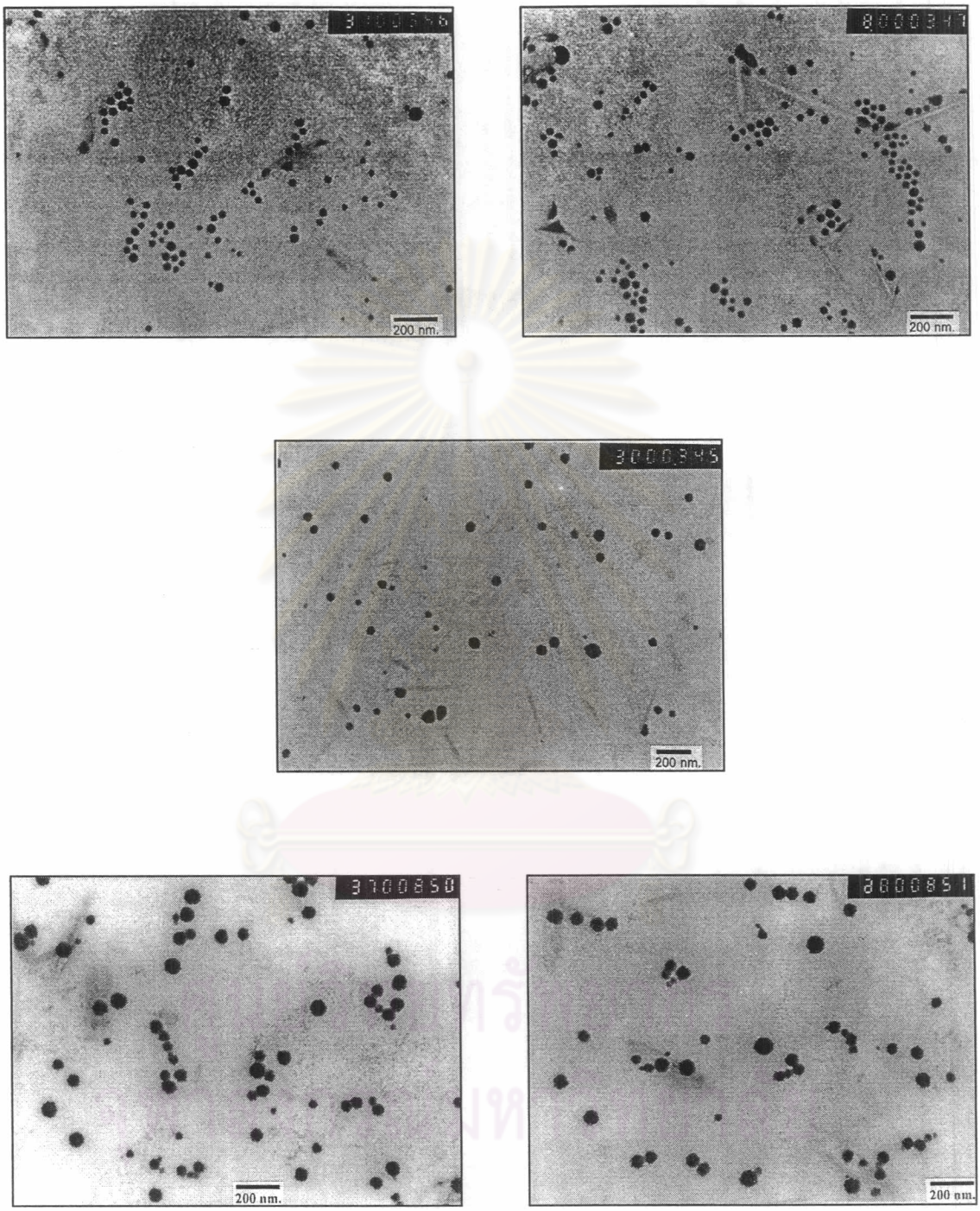


Figure d 8-1 The TEM photomicrograph of formulation (3/4) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=20%) (IPM:T_{80}:L_{68} = 2 : 5.33 : 2.67) before stability testing.

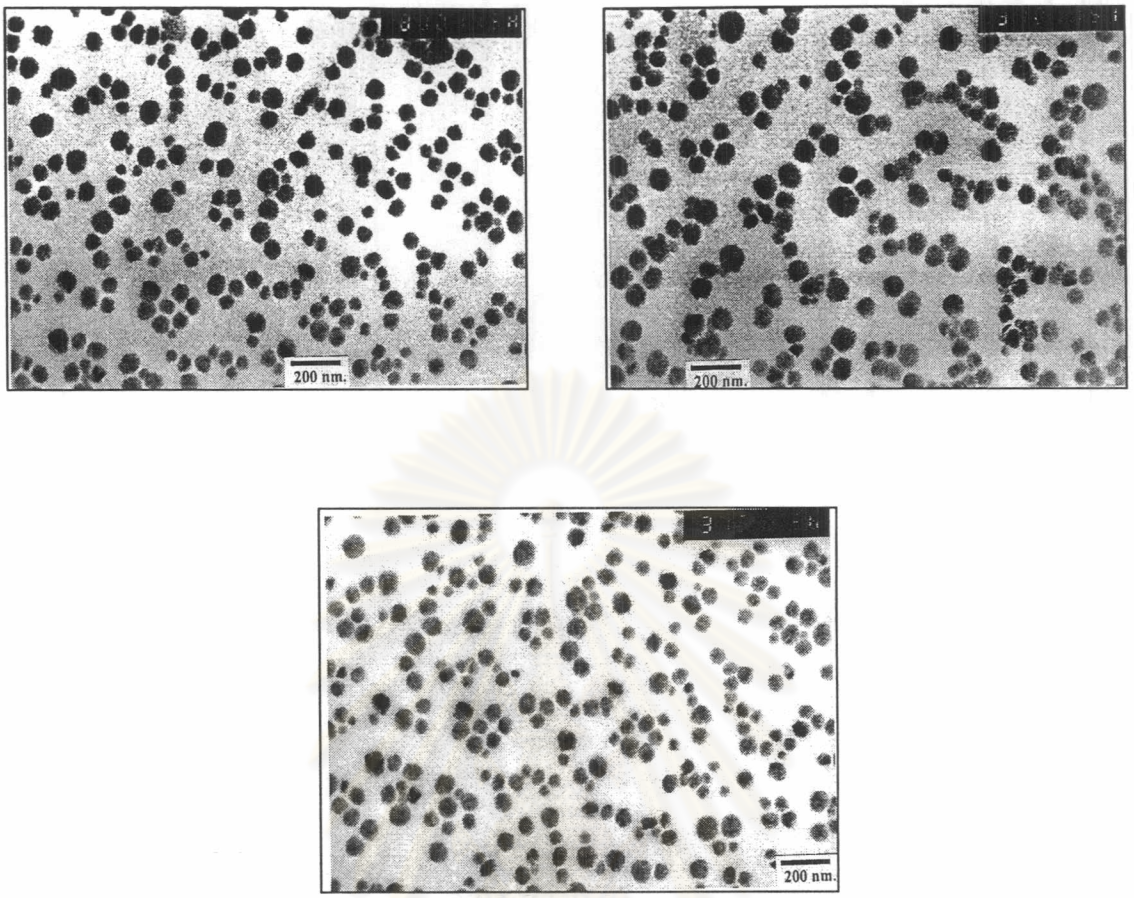


Figure d 8-2 The TEM photomicrograph of formulation (3/4) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=20%) (IPM:T_{80}:L_{68} = 2 : 5.33 : 2.67) after stability testing.

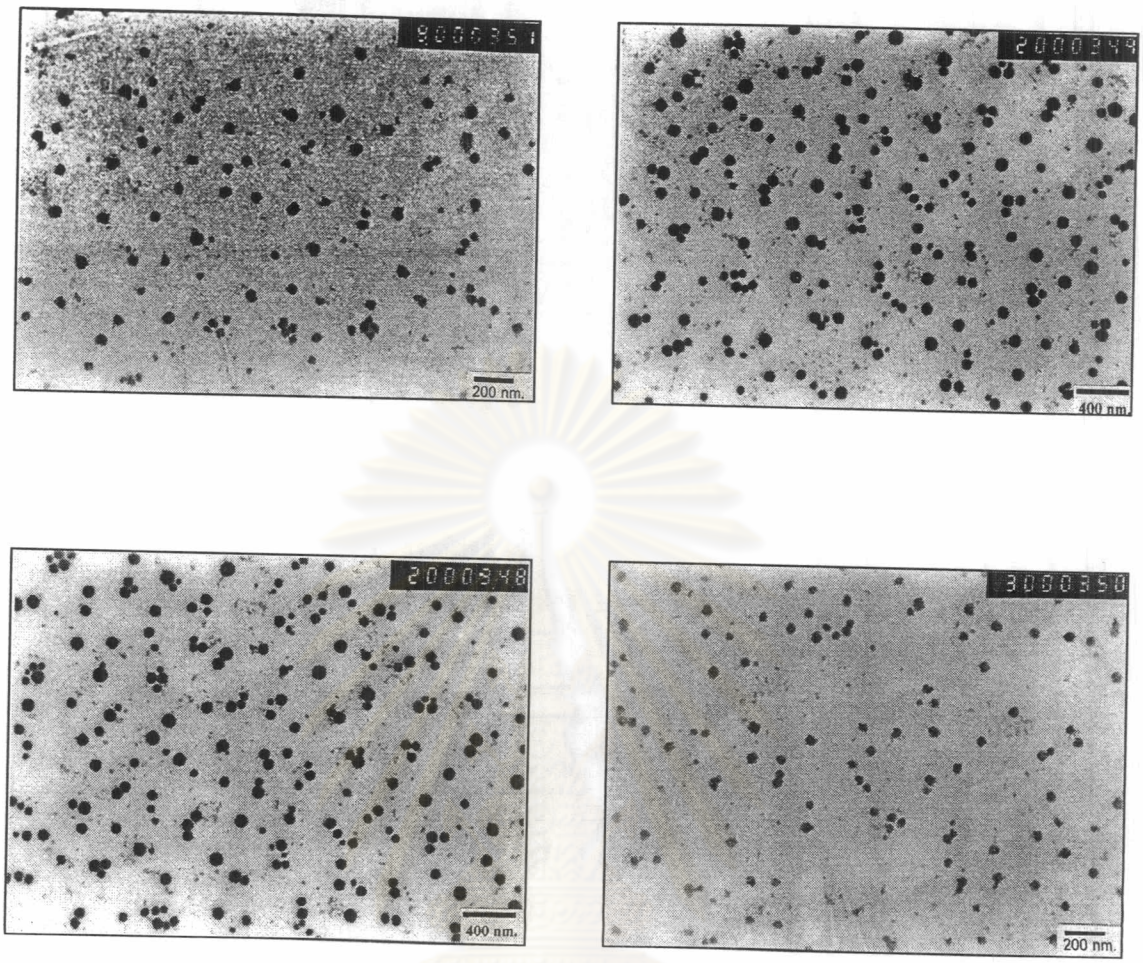


Figure d 9-1 The TEM photomicrograph of formulation (3/5) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=25%) (IPM:T_{80}:L_{68} = 2 : 5.33 : 2.67) before stability testing.

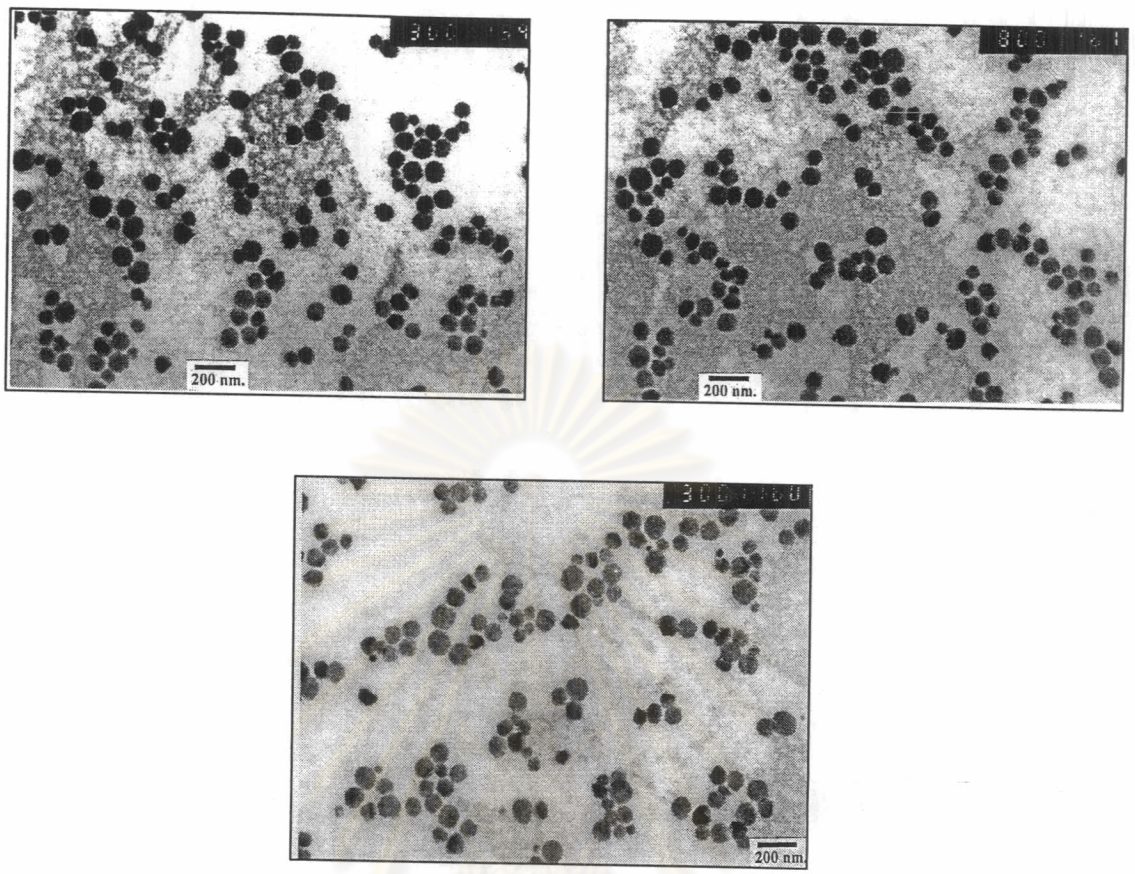


Figure d 9-2 The TEM photomicrograph of formulation (3/5) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=25%) (IPM:T_{80}:L_{68} = 2 : 5.33 : 2.67) after stability testing.

