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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 ^{o}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 eluded with ethyl acetate/hexane (0-25%) mixtures of increasing polarity to give 24 fractions. Each fraction was evaporated using rotary evaporator and was monitoring 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 and nuclear magnetic resonance (NMR).

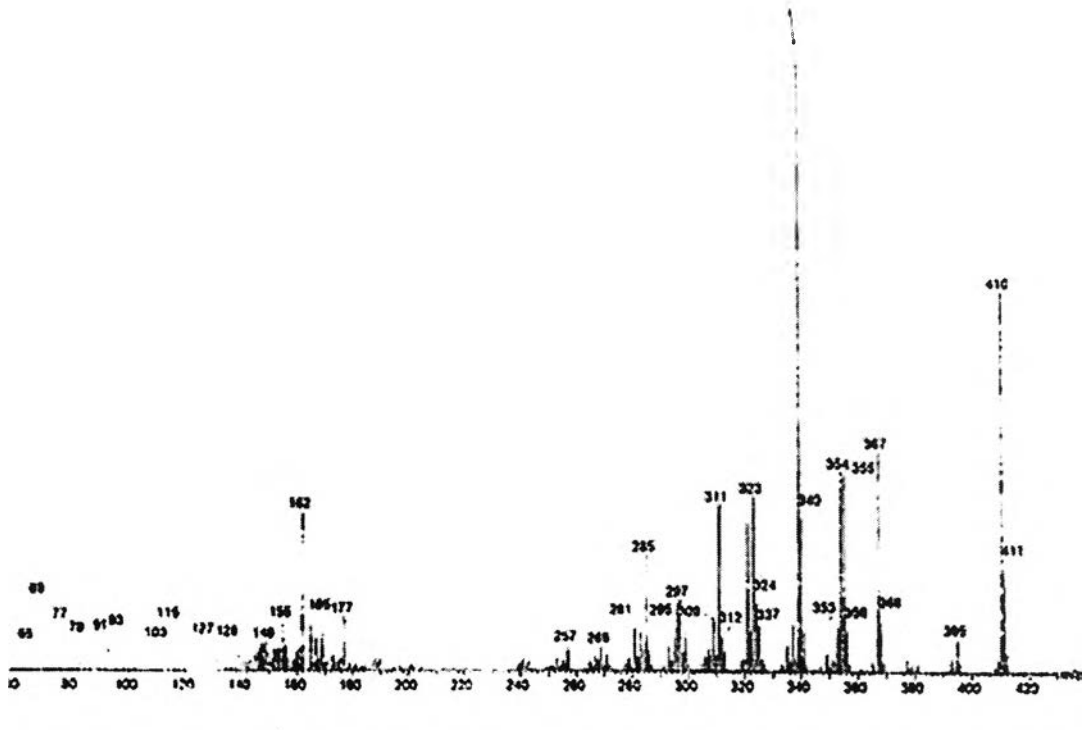


Figure A1 MS spectra of standard mangostin

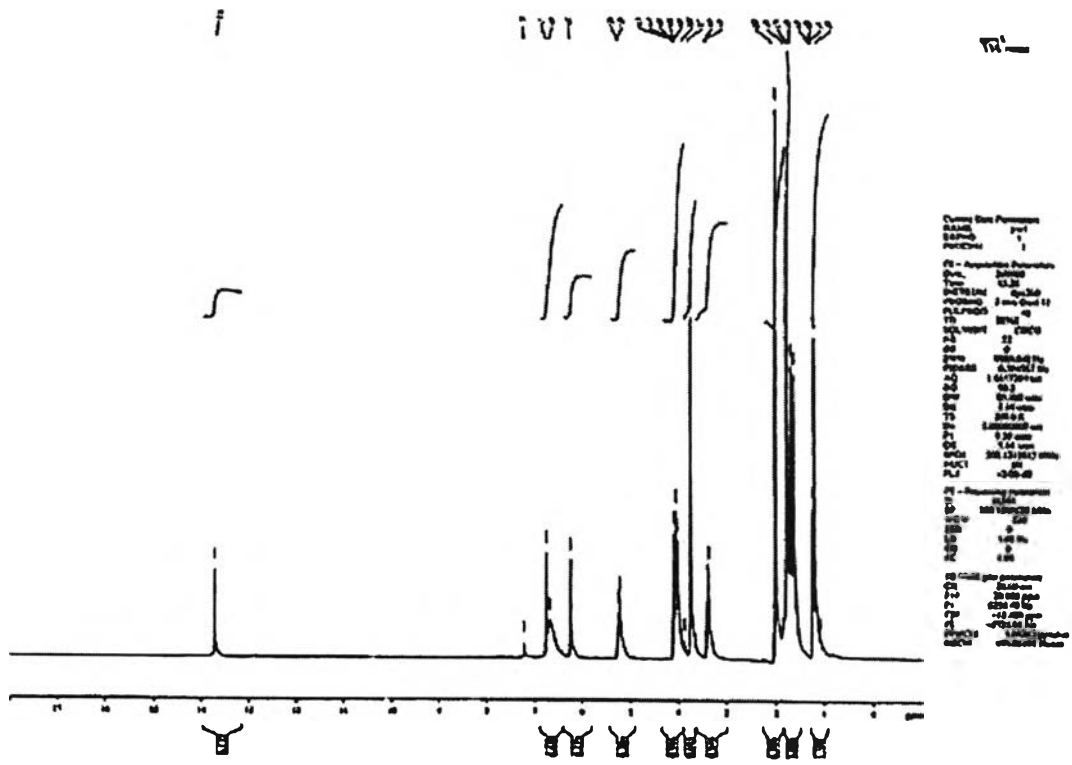


Figure A2 H NMR spectra of standard mangostin

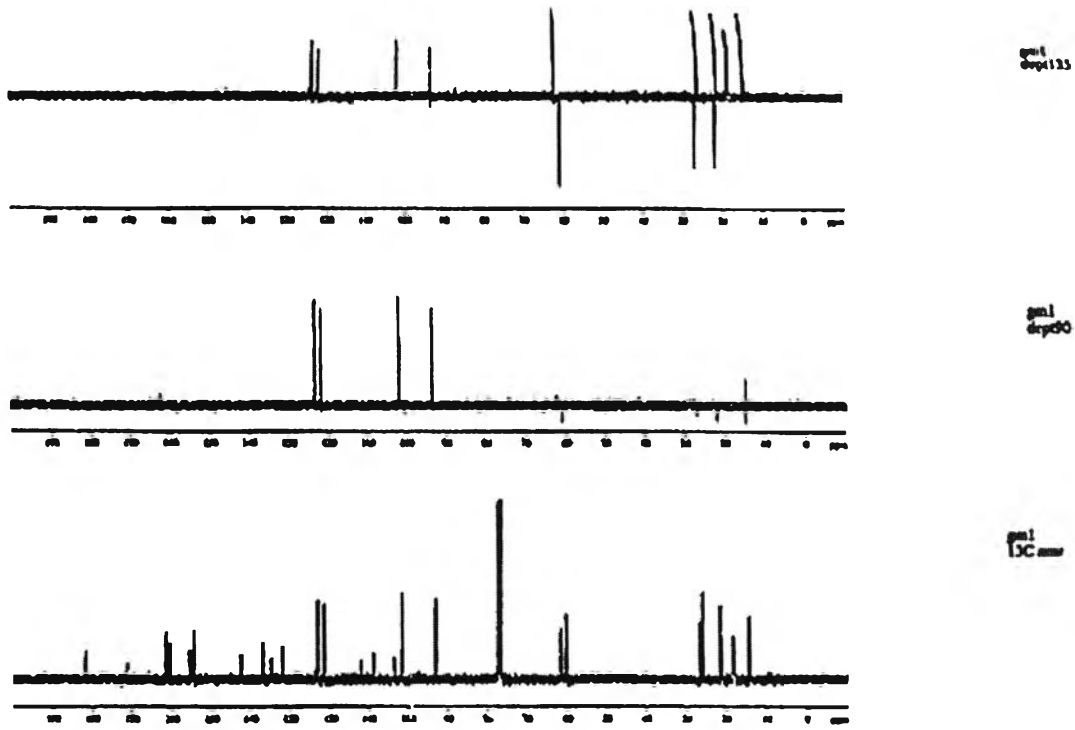


Figure A3 C NMR spectra of standard mangostin

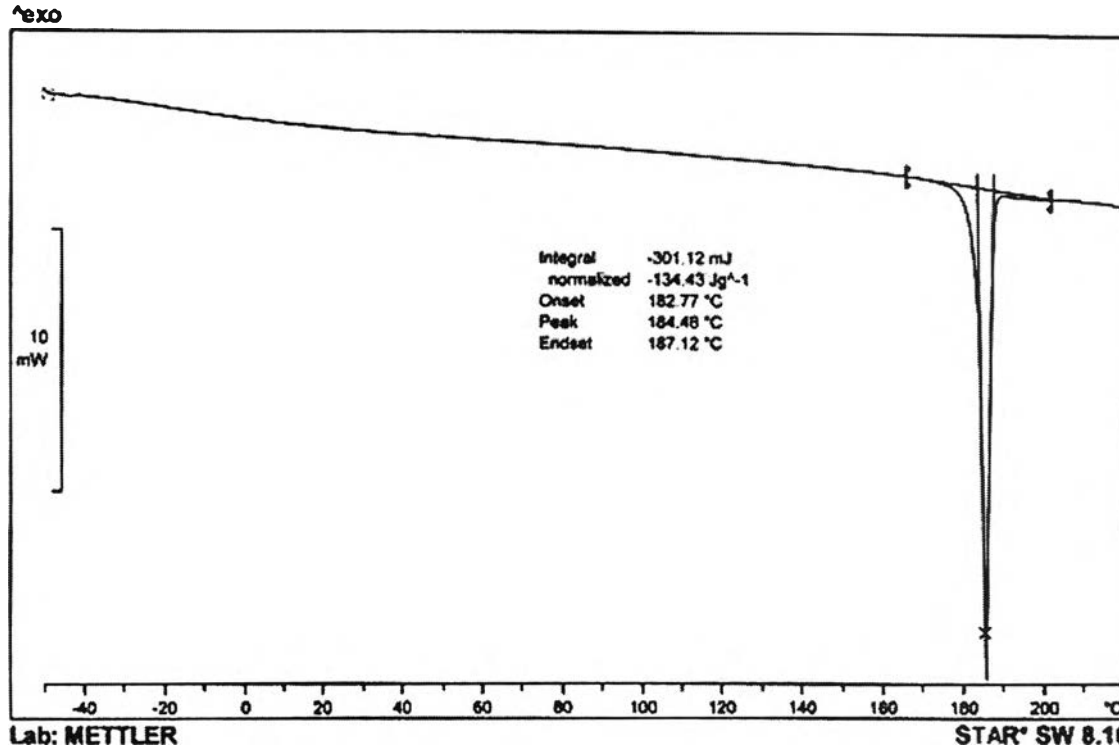


Figure A4 DSC chromatogram of standard mangostin at temperature range –50 to 220 °C, heating rate 10 °C/min (sample weight 2.24 mg)

APPENDIX B

Ingredient properties

Isotonic phosphate buffer pH 6.2

Potassium dihydrogen phosphate	0.19 g.
Disodium hydrogen orthophosphate	2.38 g.
Sodium chloride	8.00 g.
Deionized water qs. to	1000 ml.
Phosphoric acid adjust to pH 6.2	

Mueller Hinton broth (Difco, USA)

Beef extract powder	2.0 g.
Acid digest of casein	17.5 g
Soluble starch	1.5 g.
Deionized water qs. to	1000 ml.

Mueller Hinton agar (Merck, Germany)

Infusion from meat	2.0 g.
Casein hydrolysate	17.5 g.
Starch	1.5 g.
Agar	13.0 g.
Deionized water qs. to	1000 ml.

1. Hydroxypropyl methylcellulose (Rowe, Sheskey, and Weller, 2003)

1.1 Synonyms : Cellulose, hydroxypropyl methyl ether, Methocel, methylcellulose propylene glycol ether, methyl hydroxypropylcellulose

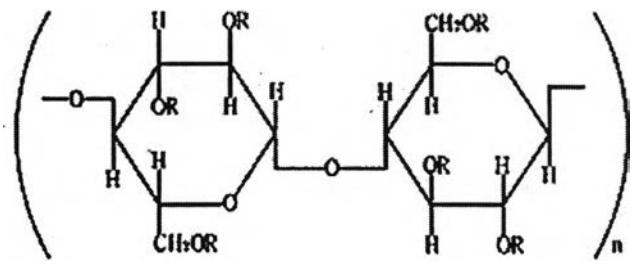
1.2 Chemical name: Cellulose, 2-Hydroxypropyl methyl ether

1.3 Molecular formulation: $C_8H_{15}O_6$-$(C_{10}H_{18}O_6)_n$-$C_8H_{15}O_5$

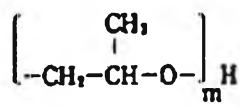
1.4 Molecular weight range: 10,000- 1,500,000

1.5 Chemical structure

1.6 Appearance



R = −H, −CH₃ or



Hydroxypropyl methylcellulose is an odorless and tasteless, while or creamy-white colored fibrous or granular powder.

1.7 Solubility

Hydroxypropyl methylcellulose is soluble in cold water, forming a viscous colloidal solution, insoluble in alcohol, ether, chloroform, but soluble in mixtures of methyl alcohol and methylene chloride.

1.8 Melting point

Hydroxypropyl methylcellulose is browns at 190-200 °C, chars at 225-230 °C.

1.9 Acidity/alkalinity

The pH of 1% w/v aqueous solution is 5.5-8.0.

1.10 Safety and application

Hydroxypropyl methylcellulose is widely used as an excipient in oral or topical pharmaceutical formulations. It is also extensively used in cosmetics and food

products. Hydroxypropyl methylcellulose is generally regarded as a nontoxic and nonirritant material although excessive oral consumption may have a laxative effect.

2. Hydroxypropyl cellulose (Rowe, Sheskey, and Weller, 2003)

2.1 Synonyms

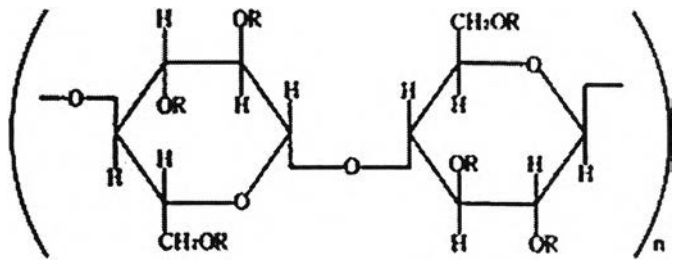
Cellulose, hydroxypropyl ether, Klucel, hyprolose, Nisso HPC, oxypropylated cellulose

2.2 Chemical name : Cellulose, 2-hydroxypropyl ether

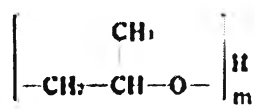
2.3 Molecular formulation : $(C_{15}H_{28}O_8)_n$

2.4 Molecular weight range : 50,000-1,250,000

2.5 Chemical structure



R = H or



2.6 Appearance

Hydroxypropyl cellulose is a white to slightly yellow-color, odorless and tasteless powder.

2.7 Solubility

Hydroxypropyl cellulose is freely soluble in water below 38 °C, forming a smooth, clear, colloidal solution. In hot water is insoluble and is precipitated as a highly swollen floc at temperature between 40- 45°C. All types have excellent solubility in either hot or polar organic liquids.

2.8 Melting point

Hydroxypropyl cellulose is softens at 130°C, chars at 260-275°C.

2.9 Acidity/alkalinity

The pH of 1% w/v aqueous solution is 5.0-8.5.

2.10 Safety

Hydroxypropyl cellulose is widely used as an excipient in oral or topical pharmaceutical formulations. It is also extensively used in cosmetics and food products. Hydroxypropyl cellulose is generally regarded as essentially nontoxic and nonirritant material. However, the use of hydroxypropyl cellulose as a solid ocular insert has been associated with rare of discomfort or irritation, including hypersensitivity and edema of eyelids.

3. Acesulfame Potassium (Rowe, Sheskey, and Weller, 2003)

3.1 General Characteristics

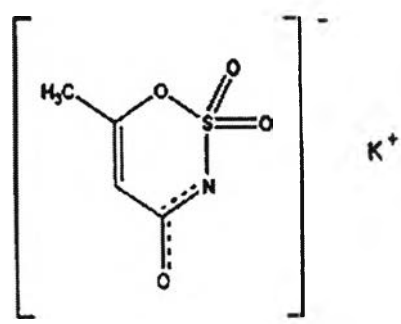
Acesulfame potassium occurs as a colorless to white-colored, odorless, crystalline powder with an intensely sweet taste.

3.2 Chemical name and empirical formula

Chemical name : 6-Menthyl-1,2,3-oxathiazin-4(3H)-one-2,2-dioxide potassium salt

Empirical formula : $C_4H_4KNO_4S$

3.3 Structural formula



3.4 Typical properties

Molecular weight	: 201.24
Melting point	: 250 °C decomposition can be observed at 225 °C if slowly heated
Solubility at 20 °C	: 1 in 1000 in ethanol
	: 1 in 100 in 50% ethanol
	: 1 in 3.7 in water

3.5 Applications

Acesulfame potassium is a caloric-free sweetener and has about 200 times sweeter than sucrose. It is used as an intense sweetening agent in cosmetics, foods, beverage products, table-top sweeteners, vitamin and pharmaceutical preparations, including powder mixes, tablets and liquid products. It is widely used as a sugar substitute in compounded formulations, and as a toothpaste sweetener.

3.6 Safety

Acesulfame potassium is widely used in cosmetics, foods, beverages, and pharmaceutical formulations and is generally regarded as a relatively nontoxic and nonirritant material. Pharmacokinetic studies have shown that acesulfame potassium is not metabolized and is rapidly excreted unchanged in the urine. Long-term feeding studies in rats and dogs showed no evidence to suggest acesulfame potassium is mutagenic or carcinogenic.

The WHO has set an acceptable daily intake for acesulfame potassium of up to 15 mg/kg body weight

LD_{50} (rat, IP)	:	2.2 g/kg
LD_{50} (rat, oral)	:	6.9-8.0 g/kg

4. Menthol (Rowe, Sheskey, and Weller, 2003)

4.1 General Characteristics

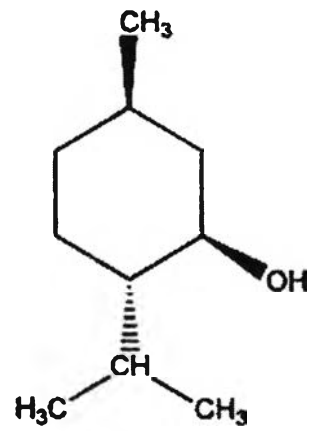
Racemic menthol is a mixture of equal parts of the (1*R*,2*S*,5*R*)- and (1*S*,2*R*,5*S*)-isomers of menthol. It is a free flowing or agglomerated crystalline powder, or colorless, prismatic, or acicular shiny crystals, with a strong characteristic odor and taste. The crystalline form may change with time owing to sublimation within a closed vessel.

4.2. Chemical name and empirical formula

Chemical name : (1*RS*,2*RS*,5*RS*)-(+)-5-Menthyl-2-(1-methylethyl)cyclohexanol

Empirical formula : $C_{10}H_{20}O$

4.3 Structural formula



4.4 Typical properties

Molecular weight : 156.27

Melting point : 34-36 °C

Boiling point : 212 °C

Solubility at 20 °C : very soluble in 95% ethanol, chloroform and ether

: very slightly soluble in glycerin

: practically insoluble in water

4.5 Applications

Menthol is widely used as a flavoring agent or odor enhancer in pharmaceuticals, confectionery, and toiletry products. In addition to its characteristic peppermint flavor, *l*-menthol, which occurs naturally, also exerts a cooling or refreshing sensation that is exploited in many topical preparations. Unlike mannitol, which exerts a similar effect due to a negative heat of solution, *l*-menthol interacts directly with the body's coldness receptors. *d*-Menthol has no cooling effect, while racemic menthol exerts an effect approximately half that of *l*-menthol.

4.6 Safety

Almost all toxicological data for menthol relate to its use as a therapeutic agent rather than as an excipient. Inhalation or ingestion of large quantities can result in serious adverse reaction such as ataxia and CNS depressant. Although menthol is essentially nonirritant there have been some reports of hypersensitivity following topical application. In a polish study approximately 1% of individuals were determined as being sensitive to menthol.

The WHO has set an acceptable daily intake of menthol at up to 0.4 mg/kg body weight.

LD_{50} (rat, IM) : 10.0 g/kg

LD_{50} (rat, oral) : 3.18 g/kg

5. Eucalyptus oil (Budavari, 2001)

Eucalyptol or cineole is the chief constituent of oil of eucalyptus. It is colorless liquid that has camphor-like odor, spicy and cooling taste.

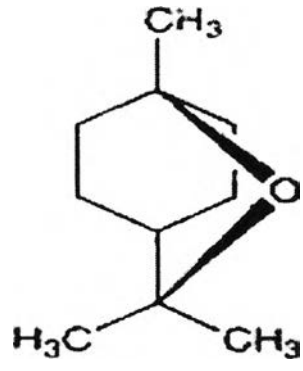
5.1 Synonyms: cineole, cajeputol

5.2 Chemical name and empirical formula

Chemical name : 1,3,3-Trimethyl-2-oxabicyclo[2,2,2]octane

Empirical formula : $C_{10}H_{18}O$

5.3 structure formula



5.4 Typical properties

Molecular weight	:	154.25
Boiling point	:	176-177 °C
Melting point	:	+1.5 °C
Solubility	:	practically insoluble in water
	:	miscible with alcohol, chloroform, ether, glacial acetic acid, and oils

5.5 Application

Eucalyptus oil is widely used as a pharmaceutical aid as flavoring agent or odor enhancer in pharmaceuticals

APPENDIX C

Experimental data

Table C1 The thickness of orally fast dissolving film bases

Formulas	Sample no.	Thickness (μm)					Mean	SD.	%CV
		Point 1	Point 2	Point 3	Point 4	Point 5			
PEG/PG	1	42	41	40	39	39	40.2	1.30	3.24
	2	38	40	41	41	40	40.0	1.22	3.06
	3	39	40	35	36	39	37.8	2.17	5.74
	4	38	35	37	40	39	37.8	1.92	5.09
	5	40	40	40	40	41	40.2	0.45	1.11
PEG	1	34	34	34	34	34	34.0	0.00	0.00
	2	33	34	33	34	34	33.6	0.55	1.63
	3	34	30	30	34	34	32.4	2.19	6.76
	4	33	32	33	33	35	33.2	1.10	3.30
	5	36	35	36	37	35	35.8	0.84	2.34
PG/GLY	1	39	38	42	39	38	39.2	1.64	4.19
	2	36	38	39	39	39	38.2	1.30	3.41
	3	35	35	35	36	36	35.4	0.55	1.55
	4	35	40	37	40	35	37.4	2.51	6.71
	5	38	37	38	37	39	37.8	0.84	2.21
PEG/GLY	1	39	43	38	44	42	41.2	2.59	6.28
	2	40	42	45	44	42	42.6	1.95	4.58
	3	40	40	37	42	36	39.0	2.45	6.28
	4	40	43	39	41	43	41.2	1.79	4.34
	5	40	40	37	39	40	39.2	1.30	3.33

Table C1 The thickness of orally fast dissolving film bases (cont.)