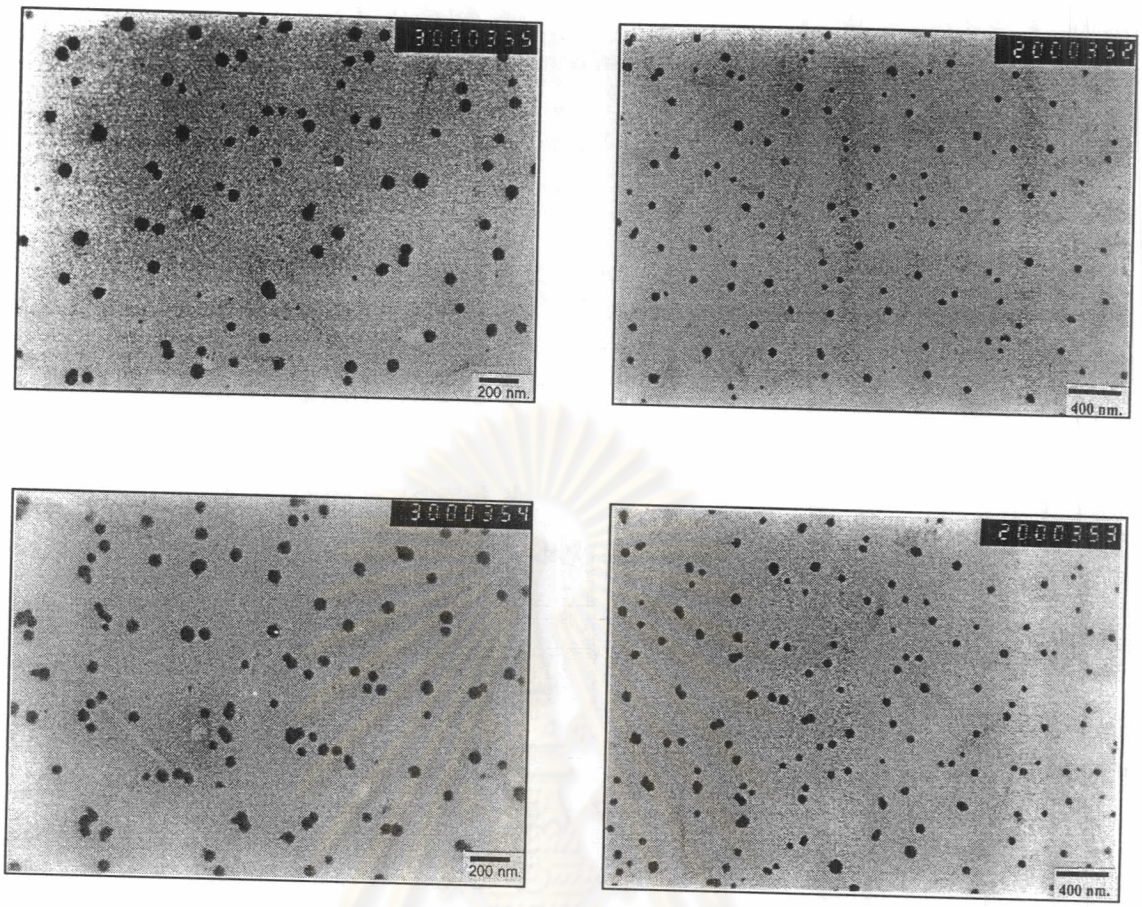


Figure d 10-1 The TEM photomicrograph of formulation (4/2) IPM : C_{EL} : W: PG (4:1) (25%) (IPM:C_{EL} = 2:8) before stability testing.

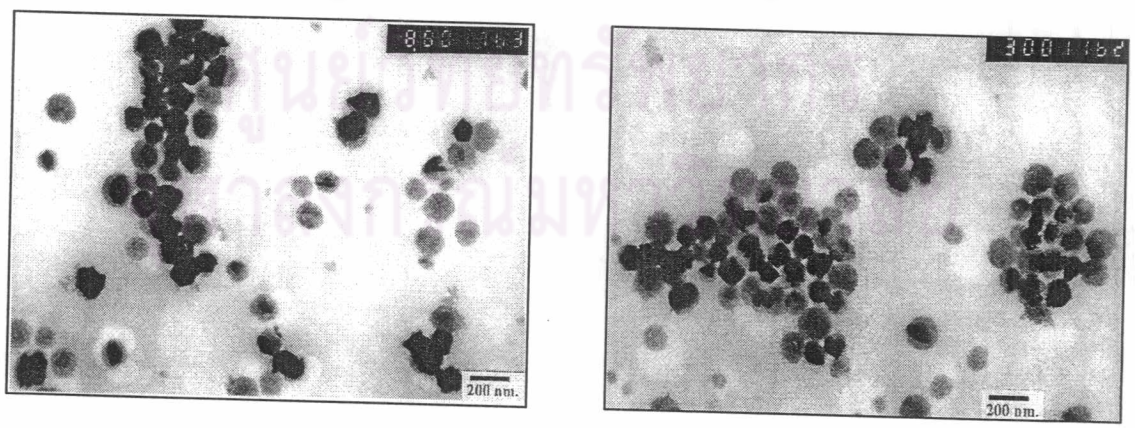


Figure d 10-2 The TEM photomicrograph of formulation (4/2) IPM : C_{EL} : W: PG (4:1) (25%) (IPM:C_{EL} = 2:8) after stability testing.

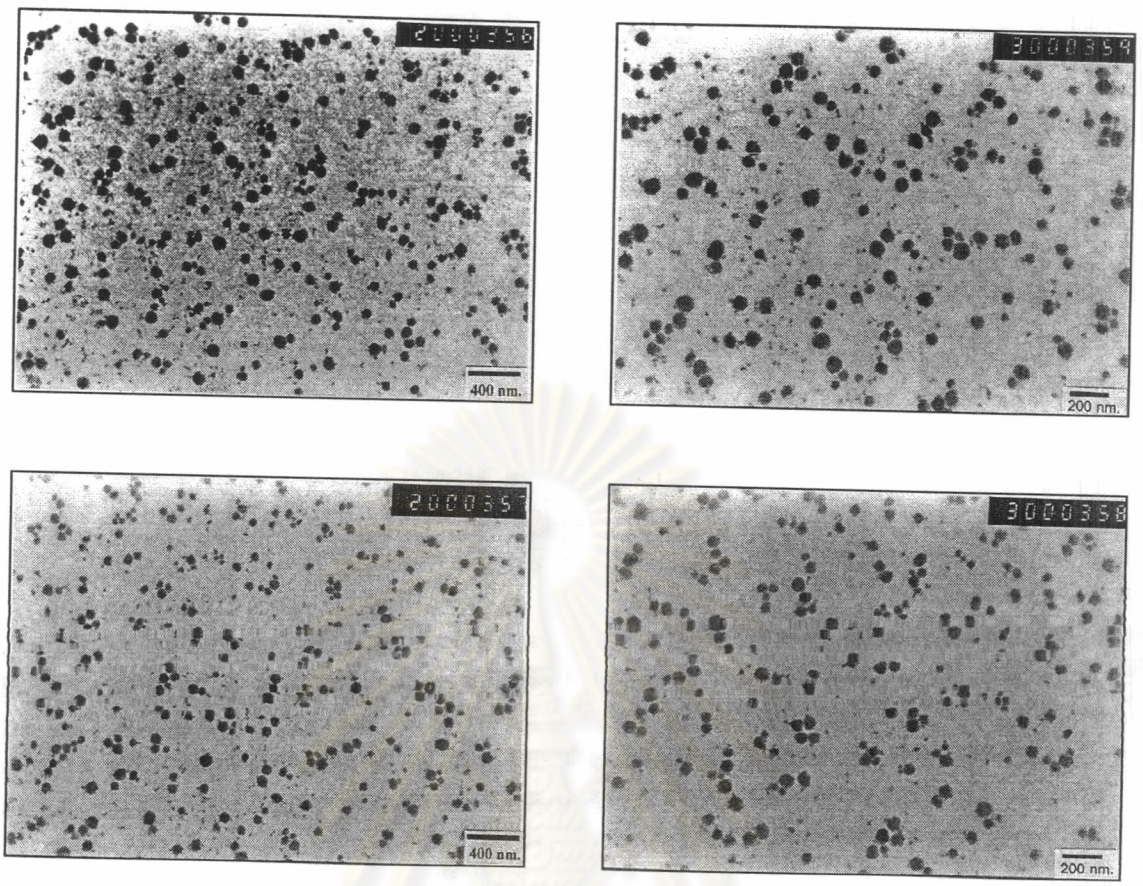


Figure d 11-1 The TEM photomicrograph of formulation (4/4) IPM : C_{EL} : W: PG (4:1) (20%) (IPM:C_{EL} = 3:7) before stability testing.

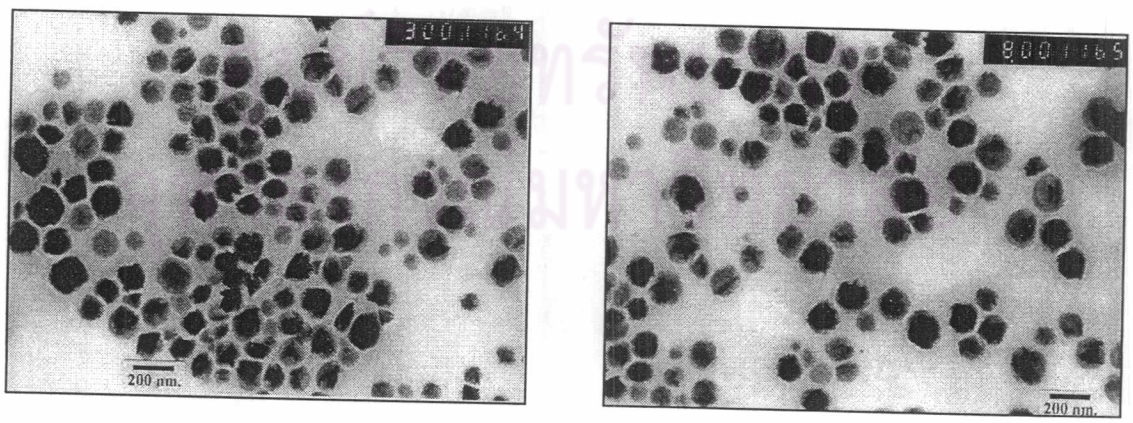


Figure d 11-2 The TEM photomicrograph of formulation (4/4) IPM : C_{EL} : W: PG (4:1) (20%) (IPM:C_{EL} = 3:7) after stability testing.

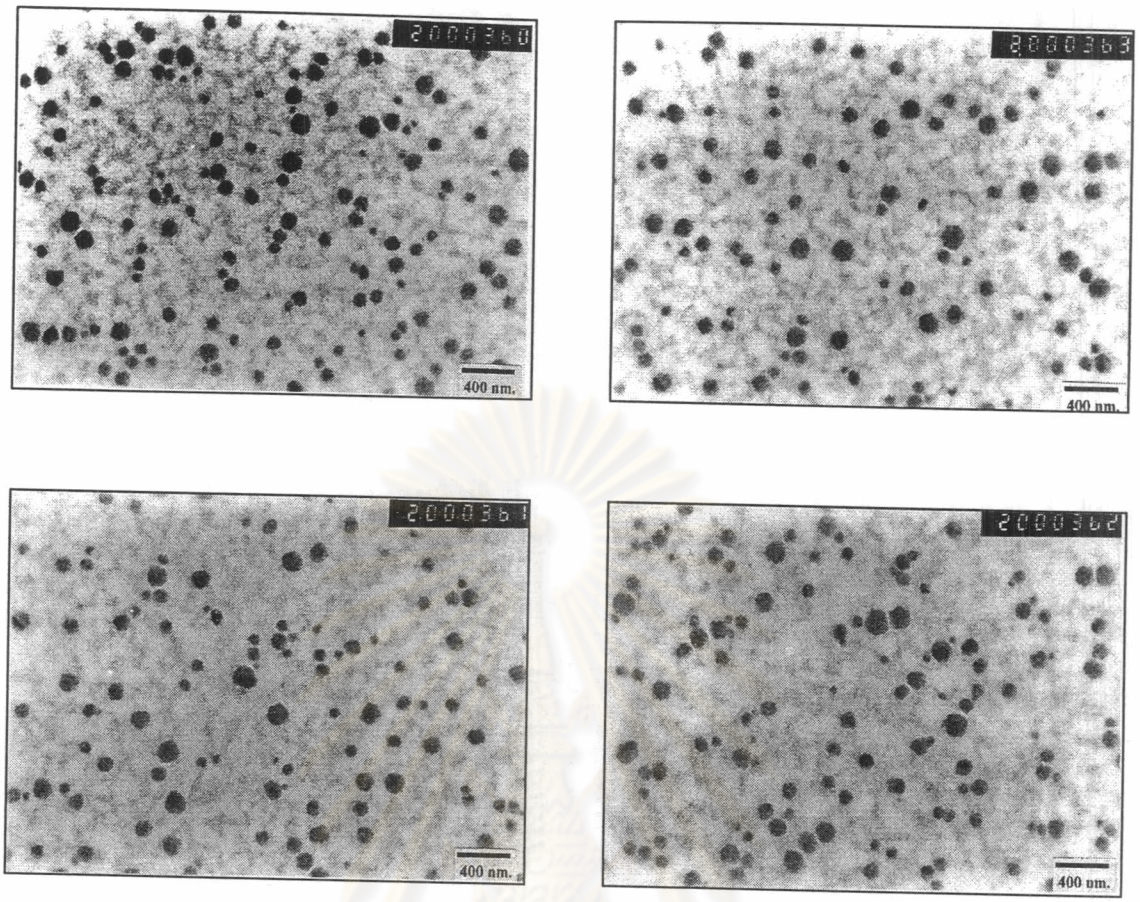


Figure d 12-1 The TEM photomicrograph of formulation (5/1) IPM : C_{RH} : W: PG (4:1) (W=14.52%) (IPM:C_{RH} = 3:7) before stability testing.

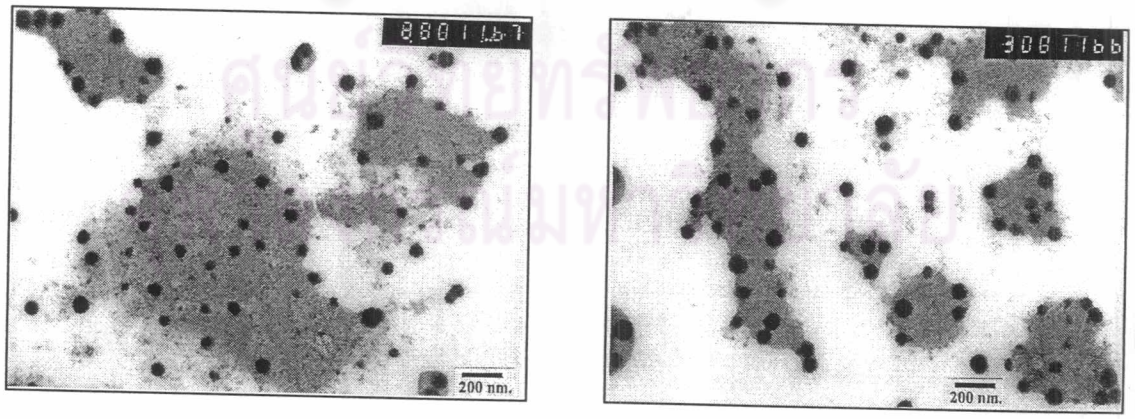


Figure d 12-2 The TEM photomicrograph of formulation (5/1) IPM : C_{RH} : W: PG (4:1) (W=14.52%) (IPM:C_{RH} = 3:7) after stability testing.

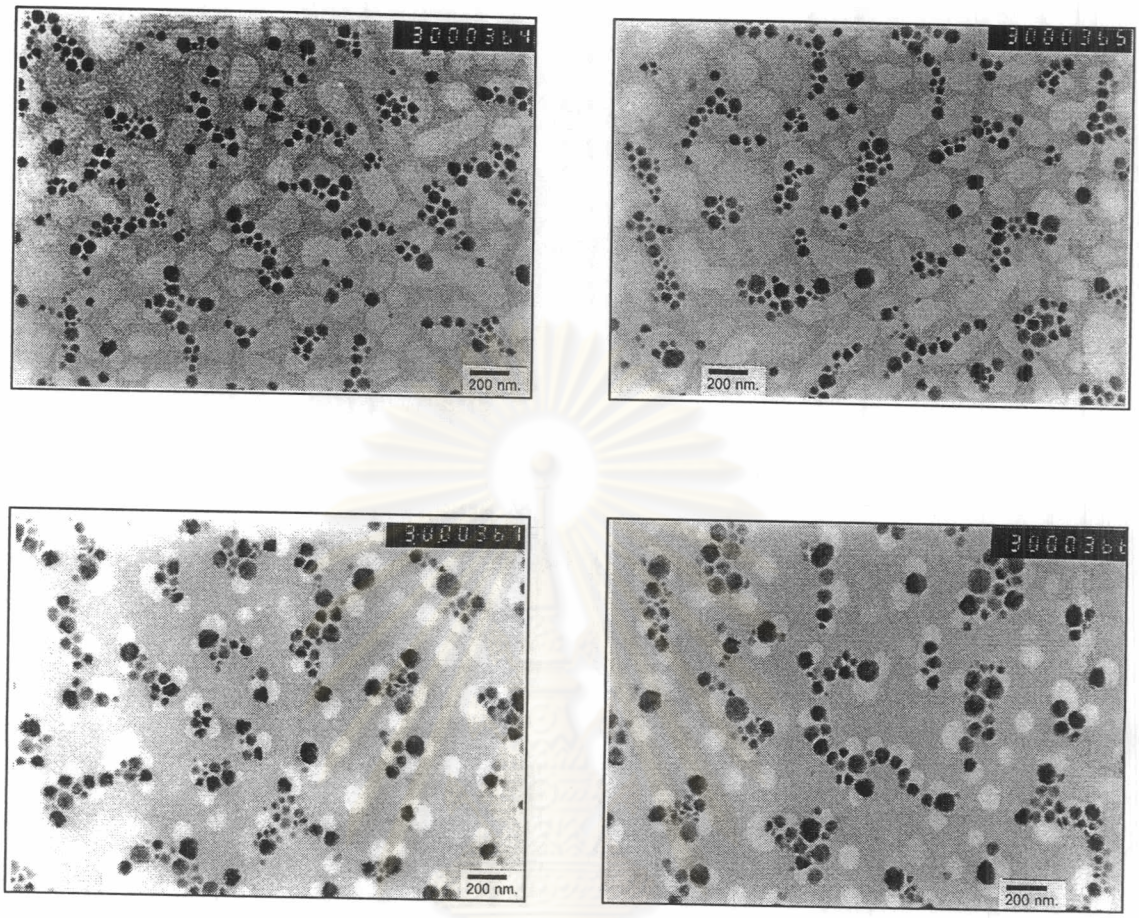


Figure d 13-1 The TEM photomicrograph of formulation (5/5) IPM : C_{RH} : W: PG (4:1) (W=15%) (IPM:C_{RH} = 5:5) before stability testing.

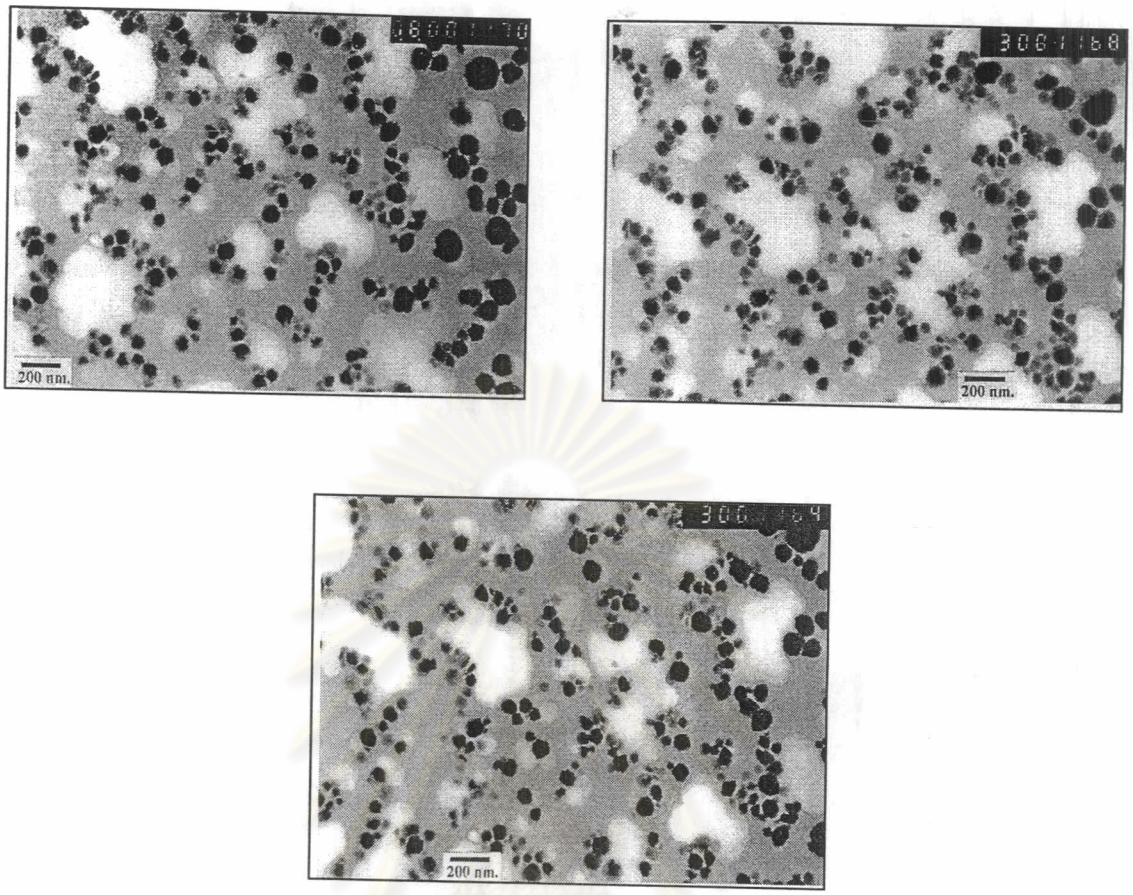


Figure d 13-2 The TEM photomicrograph of formulation (5/5) IPM : C_{RH} : W: PG (4:1) (W=15%) (IPM:C_{RH} = 5:5) after stability testing.

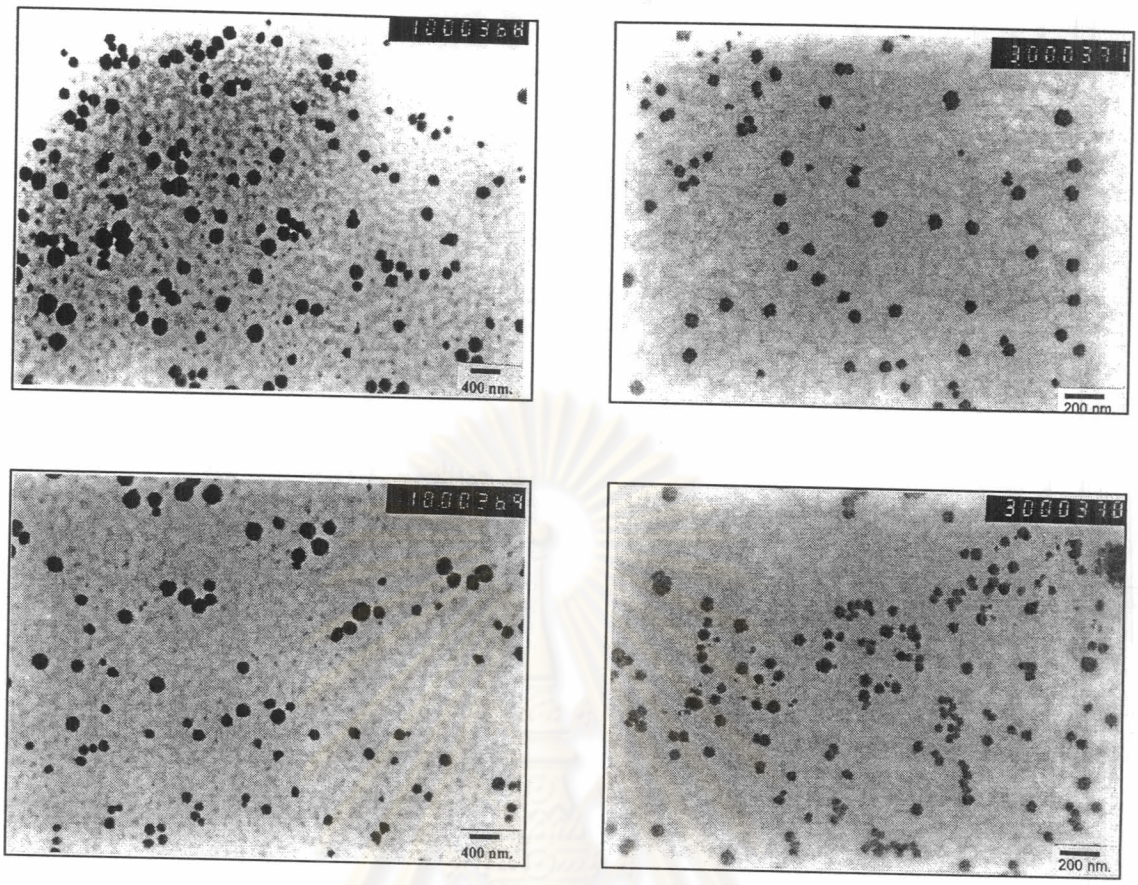


Figure d 14-1 The TEM photomicrograph of formulation (6/1) IPM : T_{80} : C_{EL} : W(W=15%) (IPM: T_{80} : C_{EL} = 3 : 3.5 : 3.5) before stability testing.