Formulas	Sample no.	Thickness (μm)					Mean	SD.	%CV.
		Point 1	Point 2	Point 3	Point 4	Point 5			
PG	1	42	40	41	44	42	41.8	1.48	3.55
	2	41	39	39	40	38	39.4	1.14	2.89
	3	40	38	37	39	38	38.4	1.14	2.97
	4	40	36	39	39	41	39.0	1.87	4.80
	5	38	40	37	39	38	38.4	1.14	2.97
GLY	1	36	36	36	35	35	35.6	0.55	1.54
	2	36	36	36	37	35	36.0	0.71	1.96
	3	36	35	36	37	37	36.2	0.84	2.31
	4	35	34	35	35	34	34.6	0.55	1.58
	5	37	39	39	38	37	38.0	1.00	2.63
PEG/GLY	1	44	44	45	47	44	44.8	1.30	2.91
/PG	2	47	49	54	51	51	50.4	2.61	5.17
	3	49	50	50	47	48	48.8	1.30	2.67
	4	47	51	48	50	49	49.0	1.58	3.23
	5	44	48	46	43	49	46.0	2.55	5.54
E3	1	39	36	41	38	39	38.6	1.82	4.71
	2	44	40	38	40	41	40.6	2.19	5.40
	3	38	37	41	41	41	39.6	1.95	4.92
	4	41	44	43	44	42	42.8	1.30	3.05
	5	40	42	42	44	43	42.2	1.48	3.51

Table C1 The thickness of orally fast dissolving film bases (cont.)

Formulas	Sample no.	Thickness (μm)					Mean	SD.	%CV.
		Point 1	Point 2	Point 3	Point 4	Point 5			
HPC LV	1	42	37	36	42	41	39.6	2.88	7.28
	2	40	39	35	38	39	38.2	1.92	5.04
	3	41	37	42	38	40	39.6	2.07	5.24
	4	40	41	39	37	41	39.6	1.67	4.23
	5	42	39	40	39	41	40.2	1.30	3.24
E5	1	38	38	37	39	38	38.0	0.71	1.86
	2	37	39	37	38	38	37.8	0.84	2.21
	3	37	37	39	38	39	38.0	1.00	2.63
	4	41	39	41	41	38	40.0	1.41	3.54
	5	41	41	41	38	41	40.4	1.34	3.32
E3E5	1	37	36	37	39	37	37.2	1.10	2.94
(1:1)	2	36	37	38	38	36	37.0	1.00	2.70
	3	38	39	38	36	38	37.8	1.10	2.90
	4	39	38	38	39	38	38.4	0.55	1.43
	5	37	39	35	36	36	36.6	1.52	4.14
E3E5	1	33	34	34	35	34	34.0	0.71	2.08
(2:1)	2	37	37	36	36	36	36.4	0.55	1.50
	3	34	35	35	35	36	35.0	0.71	2.02
	4	40	38	37	36	39	38.0	1.58	4.16
	5	35	37	34	33	35	34.8	1.48	4.26

Table C1 The thickness of orally fast dissolving film bases (cont.)

Formulas	Sample no.	Thickness (μm)					Mean	SD.	%CV.
		Point 1	Point 2	Point 3	Point 4	Point 5			
E3E5	1	41	40	40	41	41	40.6	0.55	1.35
(3:1)	2	35	35	34	35	35	34.8	0.45	1.29
	3	37	37	35	36	34	35.8	1.30	3.64
	4	37	39	35	35	37	36.6	1.67	4.57
	5	38	38	37	36	36	37.0	1.00	2.70
E3E5	1	38	38	38	38	38	38.0	0.00	0.00
(5:1)	2	38	39	37	38	36	37.6	1.14	3.03
	3	37	37	40	40	39	38.6	1.52	3.93
	4	35	34	39	35	38	36.2	2.17	5.99
	5	36	37	34	35	35	35.4	1.14	3.22
E5HPC	1	36	37	36	37	36	36.4	0.55	1.50
(1:1)	2	35	40	34	37	36	36.4	2.30	6.32
	3	36	36	36	37	34	35.8	1.10	3.06
	4	40	38	37	39	40	38.8	1.30	3.36
	5	37	37	36	36	36	36.4	0.55	1.50
E5HPC	1	35	37	38	37	36	36.6	1.14	3.12
(2:1)	2	37	36	36	34	37	36.0	1.22	3.40
	3	37	35	36	34	37	35.8	1.30	3.64
	4	41	41	41	41	41	41.0	0.00	0.00
	5	36	37	37	37	37	36.8	0.45	1.22

Table C1 The thickness of orally fast dissolving film bases (cont.)

Formulas	Sample no.	Thickness (μm)					Mean	SD.	%CV.
		Point 1	Point 2	Point 3	Point 4	Point 5			
E5HPC (3:1)	1	37	37	37	37	36	36.8	0.45	1.22
	2	37	36	37	36	34	36.0	1.22	3.40
	3	35	36	37	35	35	35.6	0.89	2.51
	4	37	38	38	38	37	37.6	0.55	1.46
	5	37	37	38	40	37	37.8	1.30	3.45
E5HPC (5:1)	1	32	32	32	32	33	32.2	0.45	1.39
	2	34	34	33	34	34	33.8	0.45	1.32
	3	32	35	33	33	32	33.0	1.22	3.71
	4	34	34	32	33	33	33.2	0.84	2.52
	5	32	32	33	33	33	32.6	0.55	1.68
E3HPC (2:1)	1	36	36	37	35	37	36.2	0.84	2.31
	2	39	38	38	38	39	38.4	0.55	1.43
	3	39	39	40	40	38	39.2	0.84	2.13
	4	38	37	39	40	38	38.4	1.14	2.97
	5	37	38	38	38	38	37.8	0.45	1.18
E3HPC (3:1)	1	35	35	36	35	35	35.2	0.45	1.27
	2	35	36	35	35	36	35.4	0.55	1.55
	3	39	41	38	40	41	39.8	1.30	3.28
	4	39	38	37	37	39	38.0	1.00	2.63
	5	38	39	39	38	38	38.4	0.55	1.43

Table C1 The thickness of orally fast dissolving film bases (cont.)

Formulas	Sample no.	Thickness (μm)					Mean	SD.	%CV.
		Point 1	Point 2	Point 3	Point 4	Point 5			
E3HPC	1	35	35	35	35	35	35.0	0.00	0.00
(4:1)	2	34	35	34	35	35	34.6	0.55	1.58
	3	33	34	34	34	35	34.0	0.71	2.08
	4	33	34	34	35	35	34.2	0.84	2.45
	5	39	34	33	34	35	35.0	2.35	6.70
E3HPC	1	38	37	38	40	36	37.8	1.48	3.92
(5:1)	2	35	37	36	35	36	35.8	0.84	2.34
	3	35	35	36	37	34	35.4	1.14	3.22
	4	34	34	35	35	36	34.8	0.84	2.40
	5	37	37	36	36	36	36.4	0.55	1.50
Commercial	1	43	40	43	41	39	41.2	1.79	4.34
Product	2	38	36	36	39	38	37.4	1.34	3.59
strips A	3	43	40	39	42	38	40.4	2.07	5.13
	4	44	46	43	42	44	43.8	1.48	3.39
	5	43	43	41	40	38	41.0	2.12	5.17

Table C2 Mechanical properties of orally fast dissolving film bases

Formulas	Sample no.	Ultimate tensile strength (MPa)	Elongation at break (%)	Young's modulus (Mpa)	Work of failure (mJ)
PEG/PG	1	38.95	16.78	382.1	1.600
	2	41.37	20.60	376.9	2.250
	3	42.55	15.70	402.9	1.620
	4	40.01	15.42	365.3	1.428
	5	41.30	14.36	397.3	1.306
	Mean	40.84	16.57	385.6	1.651
	SD.	1.24	2.16	15.20	0.36
	%CV.	3.03	13.01	3.94	22.02
PEG/GLY	1	34.86	11.80	374.2	0.831
	2	34.89	11.84	387.2	0.832
	3	33.10	10.88	378.8	0.699
	4	35.72	11.74	377.4	0.880
	5	37.71	13.30	357.1	1.082
	Mean	35.26	11.91	374.9	0.860
	SD.	1.50	0.78	9.90	0.12
	%CV.	4.24	6.54	2.64	4.36
PEG/PG/GLY	1	23.52	13.34	318.0	0.746
	2	25.24	12.88	326.7	0.746
	3	24.66	12.00	318.7	0.585
	4	25.68	14.34	318.1	0.863
	5	24.39	11.92	334.2	0.581
	Mean	24.70	12.90	323.1	0.704
	SD.	0.83	1.00	7.19	0.12
	%CV.	3.35	7.79	2.22	17.11

Table C2 Mechanical properties of orally fast dissolving film bases (cont.)

Formulas	Sample no.	Ultimate tensile strength (MPa)	Elongation at break (%)	Young's modulus (Mpa)	Work of failure (mJ)
PG/GLY	1	33.40	15.74	366.2	1.511
	2	35.38	14.78	346.3	1.378
	3	36.48	15.76	329.4	1.523
	4	33.30	13.28	332.2	1.047
	5	33.74	13.40	350.7	1.095
	Mean	34.46	14.59	345.0	1.311
	SD.	1.41	1.21	14.92	0.23
	%CV.	4.08	8.29	4.33	17.30
PG	1	44.87	18.00	370.2	2.030
	2	47.00	21.40	395.0	2.636
	3	47.48	20.60	384.1	2.433
	4	48.33	19.12	396.5	2.287
	5	49.03	16.68	384.3	2.495
	Mean	47.34	19.76	386.0	2.380
	SD.	1.59	1.31	10.58	0.23
	%CV.	3.35	6.65	2.74	9.70
PEG	1	45.12	20.00	357.7	2.462
	2	44.45	19.96	357.7	2.135
	3	46.89	17.04	364.3	1.514
	4	47.86	17.90	415.4	1.749
	5	48.34	20.00	388.6	2.136
	Mean	46.53	18.98	376.7	1.999
	SD.	1.69	1.41	25.08	0.37
	%CV.	3.64	7.44	6.66	18.54

Table C2 Mechanical properties of orally fast dissolving film bases (cont.)