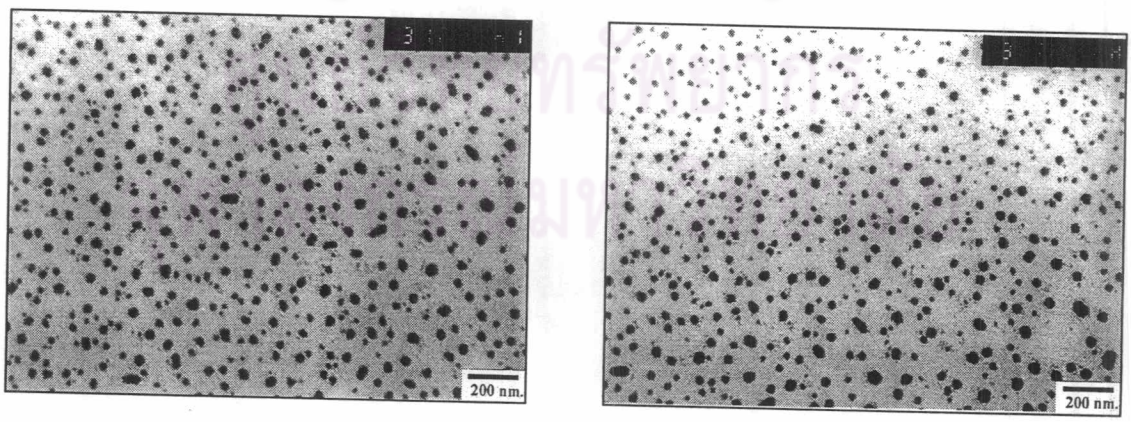


Figure d 14-2 The TEM photomicrograph of formulation (6/1) IPM : T_{80} : C_{EL} : W(W=15%) (IPM: T_{80} : C_{EL} = 3 : 3.5 : 3.5) after stability testing.

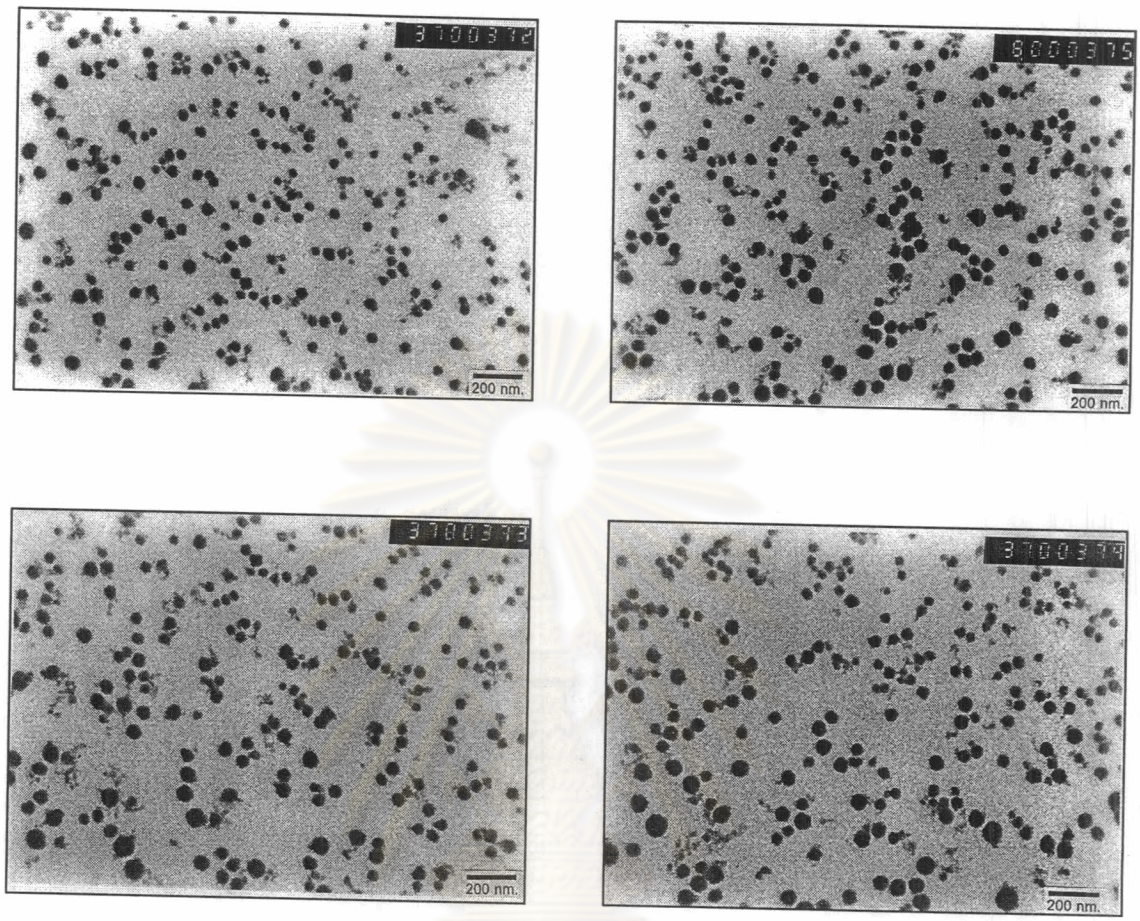


Figure d 15-1 The TEM photomicrograph of formulation (6/4) IPM : T_{80} : C_{EL} : W(W=20%) (IPM: T_{80} : C_{EL} = 1 : 4.5 : 4.5) before stability testing.

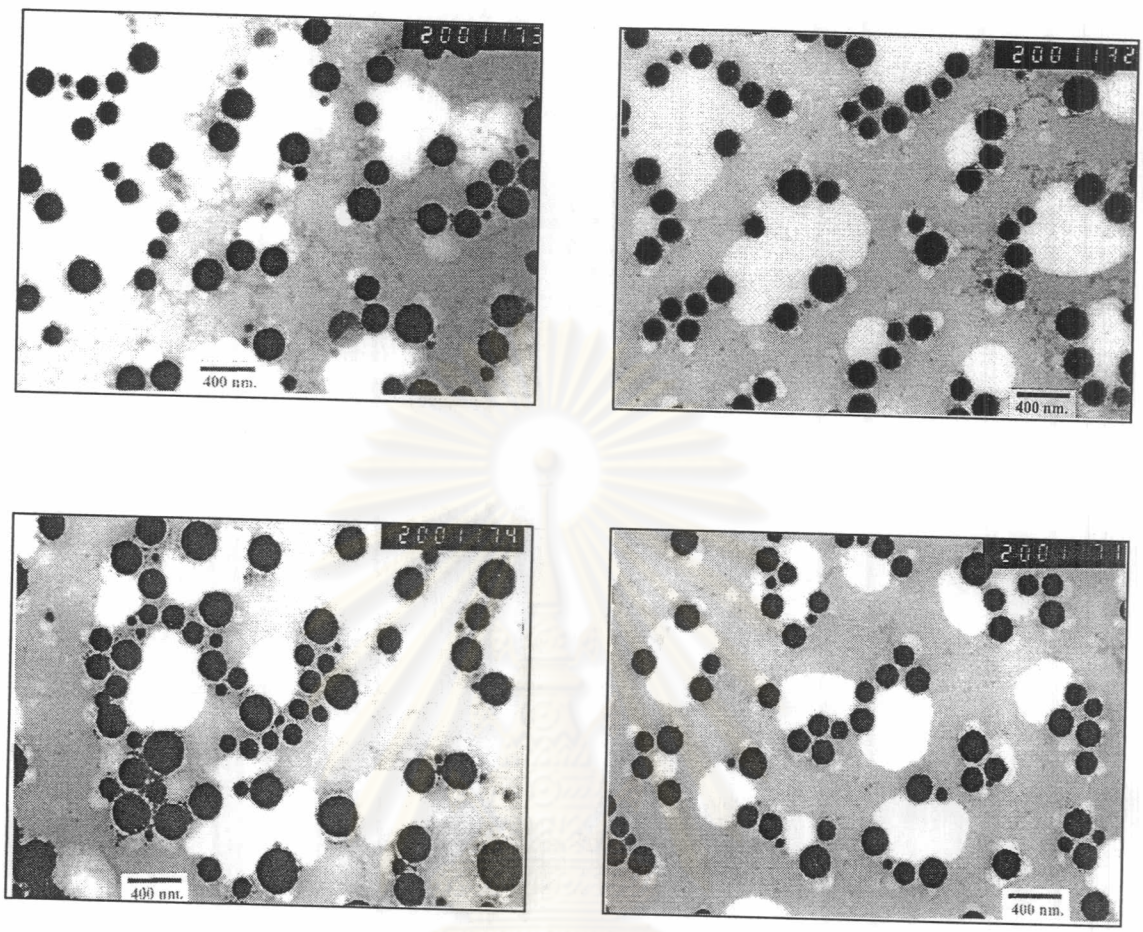


Figure d 15-2 The TEM photomicrograph of formulation (6/4) IPM : T_{80} : C_{EL} : W(W=20%) (IPM: T_{80} : C_{EL} = 1 : 4.5 : 4.5) after stability testing.

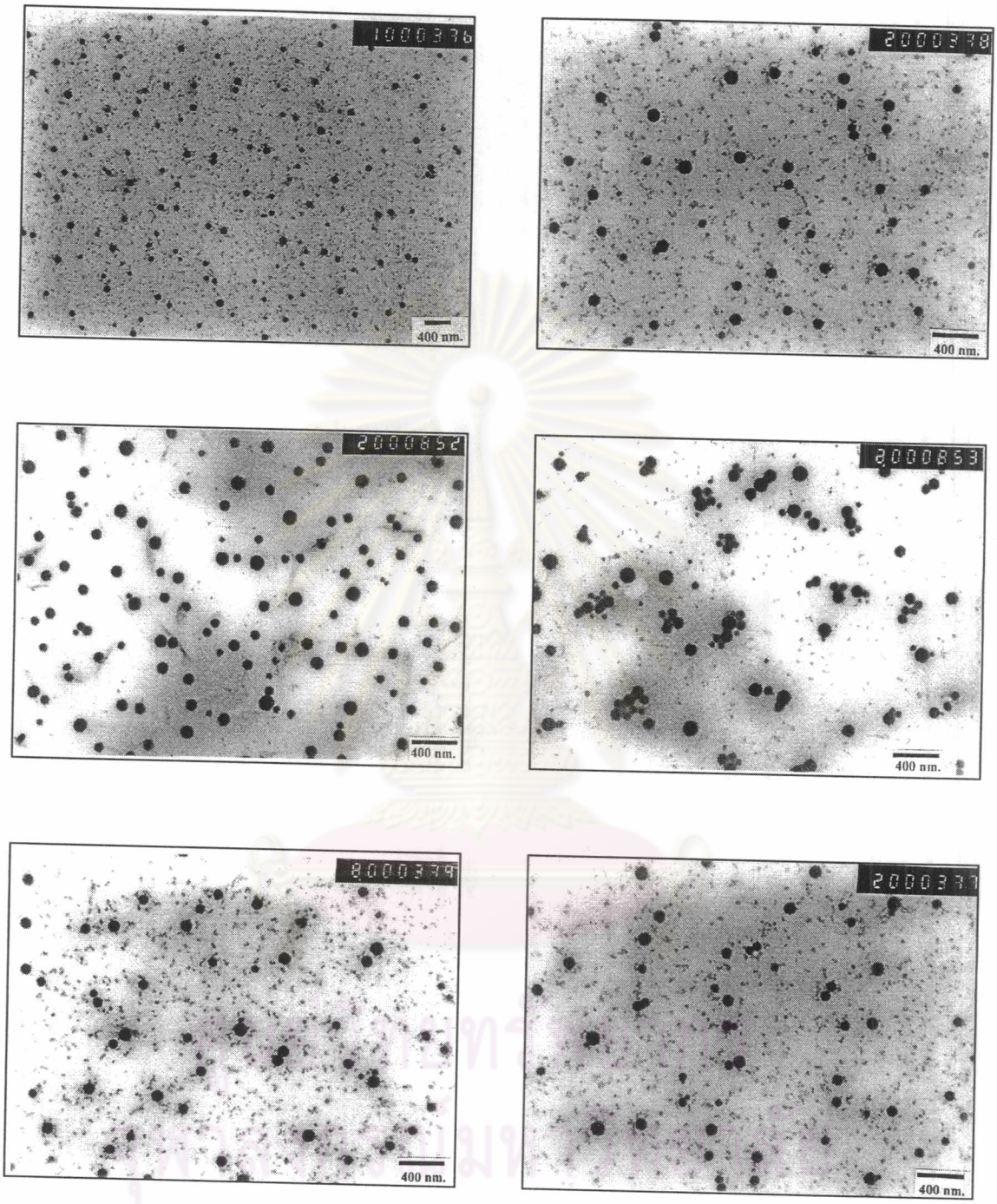


Figure d 16-1 The TEM photomicrograph of formulation (7/1) IPM : T_{80} : B_{35} : W(W=15%) (IPM: T_{80} : B_{35} = 3 : 3.5 : 3.5) before stability testing.