Formulas	Sample no.	Ultimate tensile strength (MPa)	Elongation at break (%)	Young's modulus (Mpa)	Work of failure (mJ)
GLY	1	51.80	27.21	422.3	4.071
	2	50.90	27.21	412.0	3.933
	3	53.20	27.81	423.3	4.338
	4	52.10	26.79	407.5	3.763
	5	53.20	27.81	395.5	3.837
	Mean	52.24	27.37	412.1	3.990
	SD.	0.98	0.44	11.47	0.23
	%CV.	1.88	1.61	2.78	5.69
E3	1	39.21	13.64	415.9	1.086
	2	45.16	15.06	451.9	1.312
	3	45.68	14.38	433.1	1.195
	4	39.95	14.20	418.0	1.113
	5	47.97	14.48	438.6	1.421
	Mean	43.59	14.35	431.5	1.230
	SD.	3.82	0.51	14.96	0.14
	%CV.	8.77	3.57	3.47	11.45
HPC LV	1	9.86	60.80	194.1	2.122
	2	10.00	59.20	199.1	2.199
	3	9.81	58.00	167.7	1.992
	4	11.37	60.80	171.6	2.283
	5	11.10	56.20	165.3	1.933
	Mean	10.43	59.00	179.6	2.106
	SD.	0.75	1.96	15.82	0.14
	%CV.	7.15	3.32	8.81	6.85

Table C2 Mechanical properties of orally fast dissolving films (Cont.)

Formulas	Sample no.	Ultimate tensile strength (MPa)	Elongation at break (%)	Young's modulus (Mpa)	Work of failure (mJ)
E5	1	75.60	250.00	440.8	54.600
	2	69.80	252.00	423.1	61.400
	3	82.60	252.10	464.2	58.300
	4	73.20	262.00	452.7	42.070
	5	60.70	256.00	429.9	47.830
	Mean	72.38	254.42	442.1	52.840
	SD.	8.04	4.76	16.68	7.86
	%CV.	11.11	1.87	3.77	14.88
E5HPC (1:1)	1	22.12	17.38	331.1	0.915
	2	21.91	17.92	337.5	1.101
	3	22.38	16.50	352.6	0.984
	4	21.86	18.92	356.5	1.093
	5	22.74	19.40	300.4	1.069
	Mean	22.20	18.02	335.6	1.032
	SD.	0.36	1.17	22.30	0.08
	%CV.	1.64	6.47	6.64	7.79
E5HPC (2:1)	1	32.45	30.60	386.1	2.822
	2	33.64	33.40	390.8	3.226
	3	34.23	32.60	345.8	3.057
	4	32.95	30.80	401.6	2.940
	5	30.49	30.00	375.0	2.574
	Mean	32.75	31.48	379.9	2.924
	SD.	1.43	1.45	21.30	0.25
	%CV.	4.38	4.59	5.61	8.41

Table C2 Mechanical properties of orally fast dissolving films (Cont.)

Formulas	Sample no.	Ultimate tensile strength (MPa)	Elongation at break (%)	Young's modulus (Mpa)	Work of failure (mJ)
E5HPC	1	35.75	27.21	420.3	2.579
(3:1)	2	35.98	26.01	419.9	2.489
	3	35.41	27.39	398.0	2.758
	4	35.64	27.39	389.9	2.539
	5	34.51	27.60	403.2	2.506
	Mean	35.46	27.12	406.3	2.574
	SD.	0.57	0.64	13.49	0.11
	%CV.	1.60	2.34	3.32	4.21
E5HPC	1	49.55	35.80	476.9	4.497
(5:1)	2	48.36	38.00	453.3	4.513
	3	50.70	37.40	442.8	4.807
	4	48.30	34.40	457.7	4.161
	5	48.60	38.40	429.9	4.706
	Mean	49.10	36.80	452.1	4.537
	SD.	1.02	1.67	17.52	0.25
	%CV.	2.09	4.53	3.87	5.46
E3E5	1	68.90	221.20	459.1	38.430
(1:1)	2	68.30	210.00	475.0	43.970
	3	60.40	234.00	443.3	45.040
	4	61.10	215.00	452.0	48.990
	5	66.60	224.00	485.7	54.200
	Mean	65.06	220.84	463.0	46.126
	SD.	4.03	9.15	17.20	5.88
	%CV.	6.20	4.14	3.72	12.75

Table C2 Mechanical properties of orally fast dissolving films (Cont.)

Formulas	Sample no.	Ultimate tensile strength (MPa)	Elongation at break (%)	Young's modulus (Mpa)	Work of failure (mJ)
E3E5	1	58.80	100.00	432.4	35.630
(2:1)	2	58.20	117.00	431.4	20.620
	3	57.20	102.40	445.8	17.940
	4	62.40	100.30	461.5	18.950
	5	60.40	106.30	430.0	19.240
	Mean	59.40	105.20	440.2	22.476
	SD.	2.04	7.06	13.48	7.42
	%CV.	3.43	6.71	3.06	32.99
E3E5	1	62.40	69.60	472.7	12.970
(3:1)	2	63.10	50.00	465.9	8.920
	3	65.30	54.00	476.4	10.150
	4	68.10	41.00	497.4	7.430
	5	59.70	52.00	429.2	8.750
	Mean	63.72	53.32	468.3	9.644
	SD.	3.16	10.37	24.83	2.09
	%CV.	4.96	19.45	5.30	21.72
E3E5	1	57.10	52.20	464.1	8.020
(5:1)	2	53.30	46.20	419.8	6.560
	3	56.60	53.80	456.9	8.490
	4	53.10	51.00	419.8	6.530
	5	53.90	44.00	404.7	6.360
	Mean	54.80	49.44	433.1	7.192
	SD.	1.90	4.16	25.92	0.99
	%CV.	3.47	8.41	5.99	13.73

Table C2 Mechanical properties of orally fast dissolving film bases (cont.)

Formulas	Sample no.	Ultimate tensile strength (MPa)	Elongation at break (%)	Young's modulus (Mpa)	Work of failure (mJ)
E3HPC	1	43.27	14.62	409.5	1.112
(2:1)	2	43.06	16.10	390.1	1.352
	3	44.45	15.80	416.5	1.381
	4	43.35	14.36	410.2	1.156
	5	40.15	13.62	400.5	1.051
	Mean	42.86	14.90	405.4	1.210
	SD.	1.61	1.03	10.26	0.15
	%CV.	3.75	6.92	2.53	12.20
E3HPC	1	43.84	13.58	413.5	1.102
(3:1)	2	42.64	13.94	378.5	1.078
	3	41.70	14.22	357.2	0.983
	4	51.50	16.10	421.9	1.644
	5	46.15	14.64	415.9	1.385
	Mean	45.17	14.50	397.4	1.238
	SD.	3.91	0.98	28.17	0.27
	%CV.	8.66	6.74	7.09	21.95
E3HPC	1	48.21	15.08	445.9	1.253
(4:1)	2	47.25	15.22	435.1	1.205
	3	47.55	14.34	456.2	1.122
	4	48.24	15.48	440.1	1.299
	5	46.38	15.1	434.1	1.272
	Mean	47.53	15.04	442.3	1.230
	SD.	0.77	0.42	9.08	0.07
	%CV.	1.62	2.82	2.05	5.65

Table C2 Mechanical properties of orally fast dissolving film bases (cont.)

Formulas	Sample no.	Ultimate tensile strength (MPa)	Elongation at break (%)	Young's modulus (Mpa)	Work of failure (mJ)
E3HPC	1	44.82	13.96	430.5	1.111
(5:1)	2	49.85	15.34	432.7	1.455
	3	43.95	12.08	444.9	0.978
	4	46.82	13.06	450.0	1.117
	5	50.20	14.26	460.9	1.290
	Mean	47.13	13.74	443.8	1.190
	SD.	2.84	1.23	12.57	0.18
	%CV.	6.04	8.99	2.83	15.53
Commercial	1	47.72	16.74	480.1	1.973
product	2	47.44	16.58	489.0	1.882
strips A	3	50.10	17.30	496.0	2.092
	4	50.40	15.34	469.1	1.686
	5	49.98	17.72	483.8	2.192
	Mean	49.13	16.74	483.6	1.965
	SD.	1.42	0.90	10.07	0.20
	%CV.	2.90	5.39	2.08	9.94

Table C3 Mechanical properties of orally fast dissolving films containing *Garcinia mangostana* extract

Formulas	Sample no.	Ultimate tensile strength (MPa)	Elongation at break (%)	Young's modulus (Mpa)	Work of failure (mJ)
E3HPC	1	43.84	12.72	420.7	0.941
(2:1)	2	42.64	13.44	437.0	1.017
	3	43.72	13.20	410.0	0.992
	4	44.55	14.22	435.1	1.068
	5	45.35	13.22	443.4	1.160
	Mean	44.02	13.36	429.2	1.036
	SD.	1.01	0.55	13.58	0.08
	%CV.	2.29	4.10	3.16	8.04
E3HPC	1	49.25	13.48	445.2	1.229
(3:1)	2	49.21	13.30	464.0	1.189
	3	49.81	13.90	464.0	1.342
	4	48.63	13.00	477.8	1.144
	5	48.60	13.20	477.6	1.149
	Mean	49.10	13.38	465.7	1.211
	SD.	0.50	0.34	13.36	0.08
	%CV.	1.02	2.54	2.87	6.70
E3HPC	1	51.50	12.94	491.2	1.151
(4:1)	2	48.58	13.00	481.5	1.088
	3	53.20	14.78	454.1	1.357
	4	52.10	13.30	475.5	1.182
	5	54.60	14.06	483.1	1.317
	Mean	52.00	13.62	477.1	1.219
	SD.	2.24	0.79	14.02	0.11
	%CV.	4.32	5.79	2.94	9.34

Table C3 Mechanical properties of orally fast dissolving films containing *Garcinia mangostana* extract (cont.)

Formulas	Sample no.	Ultimate tensile strength (MPa)	Elongation at break (%)	Young's modulus (Mpa)	Work of failure (mJ)
E3HPC	1	47.49	14.08	444.9	1.129
(5:1)	2	47.24	13.68	408.4	1.100
	3	46.40	12.88	447.1	1.016
	4	46.68	12.68	465.5	1.050
	5	49.41	14.56	452.7	1.254
	Mean	47.44	13.58	443.7	1.110
	SD.	1.18	0.79	21.30	0.09
	%CV.	2.49	5.85	4.80	8.26

Table C4 Content uniformity of orally fast dissolving films containing *Garcinia mangostana* extract

Formulas	Sample no.	Mangostin content (μg/patch)	% Labeled amount
E3HPC (2:1)	1	173.8951	95.75
	2	169.9052	93.55
	3	177.6043	97.79
	4	169.5555	93.36
	5	169.5670	93.37
	6	172.3582	94.91
	7	168.3776	92.71
	8	164.7309	90.71
	9	164.8680	90.78
	10	175.9815	96.90
	Mean	170.6843	93.98
	SD.	4.30	2.37
	%CV.	2.52	2.52
E3HPC (3:1)	1	197.9925	109.02
	2	198.2315	109.15
	3	199.2794	109.73
	4	196.7538	108.34
	5	196.6858	108.30
	6	198.7028	109.41
	7	178.9157	98.52
	8	184.0733	101.36
	9	184.5347	101.61
	10	196.1067	107.98
	Mean	193.1276	106.34
	SD.	7.54	4.15
	%CV.	3.90	3.90

Table C4 Content uniformity of orally fast dissolving films containing *Garcinia mangostana* extract (cont.)

Formulas	Sample no.	Mangostin content (μg/patch)	% Labeled amount
E3HPC (4:1)	1	184.3520	101.51
	2	177.0751	97.50
	3	178.4831	98.28
	4	185.9612	102.40
	5	184.8793	101.80
	6	178.6769	98.38
	7	165.7699	91.28
	8	177.8755	97.94
	9	184.0412	101.34
	10	177.8621	97.94
	Mean	179.4976	98.84
	SD.	5.93	3.26
	%CV.	3.30	3.30
E3HPC (5:1)	1	178.4970	98.29
	2	190.9211	105.13
	3	184.6143	101.65
	4	192.8654	106.20
	5	188.0985	103.57
	6	176.0405	96.93
	7	179.2765	98.72
	8	185.5300	102.16
	9	181.6644	100.03
	10	190.4628	104.87
	Mean	184.7971	101.75
	SD.	5.80	3.19
	%CV.	3.14	3.14

Table C5 Weight variation of orally fast dissolving films containing *Garcinia mangostana* extract

Formulas	Sample no.	Weight (mg)	Mean	SD.	%CV.
E3HPC (2:1)	1	21.20	21.25	0.52	2.43
	2	20.87			
	3	20.58			
	4	21.95			
	5	21.01			
	6	21.00			
	7	21.63			
	8	21.68			
	9	20.63			
	10	21.94			
E3HPC (3:1)	1	24.98	24.39	0.56	2.31
	2	23.58			
	3	23.78			
	4	23.46			
	5	24.61			
	6	24.94			
	7	24.54			
	8	24.52			
	9	24.81			
	10	24.63			

Table C5 Weight variation of orally fast dissolving films containing *Garcinia mangostana* extract (cont.)

Formulas	Sample no.	Weight (mg)	Mean	SD.	%CV.
E3HPC (4:1)	1	23.34	23.92	0.82	3.43
	2	22.14			
	3	23.60			
	4	23.24			
	5	24.72			
	6	24.37			
	7	24.48			
	8	24.58			
	9	24.42			
	10	24.28			
E3HPC (5:1)	1	25.03	24.13	0.65	2.71
	2	24.58			
	3	23.67			
	4	23.53			
	5	25.01			
	6	24.25			
	7	23.66			
	8	24.67			
	9	23.30			
	10	23.61			

APPENDIX D

Data of *In vitro* Dissolution Study

Table D1 The cumulative amount of dissolution and % dissolution from E3HPC (2:1) films containing *Garcinia mangostana* extract

Time	Cumulative amount of dissolution						% dissolution					
(min)	n1	n2	n3	mean	SD	%CV	n1	n2	n3	mean	SD	%CV
1	86.7956	83.8360	74.8554	81.8290	6.22	7.60	50.85	49.12	43.86	47.94	3.64	7.60
3	134.2123	141.3199	168.8664	148.1329	18.30	12.36	78.63	82.80	98.93	86.79	10.72	12.36
5	151.6634	154.8992	175.3681	160.6436	12.85	8.00	88.86	90.75	102.74	94.12	7.53	8.00
7	152.0164	158.4254	171.5401	160.6606	9.95	6.19	89.06	92.82	100.50	94.13	5.83	6.19
10	160.5835	158.6144	174.5828	164.5936	8.71	5.29	94.08	92.93	102.28	96.43	5.10	5.29
15	163.1617	158.3767	157.4392	159.6592	3.07	1.92	95.59	92.79	92.24	93.54	1.80	1.92
30	161.8777	162.1811	158.5593	160.8727	2.01	1.25	94.84	95.02	92.90	94.25	1.18	1.25
45	168.0333	162.2716	172.0744	167.4598	4.93	2.94	98.45	95.07	100.81	98.11	2.89	2.94
60	165.1230	163.8247	170.1815	166.3764	3.36	2.02	96.74	95.98	99.71	97.48	1.97	2.02

Amount of mangostin = 170.6843 μg/film

Table D2 The cumulative amount of dissolution and % dissolution from E3HPC (3:1) films containing *Garcinia mangostana* extract

Time	Cumulative amount of dissolution						% dissolution					
(min)	n1	n2	n3	mean	SD	%CV	n1	n2	n3	mean	SD	%CV
1	81.3668	100.5200	101.8382	94.5750	11.46	12.11	42.13	52.05	52.73	48.97	5.93	12.11
3	122.5308	157.4945	142.5605	140.8619	17.54	12.45	63.45	81.55	73.82	72.94	9.08	12.45
5	147.6993	159.6301	151.9402	153.0898	6.05	3.95	76.48	82.66	78.67	79.27	3.13	3.95
7	161.3257	166.1255	164.5551	164.0021	2.45	1.49	83.53	86.02	85.21	84.92	1.27	1.49
10	154.0634	167.9536	158.7880	160.2683	7.06	4.41	79.77	86.97	82.22	82.99	3.66	4.41
15	151.6278	167.8606	162.4084	160.6323	8.26	5.14	78.51	86.92	84.09	83.17	4.28	5.14
30	153.1319	165.8548	150.3316	156.4394	8.27	5.29	79.29	85.88	77.84	81.00	4.28	5.29
45	160.5025	173.6445	151.3640	161.8370	11.20	6.92	83.11	89.91	78.38	83.80	5.80	6.92
60	165.9109	181.4495	151.2470	166.2025	15.10	9.09	85.91	93.95	78.31	86.06	7.82	9.09

Amount of mangostin = 193.1276 μg/film

Table D3 The cumulative amount of dissolution and % dissolution from E3HPC (4:1) films containing *Garcinia mangostana* extract

Time	Cumulative amount of dissolution						% dissolution					
(min)	n1	n2	n3	mean	SD	%CV	n1	n2	n3	mean	SD	%CV
1	97.5783	82.3873	99.7219	93.2291	9.45	10.14	54.36	45.90	55.56	51.94	5.26	10.14
3	149.8540	133.5734	140.0680	141.1652	8.20	5.81	83.49	74.42	78.03	78.64	4.57	5.81
5	154.3942	167.8794	148.6864	156.9867	9.86	6.28	86.01	93.53	82.83	87.46	5.49	6.28
7	157.2040	174.1464	158.2034	163.1846	9.51	5.83	87.58	97.02	88.14	90.91	5.30	5.83
10	159.2093	171.6988	153.7736	161.5606	9.19	5.69	88.70	95.66	85.67	90.01	5.12	5.69
15	167.1752	177.6162	148.9011	164.5641	14.53	8.83	93.14	98.95	82.95	91.68	8.10	8.83
30	161.6291	172.1508	149.0723	160.9507	11.55	7.18	90.05	95.91	83.05	89.67	6.44	7.18
45	160.1637	161.1753	153.8060	158.3816	3.99	2.52	89.23	89.79	85.69	88.24	2.23	2.52
60	164.3938	165.3301	153.4011	161.0417	6.63	4.12	91.59	92.11	85.46	89.72	3.70	4.12

Amount of mangostin = 179.4976 μg/film

Table D4 The cumulative amount of dissolution and % dissolution from E3HPC (5:1) films containing *Garcinia mangostana* extract

Time	Cumulative amount of dissolution						% dissolution					
(min)	n1	n2	n3	mean	SD	%CV	n1	n2	n3	mean	SD	%CV
1	60.2574	83.9271	58.3661	67.5168	14.24	21.10	32.61	45.42	31.58	36.54	7.71	21.10
3	152.9920	179.3319	140.1504	157.4914	19.97	12.68	82.79	97.04	75.84	85.22	10.81	12.68
5	175.1495	179.0118	176.7855	176.9823	1.94	1.10	94.78	96.87	95.66	95.77	1.05	1.10
7	177.5081	177.4999	190.9213	181.9765	7.75	4.26	96.06	96.05	103.31	98.47	4.19	4.26
10	158.5584	173.9752	189.4027	173.9788	15.42	8.86	85.80	94.14	102.49	94.15	8.35	8.86
15	167.4267	166.9789	185.0881	173.1645	10.33	5.96	90.60	90.36	100.16	93.71	5.59	5.96
30	169.9238	162.8608	183.4125	172.0657	10.44	6.07	91.95	88.13	99.25	93.11	5.65	6.07
45	167.0898	165.5396	183.2559	171.9617	9.81	5.71	90.42	89.58	99.17	93.05	5.31	5.71
60	167.1770	167.8024	172.9228	169.3007	3.15	1.86	90.47	90.80	93.57	91.61	1.71	1.86

Amount of mangostin = 184.7971 µg/film

APPENDIX E

In vitro microbiological data

Table E1 *In vitro* antimicrobial activity of orally fast dissolving film

Formulas	Diameter of inhibition zone (mm)									
	Staphylococcus aureus ATCC 25923					*Streptococcus mutans* ATCC $KPSK_2$				
	n1	n2	n3	mean	SD	n1	n2	n3	mean	SD
E3HPC (2:1)										
Polymer base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film with mangostin	7.50	9.80	7.40	8.23	1.36	6.45	7.00	6.55	6.67	0.29
Film with cetylpyridinium Cl	29.40	35.40	43.00	35.93	6.82	30.00	33.25	34.70	32.65	2.41
Film with chlorhexidine	25.75	23.50	23.95	24.40	1.19	27.45	28.70	27.75	27.97	0.65
E3HPC (3:1)										
Polymer base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film with mangostin	6.90	8.00	6.50	7.13	0.78	7.75	6.60	7.25	7.20	0.58
Film with cetylpyridinium Cl	34.00	38.50	40.45	37.65	3.31	37.70	32.85	37.80	36.12	2.83
Film with chlorhexidine	23.00	25.00	24.80	24.27	1.10	28.55	25.75	26.20	26.83	1.50
Commercial product strips A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Diameter of dried film = 5.50 mm

Table E1 *In vitro* antimicrobial activity of orally fast dissolving film (Cont.).

Formulas	Diameter of inhibition zone (mm)									
	Staphylococcus aureus ATCC 25923					*Streptococcus mutans* ATCC $KPSK_2$				
	n1	n2	n3	mean	SD	n1	n2	n3	mean	SD
E3HPC (4:1)										
Polymer base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film with mangostin	6.95	8.15	7.55	7.55	0.60	6.50	5.65	6.35	6.17	0.45
Film with cetylpyridinium Cl	36.35	34.50	36.90	35.92	1.26	36.20	33.35	21.20	30.25	7.97
Film with chlorhexidine	22.00	27.90	23.50	24.47	3.07	28.75	29.50	29.00	29.08	0.38
E3HPC (5:1)										
Polymer base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film with mangostin	8.05	8.55	8.45	8.35	0.26	6.20	5.60	5.85	5.88	0.30
Film with cetylpyridinium Cl	43.05	40.85	39.20	41.03	1.93	28.45	27.40	32.80	29.55	2.86
Film with chlorhexidine	22.00	26.20	25.10	24.43	2.18	29.05	26.75	27.20	27.67	1.22
Film with mangostin x 2	6.30	7.25	7.50	7.02	0.63	5.90	5.50	6.15	5.85	0.33
Film with mangostin x 4	6.95	6.00	7.50	6.82	0.76	5.45	5.60	6.10	5.72	0.34
Film with mangostin x 6	7.45	6.95	8.15	7.52	0.60	5.85	5.60	6.10	5.85	0.25

Diameter of dried film = 5.5 mm

Table E2 *In vitro* antimicrobial activity of solution of orally fast dissolving film

Formulas	Diameter of inhibition zone (mm)									
	Staphylococcus aureus ATCC 25923					*Streptococcus mutans* ATCC $KPSK_2$				
	n1	n2	n3	mean	SD	n1	n2	n3	mean	SD
E3HPC (2:1)										
Polymer base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film with mangostin	8.55	7.80	8.95	8.43	0.58	7.10	6.90	6.45	6.82	0.33
Film with cetylpyridinium Cl	10.50	11.35	9.80	10.55	0.78	16.45	14.45	15.50	15.47	1.00
Film with chlorhexidine	18.55	19.15	18.40	18.70	0.40	22.00	17.85	22.85	20.90	2.68
E3HPC (3:1)										
Polymer base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film with mangostin	9.80	7.90	8.05	8.58	1.06	6.75	6.55	7.30	6.87	0.39
Film with cetylpyridinium Cl	10.75	14.90	12.50	12.72	2.08	14.95	13.40	13.45	13.93	0.88
Film with chlorhexidine	18.10	19.30	17.85	18.42	0.78	21.75	24.55	23.25	23.18	1.40
Commercial product strip A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial mouth wash solution B	10.10	11.75	18.90	13.58	4.68	6.05	6.10	6.02	6.06	0.04
Commercial mouth wash solution C	18.70	17.75	19.00	18.48	0.65	26.35	24.55	22.45	24.45	1.95
PBS pH 6.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Diameter of sterile cup = 6.0 mm

Table E2 *In vitro* antimicrobial activity of solution of orally fast dissolving film(Cont.)