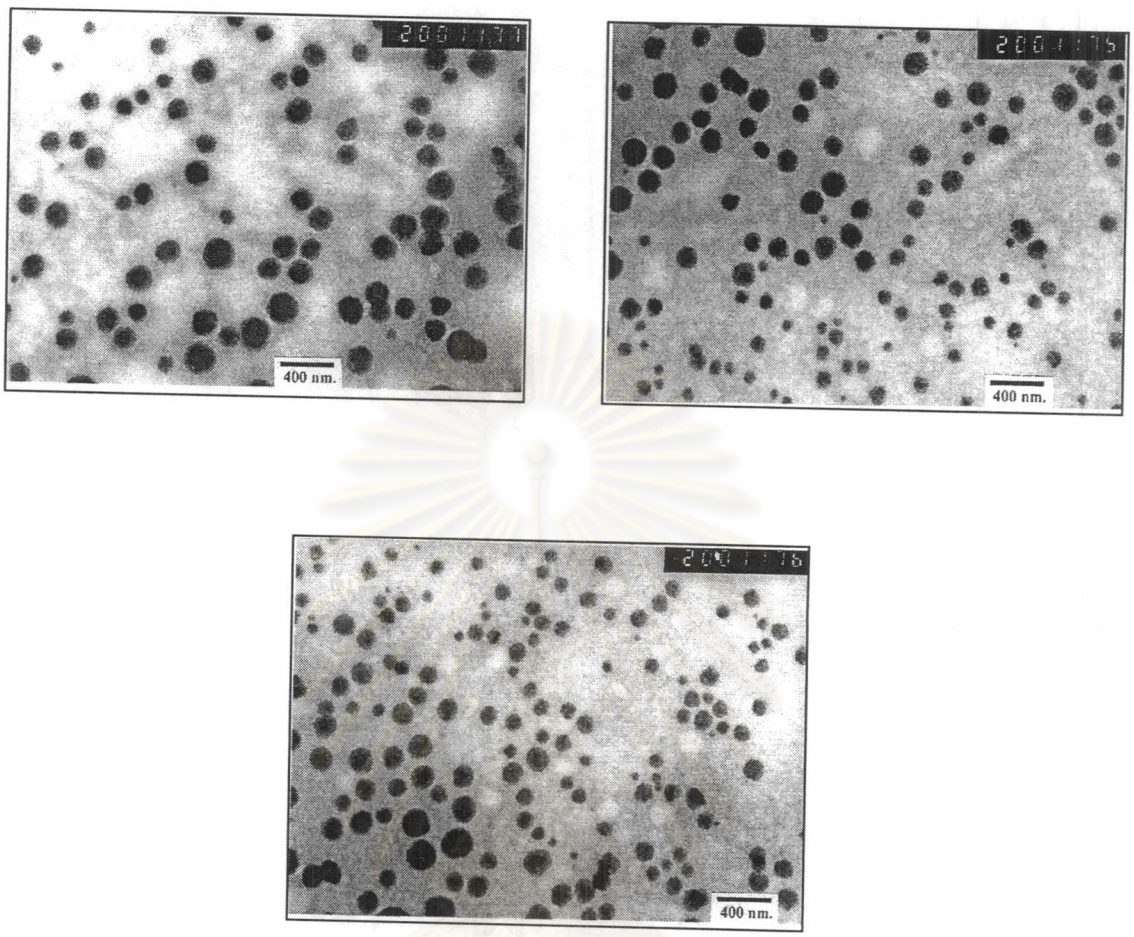


Figure d 16-2 The TEM photomicrograph of formulation (7/1) IPM : T_{80} : B_{35} : W(W=15%) (IPM: T_{80} : B_{35} = 3 : 3.5 : 3.5) after stability testing.

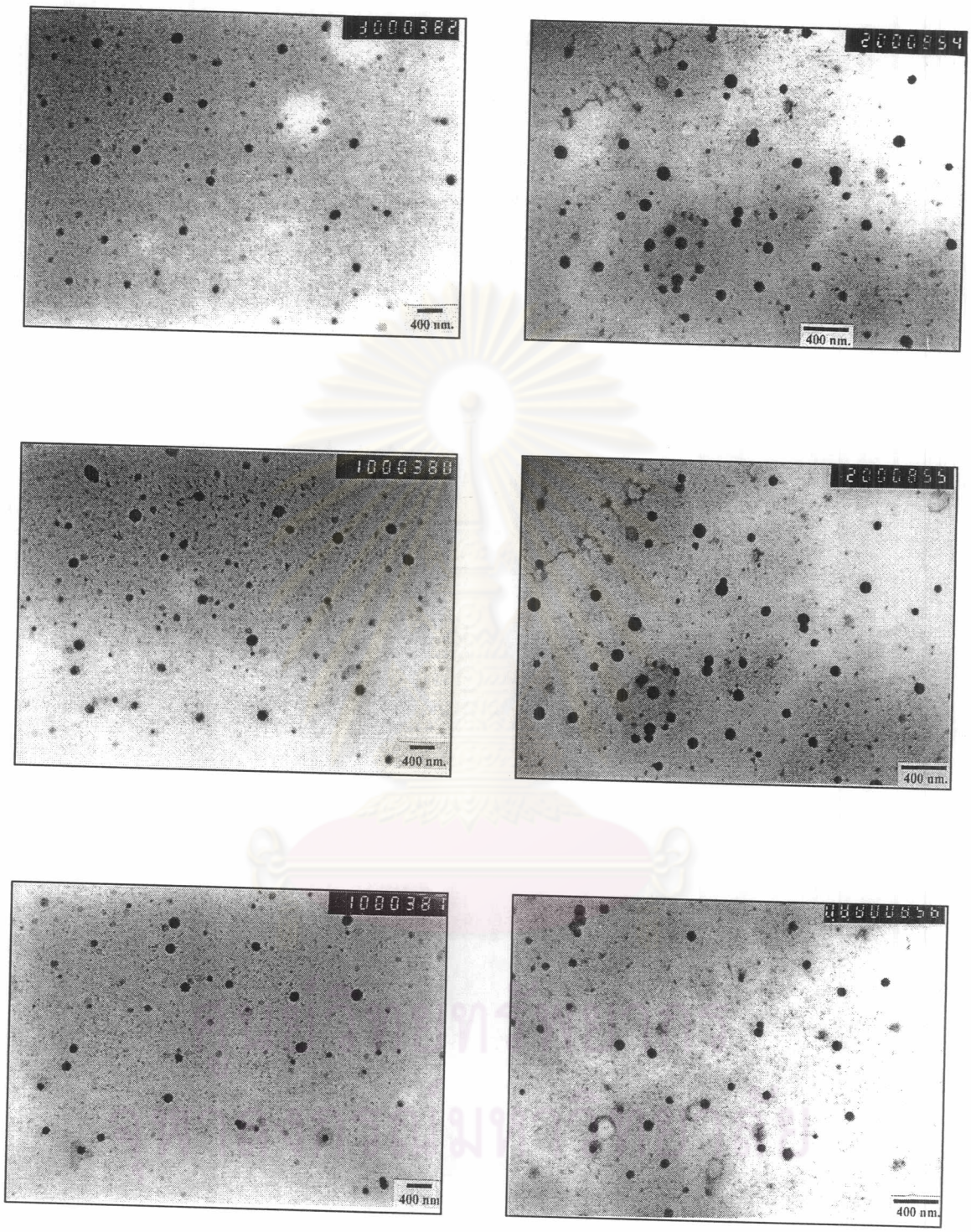


Figure d 17-1 The TEM photomicrograph of formulation (8/1) SBO : T_{80} : W (7%) (SBO:T_{80}=1:9) before stability testing.

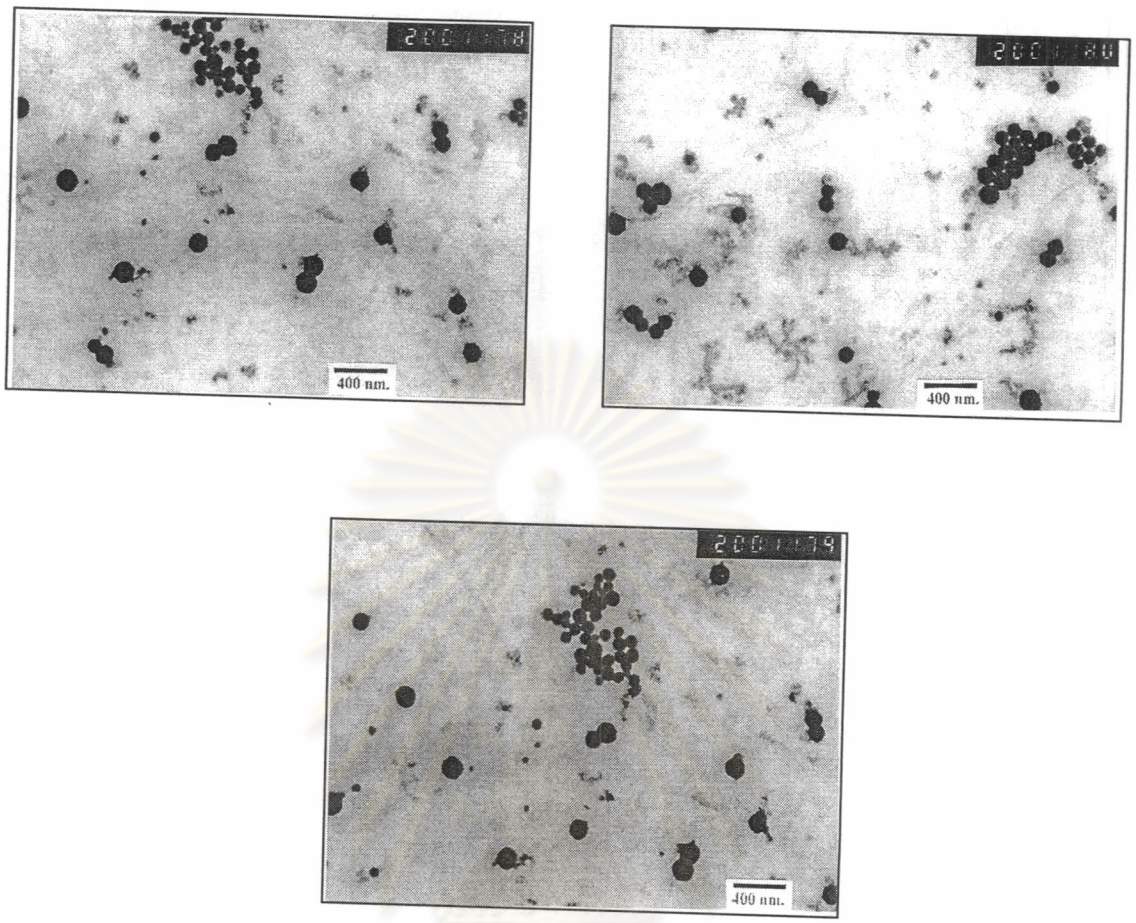


Figure d 17-2 The TEM photomicrograph of formulation (8/1) SBO : T_{80} : W (7%) (SBO:T_{80}=1:9) after stability testing.

Table d 1-1 Particle size distribution of formulation (1/1) IPM : T_{80} : W (10%) (IPM:T_{80}=5:5) before stability testing.