Formulas	Diameter of inhibition zone (mm)									
	Staphylococcus aureus ATCC 25923					*Streptococcus mutans* ATCC $KPSK_2$				
	n1	n2	n3	mean	SD	n1	n2	n3	mean	SD
E3HPC (4:1)										
Polymer base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film with mangostin	9.00	9.15	9.25	9.13	0.13	10.60	7.35	6.15	8.03	2.30
Film with cetylpyridinium Cl	20.00	12.70	12.35	15.02	4.32	16.85	16.05	18.00	16.97	0.98
Film with chlorhexidine	18.00	18.00	17.70	17.90	0.17	24.40	25.10	23.00	24.17	1.07
E3HPC (5:1)										
Polymer base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film base	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Film with mangostin	10.80	11.35	9.25	10.47	1.09	9.10	6.45	6.90	7.48	1.42
Film with cetylpyridinium Cl	10.85	14.15	18.55	14.52	3.86	16.70	16.95	17.80	17.15	0.58
Film with chlorhexidine	16.40	16.00	16.85	16.42	0.43	20.50	23.25	22.55	22.10	1.43
Film with mangostin x 2	14.90	11.90	9.60	12.13	2.66	8.90	8.45	6.00	7.78	1.56
Film with mangostin x 4	15.60	13.40	11.65	13.55	1.98	9.85	8.95	6.00	8.27	2.01
Film with mangostin x 6	12.55	12.25	12.20	12.33	0.19	10.50	6.00	12.15	9.55	3.18

Diameter of sterile cup = 6.0 mm

APPENDIX F

Statistical analysis data

Table F1 One-way analysis of variance on the tensile strength of orally fast dissolving film bases

ANOVA

TENSILE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	22509.199	22	1023.145	147.324	.000
Within Groups	638.928	92	6.945		
Total	23148.127	114			

Table F2 One-way analysis of variance on the percentage elongation at break of orally fast dissolving film bases

ANOVA

ELONGATION

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	454354.484	22	20652.477	1535.834	.000
Within Groups	1237.131	92	13.447		
Total	455591.615	114			

Table F3 One-way analysis of variance on the Young's modulus of orally fast dissolving film bases

ANOVA

YOUNG'S

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	457111.476	22	20777.794	71.312	.000
Within Groups	26805.584	92	291.365		
Total	483917.060	114			

Table F4 One-way analysis of variance on the work of failure of orally fast dissolving film bases

ANOVA

WORK

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	21805.868	22	991.176	144.658	.000
Within Groups	630.373	92	6.852		
Total	22436.241	114			

Table F5 One-way analysis of variance on dissolution time of orally fast dissolving film bases

ANOVA

DS

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5669481.791	22	257703.718	215.081	.000
Within Groups	110231.600	92	1198.170		
Total	5779713.391	114			

Table F6 Multiple comparison on the dissolution time of film bases (Subset for alpha = .05)

	N	Subset for alpha = .05								
POLYMER		1	2	3	4	5	6	7	8	9
HPC	5	65.00								
E3HPC (4:1)	5	102.40	102.40							
E3HPC (3:1)	5	107.40	107.40							
COMMERCIAL PRODUCT STRIPS A	5		121.00							
E3HPC (2:1)	5		121.40							
E3HPC (5:1)	5		133.20	133.20						
E3E5 (2:1)	5			174.20	174.20					
E5HPC (1:1)	5			175.60	175.60					
PEG/PG	5				181.60					
PEG/GLY	5				182.80					
E3E5 (3:1)	5				194.80					
E3	5				200.80	200.80				
PG	5				201.40	201.40				
E3E5 (5:1)	5				209.20	209.20	209.20			
E5HPC (2:1)	5				213.80	213.80	213.80			
E5HPC (5:1)	5					246.80	246.80			
E3E5 (1:1)	5						250.40			
E5HPC (3:1)	5						257.00			
PEG	5							303.60		
GLY	5							304.80		
PEG/PG/GLY	5							348.00		
PG/GLY	5								430.80	
E5	5									1215.00
Sig.		.070	.217	.070	.131	.063	.053	.057	1.000	1.000

Means for groups in homogeneous subsets are displayed.
a Uses Harmonic Mean Sample Size = 5.000.

Table F7 Multiple comparison on the percentage of elongation at break of film bases (Subset for alpha = .05)

	POLYMER	1	2	3	4	5	6	7	8	9	10	11
Duncan	PEG/GLY	11.912										
	PEG/PG/GLY	12.896	12.896									
	E3HPC (5:1)	13.740	13.740	13.740								
	E3	14.352	14.352	14.352	14.352							
	E3HPC (3:1)	14.496	14.496	14.496	14.496							
	PG/GLY	14.592	14.592	14.592	14.592							
	E3HPC (2:1)	14.900	14.900	14.900	14.900							
	E3HPC (4:1)	15.044	15.044	15.044	15.044							
	PEG/PG	16.572	16.572	16.572	16.572							
	COMMERCIAL PRODUCT STRIPS A	16.736	16.736	16.736	16.736							
	E5HPC (1:1)		18.024	18.024	18.024							
	PEG			18.980	18.980							
	PG				19.760							
	E5HPC (3:1)					27.120						
	GLY					27.366						
	E5HPC (2:1)					31.480						
	E5HPC (5:1)						36.800					
	E3E5 (5:1)							49.440				
	E3E5 (3:1)							53.320				
	HPC								59.000			
	E3E5 (2:1)									105.200		
	E3E5 (1:1)										220.840	
	E5											254.420
	Sig.	.084	.066	.060	.052	.078	1.000	.098	1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 5.000.

Table F8 Multiple comparison on tensile strength of film bases (Subset for alpha = .05)

POLYMER	1	2	3	4	5	6	7	8	9	10	11	12	13
HPC	10.428												
E5HPC (1:1)		22.202											
PEG/PG/GLY		24.698											
E5HPC (2:1)			32.752										
PG/GLY			34.460										
PEG/GLY			35.256										
E5HPC (3:1)			35.458										
PEG/PG				40.836									
E3HPC (2:1)				42.856	42.856								
E3				43.594	43.594	43.594							
E3HPC (3:1)					45.166	45.166	45.166						
PEG						46.532	46.532	46.532					
E3HPC (5:1)						47.128	47.128	47.128					
PG							47.342	47.342					
E3HPC (4:1)							47.526	47.526					
E5HPC (5:1)								49.102	49.102				
COMMERCIAL PRODUCT STRIPS A								49.128	49.128				
GLY									52.240	52.240			
E3E5 (5:1)										54.800			
E3E5 (2:1)											59.400		
E3E5 (3:1)												63.720	
E3E5 (1:1)												65.060	
E5													72.380
Sig.	1.000	.138	.143	.122	.195	.054	.214	.180	.078	.128	1.000	.423	1.000

Means for groups in homogeneous subsets are displayed.
a Uses Harmonic Mean Sample Size = 5.000.

Table F9 Multiple comparison on work of failure of film bases (Subset for alpha = .05)

		N	Subset for alpha = .05					
	POLYMER		1	2	3	4	5	6
Duncan	PEG/PG/GLY	5	.70420					
	PEG/GLY	5	.86480					
	E5HPC (1:1)	5	1.03240					
	E3HPC (5:1)	5	1.19020					
	E3HPC (2:1)	5	1.21040					
	E3	5	1.22540					
	E3HPC (4:1)	5	1.23020					
	E3HPC (3:1)	5	1.23840					
	PG/GLY	5	1.31080					
	PEG/PG	5	1.64080					
	COMMERCIAL PRODUCT STRIPS A	5	1.96500					
	PEG	5	1.99920					
	HPC	5	2.10400					
	PG	5	2.37620					
	E5HPC (3:1)	5	2.57420					
	E5HPC (2:1)	5	2.92380					
	GLY	5	3.98840	3.98840				
	E5HPC (5:1)	5	4.53680	4.53680				
	E3E5 (5:1)	5		7.19200	7.19200			
	E3E5 (3:1)	5			9.64400			
	E3E5 (2:1)	5				22.47600		
	E3E5 (1:1)	5					46.12600	
	E5	5						52.84000
	Sig.		.063	.070	.142	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.
a Uses Harmonic Mean Sample Size = 5.000.

Table F10 Multiple comparison on Young's modulus of film bases (Subset for alpha = .05)

	POLYMER	N	1	2	3	4	5	6	7	8	9	10
Duncan	HPC	5	179.560									
	PEG/PG/GLY	5		323.140								
	E5HPC (1:1)	5		335.620								
	PG/GLY	5		344.960								
	PEG/GLY	5			374.940							
	PEG	5			376.740							
	E5HPC (2:1)	5			379.860							
	PEG/PG	5			384.900	384.900						
	PG	5			386.020	386.020						
	E3HPC (3:1)	5			397.400	397.400	397.400					
	E3HPC (2:1)	5				405.360	405.360					
	E5HPC (3:1)	5				406.260	406.260					
	GLY	5					412.120	412.120				
	E3	5						431.500	431.500			
	E3E5 (5:1)	5						433.060	433.060			
	E3E5 (2:1)	5							440.220	440.220		
	E5	5							442.140	442.140		
	E3HPC (4:1)	5							442.280	442.280		
	E3HPC (5:1)	5							443.800	443.800		
	E5HPC (5:1)	5							452.120	452.120	452.120	
	E3E5 (1:1)	5								463.020	463.020	463.020
	E3E5 (3:1)	5									468.320	468.320
	Commercial product strips A	5										483.600
	Sig.		1.000	.058	.071	.080	.220	.069	.103	.066	.161	.074

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 5.000.

Table F11 One-way analysis of variance on tensile strength of orally fast dissolving film bases and film containing *Garcinia mangostana* extract

ANOVA

TENSILE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	331.999	10	33.200	8.601	.000
Within Groups	131.235	34	3.860		
Total	463.234	44			

Table F12 Multiple comparison on tensile strength of film containing *Garcinia mangostana* extract and its film bases (Subset for alpha = .05)

TENSILE

		N	Subset for alpha = .05			
	POLYMER		1	2	3	4
Duncan	E3HPC (2:1) BASE	5	42.8560			
	E3HPC (2:1) EXTRACT	5	44.0200			
	E3HPC (3:1) BASE	5	45.1660	45.1660		
	E3HPC (5:1) BASE	5		47.1280	47.1280	
	E3HPC (5:1) EXTRACT	5		47.4440	47.4440	
	E3HPC (4:1) BASE	5		47.5260	47.5260	
	E3HPC (3:1) EXTRACT	5			49.1000	
	Commercial Product Strips A	5			49.1280	
	E3HPC (4:1) EXTRACT	5				51.9960
	Sig.		.093	.097	.169	1.000

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 5.000.