Distribution Type : number	n = 300
Mean Diameter : 43.31	SD = 5.80

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	0.00	120.00	112.50	100.00
3.00	0.00	5.00	4.00	0.00	120.00	0.00	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	0.00	30.00	26.00	0.00	172.00	0.00	180.00	176.00	100.00
30.00	68.70	45.00	37.50	68.70	180.00	0.00	185.00	182.50	100.00
45.00	31.30	60.00	52.50	100.00	185.00	0.00	190.00	187.50	100.00
60.00	0.00	75.00	67.50	100.00	190.00	0.00	195.00	192.50	100.00
75.00	0.00	90.00	82.50	100.00	195.00	0.00	198.00	196.50	100.00
90.00	0.00	105.00	97.50	100.00	198.00	0.00	200.00	199.00	100.00

Table d 1-2 Particle size distribution of formulation (1/1) IPM : T_{80} : W (10%) (IPM:T_{80}=5:5) after stability testing.

Distribution Type : number	n = 300
Mean Diameter : 52.86	SD = 13.47

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	0.00	120.00	112.50	100.00
3.00	0.00	5.00	4.00	0.00	120.00	0.00	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	1.30	30.00	26.00	1.30	172.00	0.00	180.00	176.00	100.00
30.00	32.00	45.00	37.50	33.30	180.00	0.00	185.00	182.50	100.00
45.00	40.00	60.00	52.50	73.30	185.00	0.00	190.00	187.50	100.00
60.00	20.40	75.00	67.50	93.70	190.00	0.00	195.00	192.50	100.00
75.00	5.70	90.00	82.50	99.40	195.00	0.00	198.00	196.50	100.00
90.00	0.60	105.00	97.50	100.00	198.00	0.00	200.00	199.00	100.00

Table d 2-1 Particle size distribution of formulation (1/3) IPM : T_{80} : W (10%) (IPM:T_{80}=4:6) before stability testing.

Distribution Type : number	n = 300
Mean Diameter : 71.27	SD = 26.64

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	5.60	120.00	112.50	94.10
3.00	0.00	5.00	4.00	0.00	120.00	3.00	135.00	127.50	97.10
5.00	0.00	10.00	7.50	0.00	135.00	1.70	150.00	142.50	98.80
10.00	0.00	15.00	12.50	0.00	150.00	1.30	165.00	157.50	100.10
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.10
22.00	0.00	30.00	26.00	0.00	172.00	0.00	180.00	176.00	100.10
30.00	10.00	45.00	37.50	10.00	180.00	0.00	185.00	182.50	100.10
45.00	24.00	60.00	52.50	34.00	185.00	0.00	190.00	187.50	100.10
60.00	23.70	75.00	67.50	57.70	190.00	0.00	195.00	192.50	100.10
75.00	21.10	90.00	82.50	78.80	195.00	0.00	198.00	196.50	100.10
90.00	9.70	105.00	97.50	88.50	198.00	0.00	200.00	199.00	100.10

Table d 2-2 Particle size distribution of formulation (1/3) IPM : T_{80} : W (10%) (IPM:T_{80}=4:6) after stability testing.

Distribution Type : number	n = 300
Mean Diameter : 114.83	SD = 29.85

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	22.30	120.00	112.50	62.30
3.00	0.00	5.00	4.00	0.00	120.00	15.40	135.00	127.50	77.70
5.00	0.00	10.00	7.50	0.00	135.00	9.00	150.00	142.50	86.70
10.00	0.00	15.00	12.50	0.00	150.00	6.80	165.00	157.50	93.50
15.00	0.00	22.00	18.50	0.00	165.00	2.20	172.00	168.50	95.70
22.00	0.00	30.00	26.00	0.00	172.00	1.30	180.00	176.00	97.00
30.00	0.00	45.00	37.50	0.00	180.00	0.00	185.00	182.50	97.00
45.00	2.30	60.00	52.50	2.30	185.00	1.00	190.00	187.50	98.00
60.00	5.00	75.00	67.50	7.30	190.00	0.00	195.00	192.50	98.00
75.00	10.40	90.00	82.50	17.70	195.00	1.70	198.00	196.50	99.70
90.00	22.30	105.00	97.50	40.00	198.00	0.30	200.00	199.00	100.00

Table d 3-1 Particle size distribution of formulation (1/5) IPM : T_{80} : W (10%) (IPM:T_{80}=3:7) before stability testing.

Distribution Type : number	n = 300
Mean Diameter : 27.68	SD = 6.13

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	0.00	120.00	112.50	100.00
3.00	0.00	5.00	4.00	0.00	120.00	0.00	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	27.30	22.00	18.50	27.30	165.00	0.00	172.00	168.50	100.00
22.00	39.70	30.00	26.00	67.00	172.00	0.00	180.00	176.00	100.00
30.00	33.00	45.00	37.50	100.00	180.00	0.00	185.00	182.50	100.00
45.00	0.00	60.00	52.50	100.00	185.00	0.00	190.00	187.50	100.00
60.00	0.00	75.00	67.50	100.00	190.00	0.00	195.00	192.50	100.00
75.00	0.00	90.00	82.50	100.00	195.00	0.00	198.00	196.50	100.00
90.00	0.00	105.00	97.50	100.00	198.00	0.00	200.00	199.00	100.00

Table d 3-2 Particle size distribution of formulation (1/5) IPM : T_{80} : W (10%) (IPM:T_{80}=3:7) after stability testing.

Distribution Type : number	n = 300
Mean Diameter : 99.50	SD = 34.47

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	14.70	120.00	112.50	74.70
3.00	0.00	5.00	4.00	0.00	120.00	8.60	135.00	127.50	83.30
5.00	0.00	10.00	7.50	0.00	135.00	7.70	150.00	142.50	91.00
10.00	0.00	15.00	12.50	0.00	150.00	4.40	165.00	157.50	95.40
15.00	0.00	22.00	18.50	0.00	165.00	2.00	172.00	168.50	97.40
22.00	0.00	30.00	26.00	0.00	172.00	1.00	180.00	176.00	98.40
30.00	3.30	45.00	37.50	3.30	180.00	0.30	185.00	182.50	98.70
45.00	9.70	60.00	52.50	13.00	185.00	1.00	190.00	187.50	99.70
60.00	15.00	75.00	67.50	28.00	190.00	0.30	195.00	192.50	100.00
75.00	15.00	90.00	82.50	43.00	195.00	0.00	198.00	196.50	100.00
90.00	17.00	105.00	97.50	60.00	198.00	0.00	200.00	199.00	100.00

Table d 4-1 Particle size distribution of formulation (1/6) IPM : T_{80} : W (7%) (IPM:T_{80}=1:9) before stability testing.

Distribution Type : number	n = 300
Mean Diameter : 78.53	SD = 20.48

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	6.00	120.00	112.50	98.70
3.00	0.00	5.00	4.00	0.00	120.00	1.30	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	1.00	30.00	26.00	1.00	172.00	0.00	180.00	176.00	100.00
30.00	6.70	45.00	37.50	7.70	180.00	0.00	185.00	182.50	100.00
45.00	11.00	60.00	52.50	18.70	185.00	0.00	190.00	187.50	100.00
60.00	22.30	75.00	67.50	41.00	190.00	0.00	195.00	192.50	100.00
75.00	29.00	90.00	82.50	70.00	195.00	0.00	198.00	196.50	100.00
90.00	22.70	105.00	97.50	92.70	198.00	0.00	200.00	199.00	100.00

Table d 4-2 Particle size distribution of formulation (1/6) IPM : T_{80} : W (7%) (IPM:T_{80}=1:9) after stability testing.

Distribution Type : number	n = 300
Mean Diameter : 105.90	SD = 26.79

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	20.00	120.00	112.50	72.00
3.00	0.00	5.00	4.00	0.00	120.00	13.70	135.00	127.50	85.70
5.00	0.00	10.00	7.50	0.00	135.00	8.30	150.00	142.50	94.00
10.00	0.00	15.00	12.50	0.00	150.00	3.70	165.00	157.50	97.70
15.00	0.00	22.00	18.50	0.00	165.00	1.00	172.00	168.50	98.70
22.00	0.00	30.00	26.00	0.00	172.00	0.60	180.00	176.00	99.30
30.00	0.00	45.00	37.50	0.00	180.00	0.70	185.00	182.50	100.00
45.00	3.00	60.00	52.50	3.00	185.00	0.00	190.00	187.50	100.00
60.00	11.30	75.00	67.50	14.30	190.00	0.00	195.00	192.50	100.00
75.00	14.00	90.00	82.50	28.30	195.00	0.00	198.00	196.50	100.00
90.00	23.70	105.00	97.50	52.00	198.00	0.00	200.00	199.00	100.00

Table d 5-1 Particle size distribution of formulation (2/1) CO:C_{EL}:W: PG(4:1) (23%) (CO:C_{EL} = 2:8) before stability testing.

Distribution Type : number	n = 300
Mean Diameter : 72.94	SD = 19.67

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	6.60	120.00	112.50	99.30
3.00	0.00	5.00	4.00	0.00	120.00	0.70	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	0.00	30.00	26.00	0.00	172.00	0.00	180.00	176.00	100.00
30.00	6.30	45.00	37.50	6.30	180.00	0.00	185.00	182.50	100.00
45.00	26.70	60.00	52.50	33.00	185.00	0.00	190.00	187.50	100.00
60.00	27.70	75.00	67.50	60.70	190.00	0.00	195.00	192.50	100.00
75.00	21.00	90.00	82.50	81.70	195.00	0.00	198.00	196.50	100.00
90.00	11.00	105.00	97.50	92.70	198.00	0.00	200.00	199.00	100.00

Table d 5-2 Particle size distribution of formulation (2/1) CO:C_{EL}:W: PG(4:1) (23%) (CO:C_{EL} = 2:8) after stability testing.

Distribution Type : number	n = 300
Mean Diameter : 83.84	SD = 22.04

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	10.70	120.00	112.50	94.00
3.00	0.00	5.00	4.00	0.00	120.00	4.70	135.00	127.50	98.70
5.00	0.00	10.00	7.50	0.00	135.00	1.30	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	0.00	30.00	26.00	0.00	172.00	0.00	180.00	176.00	100.00
30.00	1.30	45.00	37.50	1.30	180.00	0.00	185.00	182.50	100.00
45.00	14.40	60.00	52.50	15.70	185.00	0.00	190.00	187.50	100.00
60.00	23.60	75.00	67.50	39.30	190.00	0.00	195.00	192.50	100.00
75.00	23.70	90.00	82.50	63.00	195.00	0.00	198.00	196.50	100.00
90.00	20.30	105.00	97.50	83.30	198.00	0.00	200.00	199.00	100.00

Table d 6-1 Particle size distribution of formulation (3/1) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=15%) (IPM:T_{80}:L_{68} = 3 : 4.67 : 2.33) before stability testing.

Distribution Type : number	n = 300
Mean Diameter : 41.77	SD = 8.40

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	0.00	120.00	112.50	100.00
3.00	0.00	5.00	4.00	0.00	120.00	0.00	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.30	15.00	12.50	0.30	150.00	0.00	165.00	157.50	100.00
15.00	0.30	22.00	18.50	0.60	165.00	0.00	172.00	168.50	100.00
22.00	8.00	30.00	26.00	8.60	172.00	0.00	180.00	176.00	100.00
30.00	57.70	45.00	37.50	66.30	180.00	0.00	185.00	182.50	100.00
45.00	31.00	60.00	52.50	97.30	185.00	0.00	190.00	187.50	100.00
60.00	2.70	75.00	67.50	100.00	190.00	0.00	195.00	192.50	100.00
75.00	0.00	90.00	82.50	100.00	195.00	0.00	198.00	196.50	100.00
90.00	0.00	105.00	97.50	100.00	198.00	0.00	200.00	199.00	100.00

Table d 6-2 Particle size distribution of formulation (3/1) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=15%) (IPM:T_{80}:L_{68} = 3 : 4.67 : 2.33) after stability testing.

Distribution Type : number	n = 300
Mean Diameter : 84.81	SD = 21.64

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	8.70	120.00	112.50	94.00
3.00	0.00	5.00	4.00	0.00	120.00	5.00	135.00	127.50	99.00
5.00	0.00	10.00	7.50	0.00	135.00	0.30	150.00	142.50	99.30
10.00	0.00	15.00	12.50	0.00	150.00	0.70	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	0.00	30.00	26.00	0.00	172.00	0.00	180.00	176.00	100.00
30.00	2.70	45.00	37.50	2.70	180.00	0.00	185.00	182.50	100.00
45.00	13.60	60.00	52.50	16.30	185.00	0.00	190.00	187.50	100.00
60.00	17.00	75.00	67.50	33.30	190.00	0.00	195.00	192.50	100.00
75.00	27.40	90.00	82.50	60.70	195.00	0.00	198.00	196.50	100.00
90.00	24.60	105.00	97.50	85.30	198.00	0.00	200.00	199.00	100.00

Table d 7-1 The TEM photomicrograph of formulation (3/2) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=20%) (IPM:T_{80}:L_{68} = 3 : 4.67 : 2.33) before stability testing.

Distribution Type : number
Mean Diameter : 47.64
n = 300
SD = 7.19

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	0.00	120.00	112.50	100.00
3.00	0.00	5.00	4.00	0.00	120.00	0.00	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	1.30	30.00	26.00	1.30	172.00	0.00	180.00	176.00	100.00
30.00	35.40	45.00	37.50	36.70	180.00	0.00	185.00	182.50	100.00
45.00	60.60	60.00	52.50	97.30	185.00	0.00	190.00	187.50	100.00
60.00	2.70	75.00	67.50	100.00	190.00	0.00	195.00	192.50	100.00
75.00	0.00	90.00	82.50	100.00	195.00	0.00	198.00	196.50	100.00
90.00	0.00	105.00	97.50	100.00	198.00	0.00	200.00	199.00	100.00

Table d7-2 Particle size distribution of formulation (3/2) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=20%) (IPM:T_{80}:L_{68} = 3 : 4.67 : 2.33) after stability testing.

Distribution Type : number
Mean Diameter : 52.94
n = 300
SD = 16.52

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	0.70	120.00	112.50	100.00
3.00	0.00	5.00	4.00	0.00	120.00	0.00	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	2.30	30.00	26.00	2.30	172.00	0.00	180.00	176.00	100.00
30.00	36.00	45.00	37.50	38.30	180.00	0.00	185.00	182.50	100.00
45.00	33.40	60.00	52.50	71.70	185.00	0.00	190.00	187.50	100.00
60.00	18.60	75.00	67.50	90.30	190.00	0.00	195.00	192.50	100.00
75.00	6.70	90.00	82.50	97.00	195.00	0.00	198.00	196.50	100.00
90.00	2.30	105.00	97.50	99.30	198.00	0.00	200.00	199.00	100.00

Table d8-1 Particle size distribution of formulation (3/4) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=20%) (IPM:T_{80}:L_{68} = 2 : 5.33 : 2.67) before stability testing.

Distribution Type : number
Mean Diameter : 39.73

n = 300
SD = 11.62

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	0.00	120.00	112.50	100.00
3.00	0.00	5.00	4.00	0.00	120.00	0.00	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	1.70	22.00	18.50	1.70	165.00	0.00	172.00	168.50	100.00
22.00	27.00	30.00	26.00	28.70	172.00	0.00	180.00	176.00	100.00
30.00	41.00	45.00	37.50	69.70	180.00	0.00	185.00	182.50	100.00
45.00	24.00	60.00	52.50	93.70	185.00	0.00	190.00	187.50	100.00
60.00	6.30	75.00	67.50	100.00	190.00	0.00	195.00	192.50	100.00
75.00	0.00	90.00	82.50	100.00	195.00	0.00	198.00	196.50	100.00
90.00	0.00	105.00	97.50	100.00	198.00	0.00	200.00	199.00	100.00

Table d8-2 Particle size distribution of formulation (3/4) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=20%) (IPM:T_{80}:L_{68} = 2 : 5.33 : 2.67) after stability testing.

Distribution Type : number
Mean Diameter : 57.87

n = 300
SD = 15.50

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	0.00	120.00	112.50	100.00
3.00	0.00	5.00	4.00	0.00	120.00	0.00	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	3.70	30.00	26.00	3.70	172.00	0.00	180.00	176.00	100.00
30.00	19.60	45.00	37.50	23.30	180.00	0.00	185.00	182.50	100.00
45.00	33.00	60.00	52.50	56.30	185.00	0.00	190.00	187.50	100.00
60.00	31.40	75.00	67.50	87.70	190.00	0.00	195.00	192.50	100.00
75.00	11.00	90.00	82.50	98.70	195.00	0.00	198.00	196.50	100.00
90.00	1.30	105.00	97.50	100.00	198.00	0.00	200.00	199.00	100.00

Table d 9-1 Particle size distribution of formulation (3/5) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=25%) (IPM:T_{80}:L_{68} = 2 : 5.33 : 2.67) before stability testing.

Distribution Type : number	n = 300
Mean Diameter : 58.33	SD = 17.56

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	0.30	120.00	112.50	100.00
3.00	0.00	5.00	4.00	0.00	120.00	0.00	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	1.00	30.00	26.00	1.00	172.00	0.00	180.00	176.00	100.00
30.00	26.30	45.00	37.50	27.30	180.00	0.00	185.00	182.50	100.00
45.00	35.00	60.00	52.50	62.30	185.00	0.00	190.00	187.50	100.00
60.00	17.40	75.00	67.50	79.70	190.00	0.00	195.00	192.50	100.00
75.00	13.50	90.00	82.50	93.20	195.00	0.00	198.00	196.50	100.00
90.00	6.50	105.00	97.50	99.70	198.00	0.00	200.00	199.00	100.00

Table d 9-2 Particle size distribution of formulation (3/5) IPM : T_{80} : L_{68} : W(T_{80}:L_{68}=2:1) (W=25%) (IPM:T_{80}:L_{68} = 2 : 5.33 : 2.67) after stability testing.

Distribution Type : number	n = 300
Mean Diameter : 73.54	SD = 18.52

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	3.60	120.00	112.50	99.30
3.00	0.00	5.00	4.00	0.00	120.00	0.70	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	0.70	30.00	26.00	0.70	172.00	0.00	180.00	176.00	100.00
30.00	7.30	45.00	37.50	8.00	180.00	0.00	185.00	182.50	100.00
45.00	16.00	60.00	52.50	24.00	185.00	0.00	190.00	187.50	100.00
60.00	27.30	75.00	67.50	51.30	190.00	0.00	195.00	192.50	100.00
75.00	32.70	90.00	82.50	84.00	195.00	0.00	198.00	196.50	100.00
90.00	11.70	105.00	97.50	95.70	198.00	0.00	200.00	199.00	100.00

Table d 10-1 Particle size distribution of formulation (4/2) IPM : C_{EL} : W: PG (4:1) (25%) (IPM:C_{EL} = 2:8) before stability testing.

Distribution Type : number	n = 300
Mean Diameter : 49.03	SD = 10.57

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	0.00	120.00	112.50	100.00
3.00	0.00	5.00	4.00	0.00	120.00	0.00	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	1.00	22.00	18.50	1.00	165.00	0.00	172.00	168.50	100.00
22.00	1.70	30.00	26.00	2.70	172.00	0.00	180.00	176.00	100.00
30.00	34.60	45.00	37.50	37.30	180.00	0.00	185.00	182.50	100.00
45.00	52.00	60.00	52.50	89.30	185.00	0.00	190.00	187.50	100.00
60.00	9.00	75.00	67.50	98.30	190.00	0.00	195.00	192.50	100.00
75.00	1.40	90.00	82.50	99.70	195.00	0.00	198.00	196.50	100.00
90.00	0.30	105.00	97.50	100.00	198.00	0.00	200.00	199.00	100.00

Table d 10-2 Particle size distribution of formulation (4/2) IPM : C_{EL} : W: PG (4:1) (25%) (IPM:C_{EL} = 2:8) after stability testing.

Distribution Type : number	n = 300
Mean Diameter : 99.14	SD = 21.58

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	21.70	120.00	112.50	82.70
3.00	0.00	5.00	4.00	0.00	120.00	12.60	135.00	127.50	95.30
5.00	0.00	10.00	7.50	0.00	135.00	4.70	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	0.00	30.00	26.00	0.00	172.00	0.00	180.00	176.00	100.00
30.00	0.00	45.00	37.50	0.00	180.00	0.00	185.00	182.50	100.00
45.00	3.70	60.00	52.50	3.70	185.00	0.00	190.00	187.50	100.00
60.00	9.30	75.00	67.50	13.00	190.00	0.00	195.00	192.50	100.00
75.00	19.30	90.00	82.50	32.30	195.00	0.00	198.00	196.50	100.00
90.00	28.70	105.00	97.50	61.00	198.00	0.00	200.00	199.00	100.00

Table d 11-1 Particle size distribution of formulation (4/4) IPM : C_{EL} : W: PG (4:1) (20%) (IPM:C_{EL} = 3:7) before stability testing.

Distribution Type : number	n = 300
Mean Diameter : 57.33	SD = 14.82

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	0.00	120.00	112.50	100.00
3.00	0.00	5.00	4.00	0.00	120.00	0.00	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	2.30	30.00	26.00	2.30	172.00	0.00	180.00	176.00	100.00
30.00	20.70	45.00	37.50	23.00	180.00	0.00	185.00	182.50	100.00
45.00	35.70	60.00	52.50	58.70	185.00	0.00	190.00	187.50	100.00
60.00	29.60	75.00	67.50	88.30	190.00	0.00	195.00	192.50	100.00
75.00	10.00	90.00	82.50	98.30	195.00	0.00	198.00	196.50	100.00
90.00	1.70	105.00	97.50	100.00	198.00	0.00	200.00	199.00	100.00

Table d 11-2 Particle size distribution of formulation (4/4) IPM : C_{EL} : W: PG (4:1) (20%) (IPM:C_{EL} = 3:7) after stability testing.

Distribution Type : number	n = 300
Mean Diameter : 97.89	SD = 23.47

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	22.00	120.00	112.50	82.30
3.00	0.00	5.00	4.00	0.00	120.00	12.00	135.00	127.50	94.30
5.00	0.00	10.00	7.50	0.00	135.00	4.00	150.00	142.50	98.30
10.00	0.00	15.00	12.50	0.00	150.00	1.70	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	0.00	30.00	26.00	0.00	172.00	0.00	180.00	176.00	100.00
30.00	0.00	45.00	37.50	0.00	180.00	0.00	185.00	182.50	100.00
45.00	6.30	60.00	52.50	6.30	185.00	0.00	190.00	187.50	100.00
60.00	11.00	75.00	67.50	17.30	190.00	0.00	195.00	192.50	100.00
75.00	25.40	90.00	82.50	42.70	195.00	0.00	198.00	196.50	100.00
90.00	17.60	105.00	97.50	60.30	198.00	0.00	200.00	199.00	100.00

Table d 12-1 Particle size distribution of formulation (5/1) IPM : C_{RH} : W: PG (4:1) (W=14.52%) (IPM:C_{RH} = 3:7) before stability testing.

Distribution Type : number	n = 300
Mean Diameter : 81.63	SD = 21.69

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	11.00	120.00	112.50	95.30
3.00	0.00	5.00	4.00	0.00	120.00	4.70	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	0.00	30.00	26.00	0.00	172.00	0.00	180.00	176.00	100.00
30.00	3.00	45.00	37.50	3.00	180.00	0.00	185.00	182.50	100.00
45.00	16.00	60.00	52.50	19.00	185.00	0.00	190.00	187.50	100.00
60.00	21.00	75.00	67.50	40.00	190.00	0.00	195.00	192.50	100.00
75.00	26.70	90.00	82.50	66.70	195.00	0.00	198.00	196.50	100.00
90.00	17.60	105.00	97.50	84.30	198.00	0.00	200.00	199.00	100.00

Table d 12-2 Particle size distribution of formulation (5/1) IPM : C_{RH} : W: PG (4:1) (W=14.52%) (IPM:C_{RH} = 3:7) after stability testing.

Distribution Type : number	n = 300
Mean Diameter : 54.28	SD = 11.20

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	0.00	120.00	112.50	100.00
3.00	0.00	5.00	4.00	0.00	120.00	0.00	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	0.00	30.00	26.00	0.00	172.00	0.00	180.00	176.00	100.00
30.00	23.70	45.00	37.50	23.70	180.00	0.00	185.00	182.50	100.00
45.00	47.30	60.00	52.50	71.00	185.00	0.00	190.00	187.50	100.00
60.00	25.70	75.00	67.50	96.70	190.00	0.00	195.00	192.50	100.00
75.00	3.30	90.00	82.50	100.00	195.00	0.00	198.00	196.50	100.00
90.00	0.00	105.00	97.50	100.00	198.00	0.00	200.00	199.00	100.00

Table d 13-1 Particle size distribution of formulation (5/5) IPM : C_{RH} : W: PG (4:1) (W=15%) (IPM:C_{RH} = 5:5) before stability testing

Distribution Type : number	n = 300
Mean Diameter : 50.69	SD = 16.62

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	0.30	120.00	112.50	100.00
3.00	0.00	5.00	4.00	0.00	120.00	0.00	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	1.30	22.00	18.50	1.30	165.00	0.00	172.00	168.50	100.00
22.00	7.70	30.00	26.00	9.00	172.00	0.00	180.00	176.00	100.00
30.00	33.30	45.00	37.50	42.30	180.00	0.00	185.00	182.50	100.00
45.00	32.00	60.00	52.50	74.30	185.00	0.00	190.00	187.50	100.00
60.00	18.00	75.00	67.50	92.30	190.00	0.00	195.00	192.50	100.00
75.00	4.70	90.00	82.50	97.00	195.00	0.00	198.00	196.50	100.00
90.00	2.70	105.00	97.50	99.70	198.00	0.00	200.00	199.00	100.00

Table d 13-2 Particle size distribution of formulation (5/5) IPM : C_{RH} : W: PG (4:1) (W=15%) (IPM:C_{RH} = 5:5) after stability testing.