Table F13 One-way analysis of variance on percentage of elongation of orally fast dissolving film bases and film containing *Garcinia mangostana* extract

ANOVA

ELONGATION

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	49.634	8	6.204	8.996	.000
Within Groups	24.827	36	.690		
Total	74.460	44			

Table F14 Multiple comparison on percentage of elongation of film containing *Garcinia mangostana* extract and its film bases (Subset for alpha = .05)

ELONGATION

		N	Subset for alpha = .05		
	POLYMER		1	2	3
Duncan	E3HPC (2:1) EXTRACT	5	13.3600		
	E3HPC (3:1) EXTRACT	5	13.3760		
	E3HPC (5:1) EXTRACT	5	13.5760		
	E3HPC (4:1) EXTRACT	5	13.6160		
	E3HPC (5:1) BASE	5	13.7400		
	E3HPC (3:1) BASE	5	14.4960	14.4960	
	E3HPC (2:1) BASE	5		14.9000	
	E3HPC (4:1) BASE	5		15.0440	
	Commercial Product Strips A	5			16.7360
	Sig.		.064	.333	1.000

Means for groups in homogeneous subsets are displayed.
a Uses Harmonic Mean Sample Size = 5.000.

Table F15 One-way analysis of variance on Young's modulus of orally fast dissolving film bases and film containing *Garcinia mangostana* extract

ANOVA

YOUNG'S MODULUS

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	34389.261	8	4298.658	15.670	.000
Within Groups	9875.872	36	274.330		
Total	44265.133	44			

Table F16 Multiple comparison on Young's modulus of film containing *Garcinia mangostana* extract and its film bases (Subset for alpha = .05)

YOUNG'S MODULUS

		Subset for alpha = .05			
	POLYMER	1	2	3	4
Duncan	E3HPC (3:1) BASE	397.4000			
	E3HPC (2:1) BASE	405.3600			
	E3HPC (2:1) EXTRACT		429.2400		
	E3HPC (4:1) BASE		442.2800	442.2800	
	E3HPC (5:1) EXTRACT		443.7200	443.7200	
	E3HPC (5:1) BASE		443.8000	443.8000	
	E3HPC (3:1) EXTRACT			462.5280	462.5280
	E3HPC (4:1) EXTRACT				477.0800
	Commercial Product Strips A				483.6000
	Sig.	.452	.214	.084	.064

Means for groups in homogeneous subsets are displayed.
a Uses Harmonic Mean Sample Size = 5.000.

Table F17 One-way analysis of variance on work of failure of orally fast dissolving film bases and film containing *Garcinia mangostana* extract

ANOVA

WORK

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.911	8	.364	15.769	.000
Within Groups	.831	36	.023		
Total	3.742	44			

Table F18 Multiple comparison on work of failure of film containing *Garcinia mangostana* extract and its film bases (Subset for alpha = .05)

WORK

		N	Subset for alpha = .05	
	POLYMER		1	2
Duncan	E3HPC (2:1) EXTRACT	5	1.0356	
	E3HPC (5:1) EXTRACT	5	1.1098	
	E3HPC (5:1) BASE	5	1.1902	
	E3HPC (2:1) BASE	5	1.2104	
	E3HPC (3:1) EXTRACT	5	1.2106	
	E3HPC (4:1) EXTRACT	5	1.2190	
	E3HPC (4:1) BASE	5	1.2302	
	E3HPC (3:1) BASE	5	1.2384	
	Commercial Product Strips A	5		1.9650
	Sig.		.077	1.000

Means for groups in homogeneous subsets are displayed.
a Uses Harmonic Mean Sample Size = 5.000.

Table F19 One-way analysis of dissolution time of orally fast dissolving film bases and film containing *Garcinia mangostana* extract

ANOVA

DISTIME

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	789792.978	8	98724.122	203.415	.000
Within Groups	17472.000	36	485.333		
Total	807264.978	44			

Table F20 Multiple comparison on dissolution time of film containing *Garcinia mangostana* extract and its film bases (Subset for alpha = .05)

Duncan

	N	Subset for alpha = .05			
FILM		1	2	3	4
E3HPC (4:1) BASE	5	102.40			
E3HPC (3:1) BASE	5	107.40			
Commercial Product Strips A	5	121.00			
E3HPC (2:1) BASE	5	121.40			
E3HPC (2:1) EXTRACT	5	123.20			
E3HPC (5:1) BASE	5	133.20			
E3HPC (5:1) EXTRACT	5		186.20		
E3HPC (4:1) EXTRACT	5			403.60	
E3HPC (3:1) EXTRACT	5				474.80
Sig.		.058	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 5.000.

Table F21 One-way analysis of variance on the percentage of drug release from orally fast dissolving films containing *Garcinia mangostana* extract

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
MIN1	Between Groups	410.858	3	136.953	4.039	.051
	Within Groups	271.260	8	33.907		
	Total	682.118	11			
MIN3	Between Groups	365.349	3	121.783	1.454	.298
	Within Groups	670.156	8	83.770		
	Total	1035.506	11			
MIN5	Between Groups	506.922	3	168.974	6.913	.013
	Within Groups	195.552	8	24.444		
	Total	702.473	11			
MIN7	Between Groups	293.061	3	97.687	4.812	.034
	Within Groups	162.408	8	20.301		
	Total	455.469	11			
MIN10	Between Groups	313.538	3	104.513	3.090	.090
	Within Groups	270.549	8	33.819		
	Total	584.087	11			
MIN15	Between Groups	223.783	3	74.594	2.520	.132
	Within Groups	236.774	8	29.597		
	Total	460.557	11			
MIN30	Between Groups	323.545	3	107.848	4.633	.037
	Within Groups	186.240	8	23.280		
	Total	509.784	11			
MIN45	Between Groups	342.298	3	114.099	6.080	.018
	Within Groups	150.129	8	18.766		
	Total	492.427	11			
MIN60	Between Groups	204.632	3	68.211	3.342	.077
	Within Groups	163.261	8	20.408		
	Total	367.893	11			

Table F22 One-way analysis of variance on the amount of drug of orally fast dissolving films containing *Garcinia mangostana* extract during stability study

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
MONTH0	Between Groups	596.151	3	198.717	10.006	.004
	Within Groups	158.880	8	19.860		
	Total	755.030	11			
MONTH1	Between Groups	749.842	3	249.947	24.681	.000
	Within Groups	81.015	8	10.127		
	Total	830.857	11			
MONTH2	Between Groups	570.789	3	190.263	12.559	.002
	Within Groups	121.193	8	15.149		
	Total	691.982	11			
MONTH3	Between Groups	225.060	3	75.020	2.027	.189
	Within Groups	296.150	8	37.019		
	Total	521.210	11			

Table F23 One-way analysis of variance on the inhibition zone of the solution of orally fast dissolving films containing *Garcinia mangostana* extract against *Streptococcus mutans* ATCC $KPSK_2$

ANOVA

INHMUTAN

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5727.704	25	229.108	133.904	.000
Within Groups	88.972	52	1.711		
Total	5816.676	77			

Table F24 One-way analysis of variance on the inhibition zone of the solution of orally fast dissolving films containing *Garcinia mangostana* extract against *Staphylococcus aureus* ATCC 25923

ANOVA

INHZONE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3851.113	25	154.045	53.067	.000
Within Groups	150.947	52	2.903		
Total	4002.060	77			

Table F25 One-way analysis of variance on the inhibition zone of orally fast dissolving films containing *Garcinia mangostana* extract against *Streptococcus mutans* ATCC $KPSK_2$

ANOVA

INHZONE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12583.610	23	547.113	144.655	.000
Within Groups	181.545	48	3.782		
Total	12765.155	71			

Table F26 One-way analysis of variance on the inhibition zone of orally fast dissolving films containing *Garcinia mangostana* extract against *Staphylococcus aureus* ATCC 25923

ANOVA

INHZONE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14080.602	23	612.200	175.203	.000
Within Groups	167.723	48	3.494		
Total	14248.326	71			

Table F27 Multiple comparison on the inhibition zone of the solution of fast dissolving films containing *Garcinia mangostana* extract against *Streptococcus mutans* ATCC $KPSK_2$

	N	Subset for alpha = .05							
FILMSOMU		1	2	3	4	5	6	7	8
Commercial product strips A	3	.00000							
E3HPC (2:1) BASE	3	.00000							
E3HPC (3:1) BASE	3	.00000							
E3HPC (4:1) BASE	3	.00000							
E3HPC (5:1) BASE	3	.00000							
E3HPC (2:1) POLYMER	3	.00000							
E3HPC (3;1) POLYMER	3	.00000							
E3HPC (4:1) POLYMER	3	.00000							
E3HPC (5:1) POLYMER	3	.00000							
commercial mouth wash solution B	3		6.05667						
E3HPC (2:1)	3		6.81667						
E3HPC (3:1)	3		6.86667						
E3HPC (5:1)	3		7.48333	7.48333					
E3HPC (5:1) X2	3		7.78333	7.78333					
E3HPC (4:1)	3		8.03333	8.03333					
E3HPC (5:1) X4	3		8.26667	8.26667					
E3HPC (5:1) X6	3			9.55000					
E3HPC (3:1) cetylpyridinium Cl	3				13.93333				
E3HPC (2:1) cetylpyridinium Cl	3				15.46667	15.46667			
E3HPC (4:1) cetylpyridinium Cl	3					16.96667			
E3HPC (5:1) cetylpyridinium Cl	3					17.15000			
E3HPC (2:1) chlorhexidine	3						20.90000		
E3HPC (5:1) chlorhexidine	3						22.10000	22.10000	
E3HPC (3:1) chlorhexidine	3							23.18333	23.18333
E3HPC (4:1) chlorhexidine	3							23.43333	23.43333
Commercial mouth wash solution C	3								24.45000
Sig.		1.000	.078	.089	.157	.143	.266	.245	.270

Means for groups in homogeneous subsets are displayed.
a Uses Harmonic Mean Sample Size = 3.000.

Table F28 Multiple comparison on the inhibition zone of the solution of fast dissolving films containing *Garcinia mangostana* extract against *Staphylococcus aureus* ATCC 25923

	N	Subset for alpha = .05							
SOLAUR		1	2	3	4	5	6	7	8
Commercial product strips A	3	.00000							
E3HPC (2:1) BASE	3	.00000							
E3HPC (3:1) BASE	3	.00000							
E3HPC (4:1) BASE	3	.00000							
E3HPC (5:1) BASE	3	.00000							
E3HPC (2:1) POLYMER	3	.00000							
E3HPC (3;1) POLYMER	3	.00000							
E3HPC (4:1) POLYMER	3	.00000							
E3HPC (5:1) POLYMER	3	.00000							
E3HPC (2:1)	3		8.43333						
E3HPC (3:1)	3		8.58333						
E3HPC (4:1)	3		9.13333	9.13333					
E3HPC (5:1)	3		10.46667	10.46667	10.46667				
E3HPC (2:1) cetylpyridinium Cl	3		10.55000	10.55000	10.55000				
E3HPC (5:1) X2	3			12.13333	12.13333	12.13333			
E3HPC (5:1) X6	3				12.33333	12.33333			
E3HPC (3:1) cetylpyridinium Cl	3				12.71667	12.71667			
E3HPC (5:1) X4	3				13.55000	13.55000	13.55000		
Commercial mouth wash solution B	3				13.58333	13.58333	13.58333		
E3HPC (5:1) cetylpyridinium Cl	3					14.51667	14.51667		
E3HPC (4:1) cetylpyridinium Cl	3					15.01667	15.01667	15.01667	
E3HPC (5:1) chlorhexidine	3						16.41667	16.41667	16.41667
E3HPC (4:1) chlorhexidine	3							17.90000	17.90000
E3HPC (3:1) chlorhexidine	3								18.41667
Commercial mouth wash solution C	3								18.48333
E3HPC (2:1) chlorhexidine	3								18.70000
Sig.		1.000	.183	.052	.056	.078	.070	.054	.150

Means for groups in homogeneous subsets are displayed.
a Uses Harmonic Mean Sample Size = 3.000.