Distribution Type : number	n = 300
Mean Diameter : 60.70	SD = 17.85

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	1.00	120.00	112.50	99.30
3.00	0.00	5.00	4.00	0.00	120.00	0.70	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	0.00	30.00	26.00	0.00	172.00	0.00	180.00	176.00	100.00
30.00	20.30	45.00	37.50	20.30	180.00	0.00	185.00	182.50	100.00
45.00	34.00	60.00	52.50	54.30	185.00	0.00	190.00	187.50	100.00
60.00	28.70	75.00	67.50	83.00	190.00	0.00	195.00	192.50	100.00
75.00	13.30	90.00	82.50	96.30	195.00	0.00	198.00	196.50	100.00
90.00	2.00	105.00	97.50	98.30	198.00	0.00	200.00	199.00	100.00

Table d 14-1 Particle size distribution of formulation (6/1) IPM : T_{80} : C_{EL} : W (W=15%) (IPM: T_{80} : C_{EL} = 3 : 3.5 : 3.5) before stability testing.

Distribution Type : number	n = 300
Mean Diameter : 82.09	SD = 40.45

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	8.40	120.00	112.50	73.70
3.00	0.00	5.00	4.00	0.00	120.00	15.00	135.00	127.50	88.70
5.00	0.00	10.00	7.50	0.00	135.00	6.30	150.00	142.50	95.00
10.00	0.00	15.00	12.50	0.00	150.00	4.70	165.00	157.50	99.70
15.00	0.00	22.00	18.50	0.00	165.00	0.30	172.00	168.50	100.00
22.00	0.00	30.00	26.00	0.00	172.00	0.00	180.00	176.00	100.00
30.00	25.70	45.00	37.50	25.70	180.00	0.00	185.00	182.50	100.00
45.00	21.00	60.00	52.50	46.70	185.00	0.00	190.00	187.50	100.00
60.00	5.60	75.00	67.50	52.30	190.00	0.00	195.00	192.50	100.00
75.00	5.00	90.00	82.50	57.30	195.00	0.00	198.00	196.50	100.00
90.00	8.00	105.00	97.50	65.30	198.00	0.00	200.00	199.00	100.00

Table d 14-2 Particle size distribution of formulation (6/1) IPM : T_{80} : C_{EL} : W (W=15%) (IPM: T_{80} : C_{EL} = 3 : 3.5 : 3.5) after stability testing.

Distribution Type : number	n = 300
Mean Diameter : 27.28	SD = 5.49

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	0.00	120.00	112.50	100.00
3.00	0.00	5.00	4.00	0.00	120.00	0.00	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	17.30	22.00	18.50	17.30	165.00	0.00	172.00	168.50	100.00
22.00	57.70	30.00	26.00	75.00	172.00	0.00	180.00	176.00	100.00
30.00	24.30	45.00	37.50	99.30	180.00	0.00	185.00	182.50	100.00
45.00	0.70	60.00	52.50	100.00	185.00	0.00	190.00	187.50	100.00
60.00	0.00	75.00	67.50	100.00	190.00	0.00	195.00	192.50	100.00
75.00	0.00	90.00	82.50	100.00	195.00	0.00	198.00	196.50	100.00
90.00	0.00	105.00	97.50	100.00	198.00	0.00	200.00	199.00	100.00

Table d 15-1 Particle size distribution of formulation (6/4) IPM : T_{80} : C_{EL} : W (W=20%) (IPM: T_{80} : C_{EL} = 1 : 4.5 : 4.5) before stability testing

Distribution Type : number	n = 300
Mean Diameter : 47.25	SD = 10.25

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	0.00	120.00	112.50	100.00
3.00	0.00	5.00	4.00	0.00	120.00	0.00	135.00	127.50	100.00
5.00	0.00	10.00	7.50	0.00	135.00	0.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	2.30	30.00	26.00	2.30	172.00	0.00	180.00	176.00	100.00
30.00	46.70	45.00	37.50	49.00	180.00	0.00	185.00	182.50	100.00
45.00	41.00	60.00	52.50	90.00	185.00	0.00	190.00	187.50	100.00
60.00	8.70	75.00	67.50	98.70	190.00	0.00	195.00	192.50	100.00
75.00	1.30	90.00	82.50	100.00	195.00	0.00	198.00	196.50	100.00
90.00	0.00	105.00	97.50	100.00	198.00	0.00	200.00	199.00	100.00

Table d15-2 Particle size distribution of formulation (6/4) IPM : T_{80} : C_{EL} : W (W=20%) (IPM: T_{80} : C_{EL} = 1 : 4.5 : 4.5) after stability testing.

Distribution Type : number	n = 300
Mean Diameter : 158.89	SD = 24.81

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	5.70	120.00	112.50	8.00
3.00	0.00	5.00	4.00	0.00	120.00	11.70	135.00	127.50	19.70
5.00	0.00	10.00	7.50	0.00	135.00	17.30	150.00	142.50	37.00
10.00	0.00	15.00	12.50	0.00	150.00	20.00	165.00	157.50	57.00
15.00	0.00	22.00	18.50	0.00	165.00	9.70	172.00	168.50	66.70
22.00	0.00	30.00	26.00	0.00	172.00	10.60	180.00	176.00	77.30
30.00	0.00	45.00	37.50	0.00	180.00	6.00	185.00	182.50	83.30
45.00	0.00	60.00	52.50	0.00	185.00	6.70	190.00	187.50	90.00
60.00	0.00	75.00	67.50	0.00	190.00	6.30	195.00	192.50	96.30
75.00	0.30	90.00	82.50	0.30	195.00	3.70	198.00	196.50	100.00
90.00	2.00	105.00	97.50	2.30	198.00	0.00	200.00	199.00	100.00

Table d16-1 Particle size distribution of formulation (7/1) IPM : T_{80} : B_{35} : W(W=15%) (IPM: T_{80} : B_{35} = 3 : 3.5 : 3.5) before stability testing.

Distribution Type : number	n = 300
Mean Diameter : 84.37	SD = 16.04

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	8.70	120.00	112.50	97.70
3.00	0.00	5.00	4.00	0.00	120.00	2.00	135.00	127.50	99.70
5.00	0.00	10.00	7.50	0.00	135.00	0.30	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	0.00	30.00	26.00	0.00	172.00	0.00	180.00	176.00	100.00
30.00	1.00	45.00	37.50	1.00	180.00	0.00	185.00	182.50	100.00
45.00	2.70	60.00	52.50	3.70	185.00	0.00	190.00	187.50	100.00
60.00	29.30	75.00	67.50	33.00	190.00	0.00	195.00	192.50	100.00
75.00	36.00	90.00	82.50	69.00	195.00	0.00	198.00	196.50	100.00
90.00	20.00	105.00	97.50	89.00	198.00	0.00	200.00	199.00	100.00

Table d 16-2 Particle size distribution of formulation (7/1) IPM : T_{80} : B_{35} : W(W=15%) (IPM: T_{80} : B_{35} = 3 : 3.5 : 3.5) after stability testing.

Distribution Type : number	n = 300
Mean Diameter : 112.56	SD = 31.97

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	14.70	120.00	112.50	61.00
3.00	0.00	5.00	4.00	0.00	120.00	14.30	135.00	127.50	75.30
5.00	0.00	10.00	7.50	0.00	135.00	10.40	150.00	142.50	85.70
10.00	0.00	15.00	12.50	0.00	150.00	7.00	165.00	157.50	92.70
15.00	0.00	22.00	18.50	0.00	165.00	3.00	172.00	168.50	95.70
22.00	0.00	30.00	26.00	0.00	172.00	2.30	180.00	176.00	98.00
30.00	0.30	45.00	37.50	0.30	180.00	2.00	185.00	182.50	100.00
45.00	3.70	60.00	52.50	4.00	185.00	0.00	190.00	187.50	100.00
60.00	7.30	75.00	67.50	11.30	190.00	0.00	195.00	192.50	100.00
75.00	18.00	90.00	82.50	29.30	195.00	0.00	198.00	196.50	100.00
90.00	17.00	105.00	97.50	46.30	198.00	0.00	200.00	199.00	100.00

Table d 17-1 Particle size distribution of formulation (8/1) SBO : T_{80} : W (7%) (SBO:T_{80}=1:9) before stability testing.

Distribution Type : number	n = 300
Mean Diameter : 78.33	SD = 20.00

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	6.60	120.00	112.50	97.30
3.00	0.00	5.00	4.00	0.00	120.00	1.70	135.00	127.50	99.00
5.00	0.00	10.00	7.50	0.00	135.00	1.00	150.00	142.50	100.00
10.00	0.00	15.00	12.50	0.00	150.00	0.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	1.00	30.00	26.00	1.00	172.00	0.00	180.00	176.00	100.00
30.00	3.00	45.00	37.50	4.00	180.00	0.00	185.00	182.50	100.00
45.00	13.30	60.00	52.50	17.30	185.00	0.00	190.00	187.50	100.00
60.00	33.00	75.00	67.50	50.30	190.00	0.00	195.00	192.50	100.00
75.00	26.00	90.00	82.50	76.30	195.00	0.00	198.00	196.50	100.00
90.00	14.40	105.00	97.50	90.70	198.00	0.00	200.00	199.00	100.00

Table d 17-2 Particle size distribution of formulation (8/1) SBO : T_{80} : W (7%) (SBO:T_{80}=1:9) after stability testing.

Distribution Type : number	n = 300
Mean Diameter : 79.58	SD = 26.52

size low (nm)	size in %	size high (nm)	D mean	under %	size low (nm)	size in %	size high (nm)	Dmean	under %
1.00	0.00	3.00	2.00	0.00	105.00	9.30	120.00	112.50	90.30
3.00	0.00	5.00	4.00	0.00	120.00	5.70	135.00	127.50	96.00
5.00	0.00	10.00	7.50	0.00	135.00	3.00	150.00	142.50	99.00
10.00	0.00	15.00	12.50	0.00	150.00	1.00	165.00	157.50	100.00
15.00	0.00	22.00	18.50	0.00	165.00	0.00	172.00	168.50	100.00
22.00	1.30	30.00	26.00	1.30	172.00	0.00	180.00	176.00	100.00
30.00	6.40	45.00	37.50	7.70	180.00	0.00	185.00	182.50	100.00
45.00	12.30	60.00	52.50	20.00	185.00	0.00	190.00	187.50	100.00
60.00	31.70	75.00	67.50	51.70	190.00	0.00	195.00	192.50	100.00
75.00	22.30	90.00	82.50	74.00	195.00	0.00	198.00	196.50	100.00
90.00	7.00	105.00	97.50	81.00	198.00	0.00	200.00	199.00	100.00

APPENDIX E

Statistic Evaluation

Table e1 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 1/1).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F1 - F1AFTE	-9.5533	7.90287	.45627	-10.4512	-8.6554	-20.938	299	.000

Table e2 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 1/3).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F2 - F2AFTE	-43.5600	27.70798	1.59972	-46.7081	-40.4119	-27.230	299	.000

Table e3 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 1/5).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F3 - F3AFTE	-71.8167	32.14791	1.85606	-75.4693	-68.1641	-38.693	299	.000

Table e4 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 1/6).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F4 - F4AFTE	-27.3700	26.69611	1.54130	-30.4032	-24.3368	-17.758	299	.000

Table e5 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 2/1).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F5 - F5AFTE	-10.9000	27.40645	1.58231	-14.0139	-7.7861	-6.889	299	.000

Table e6 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 3/1).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F6 - F6AFTE	-43.0400	17.56360	1.01403	-45.0355	-41.0445	-42.444	299	.000

Table e7 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 3/2).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F7 - F7AFTEI	-5.3000	15.05142	.86899	-7.0101	-3.5899	-6.099	299	.000

Table e8 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 3/4).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F8 - F8AFTEI	-18.1433	11.83143	.68309	-19.4876	-16.7991	-26.561	299	.000

Table e9 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 3/5).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F9 - F9AFTEI	-15.2100	27.28947	1.57556	-18.3106	-12.1094	-9.654	299	.000

Table e10 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 4/2).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F10 - F10AFTE	-50.1167	22.32228	1.28878	-52.6529	-47.5804	-38.887	299	.000

Table e11 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 4/4).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F11 - F11AFTE	-40.5600	26.20513	1.51295	-43.5374	-37.5826	-26.808	299	.000

Table e12 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 5/1).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F12 - F12AFTE	27.3500	21.45059	1.23845	24.9128	29.7872	22.084	299	.000

Table e13 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 5/3).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F13 - F3AFTEI	-48.8033	34.20719	1.97495	-52.6899	-44.9168	-24.711	299	.000

Table e14 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 6/1).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F14 - F14AFTE	54.8100	41.57051	2.40007	50.0868	59.5332	22.837	299	.000

Table e15 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 6/4).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F15 - F15AFTE	-111.6333	25.55783	1.47558	-114.5372	-108.7295	-75.654	299	.000

Table e16 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 7/1).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F16 - F16AFTEI	-28.1933	33.12502	1.91247	-31.9569	-24.4297	-14.742	299	.000

Table e17 The result of 2 tailed paired-sample T test of mean particle diameter between before and after stability testing (Formulation 8/1).

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 F17 - F17AFTEI	-1.2500	26.03601	1.50319	-4.2082	1.7082	-.832	299	.406

VITA

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