Table F29 Multiple comparison on the inhibition zone of the fast dissolving films containing *Garcinia mangostana* extract against *Streptococcus mutans* ATCC $KPSK_2$

Duncan

	N	Subset for alpha = .05				
FILMMU		1	2	3	4	5
Commercial product strips A	3	.00000				
E3HPC (2:1) BASE	3	.00000				
E3HPC (3:1) BASE	3	.00000				
E3HPC (4:1) BASE	3	.00000				
E3HPC (5:1) BASE	3	.00000				
E3HPC (2:1) POLYMER	3	.00000				
E3HPC (3;1) POLYMER	3	.00000				
E3HPC (4:1) POLYMER	3	.00000				
E3HPC (5:1) POLYMER	3	.00000				
E3HPC (5:1) X4	3		5.71667			
E3HPC (5:1) X6	3		5.85000			
E3HPC (5:1) X2	3		5.85000			
E3HPC (5:1)	3		5.88333			
E3HPC (4:1)	3		6.16667			
E3HPC (2:1)	3		6.66667			
E3HPC (3:1)	3		7.20000			
E3HPC (3:1) chlorhexidine	3			26.83333		
E3HPC (5:1) chlorhexidine	3			27.66667		
E3HPC (2:1) chlorhexidine	3			27.96667		
E3HPC (4:1) chlorhexidine	3			29.08333		
E3HPC (5:1) cetylpyridinium Cl	3			29.55000	29.55000	
E3HPC (4:1) cetylpyridinium Cl	3			30.25000	30.25000	
E3HPC (2:1) cetylpyridinium Cl	3				32.65000	
E3HPC (3:1) cetylpyridinium Cl	3					36.11667
Sig.		1.000	.428	.063	.070	1.000

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 3.000.

Table F30 Multiple comparison on the inhibition zone of the fast dissolving films containing *Garcinia mangostana* extract against *Staphylococcus aureus* ATCC 25923

	N	Subset for alpha = .05				
FILMAUR		1	2	3	4	5
Commercial product strips A	3	.00000				
E3HPC (2:1) BASE	3	.00000				
E3HPC (3:1) BASE	3	.00000				
E3HPC (4:1) BASE	3	.00000				
E3HPC (5:1) BASE	3	.00000				
E3HPC (2:1) POLYMER	3	.00000				
E3HPC (3;1) POLYMER	3	.00000				
E3HPC (4:1) POLYMER	3	.00000				
E3HPC (5:1) POLYMER	3	.00000				
E3HPC (5:1) X4	3		6.81667			
E3HPC (5:1) X2	3		7.01667			
E3HPC (3:1)	3		7.13333			
E3HPC (5:1) X6	3		7.51667			
E3HPC (4:1)	3		7.55000			
E3HPC (2:1)	3		8.23333			
E3HPC (5:1)	3		8.35000			
E3HPC (3:1) chlorhexidine	3			24.33333		
E3HPC (2:1) chlorhexidine	3			24.40000		
E3HPC (5:1) chlorhexidine	3			24.43333		
E3HPC (4:1) chlorhexidine	3			24.46667		
E3HPC (4:1) cetylpyridinium Cl	3				35.91667	
E3HPC (2:1) cetylpyridinium Cl	3				35.93333	
E3HPC (3:1) cetylpyridinium Cl	3				37.65000	
E3HPC (5:1) cetylpyridinium Cl	3					41.03333
Sig.		1.000	.394	.938	.291	1.000

Means for groups in homogeneous subsets are displayed.
a Uses Harmonic Mean Sample Size = 3.000.

APPENDIX G

HPLC Chromatogram of Dissolution and Stability Study

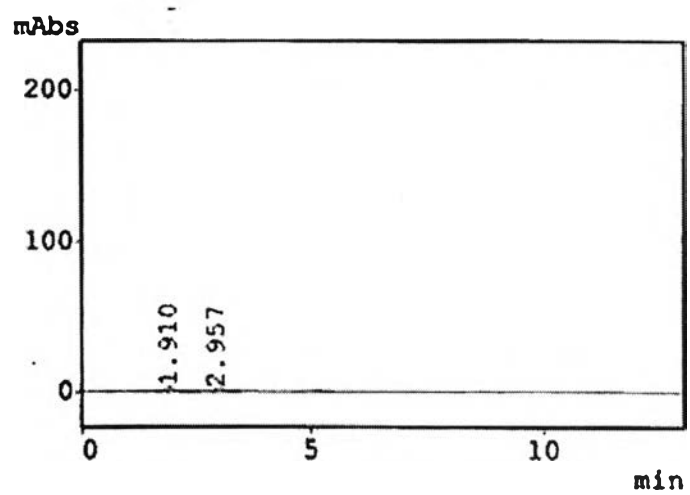


Figure G1 HPLC chromatogram of blank solution

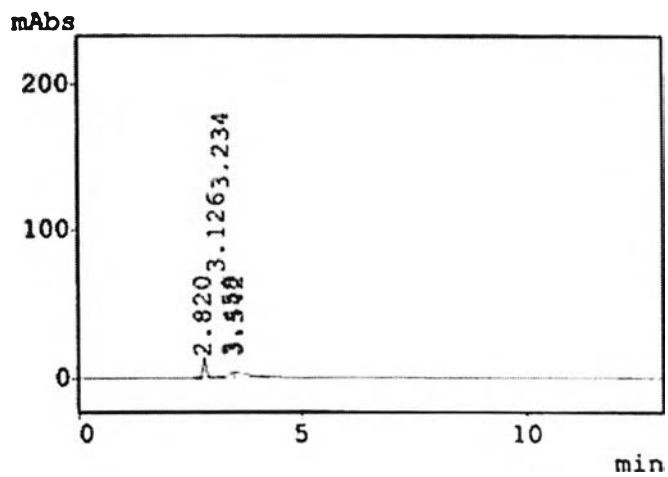


Figure G2 HPLC chromatogram of blank sample with 1% sodium lauryl sulfate in isotonic phosphate buffer pH 6.2

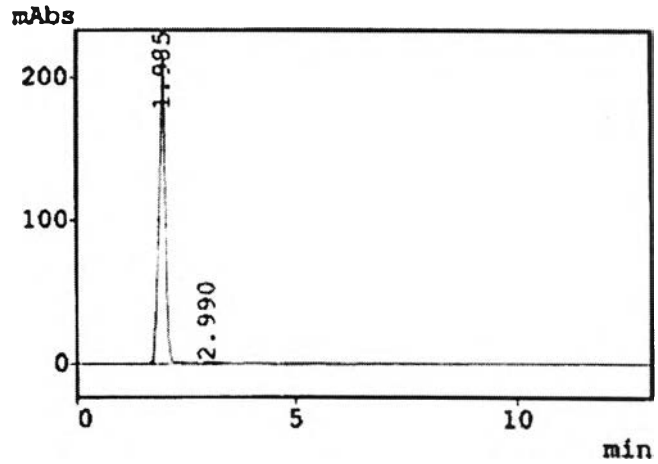


Figure G3 HPLC chromatogram of film base of formulation E3HPC (2:1)

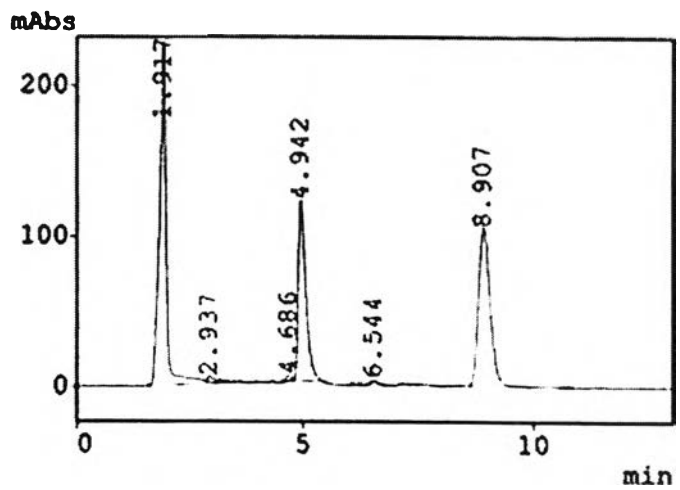


Figure G4 HPLC chromatogram of orally fast dissolving film of formulation E3HPC (2:1) containing *Garcinia mangostana* extract

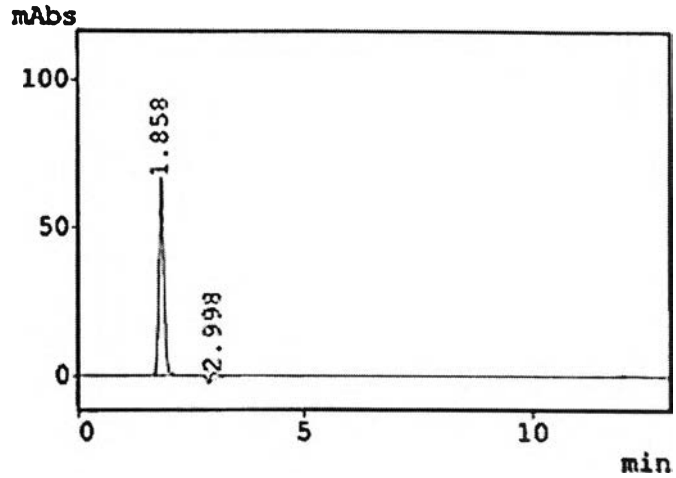


Figure G5 HPLC chromatogram of film base of formulation E3HPC (3:1)

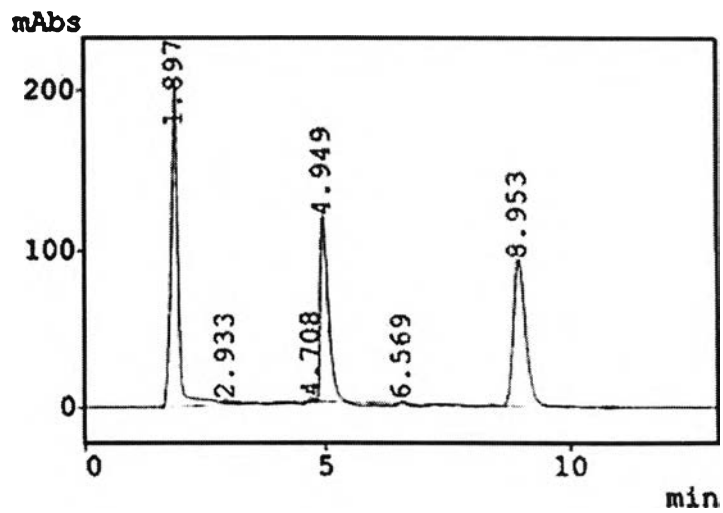


Figure G6 HPLC chromatogram of orally fast dissolving film of formulation E3HPC (3:1) containing *Garcinia mangostana* extract

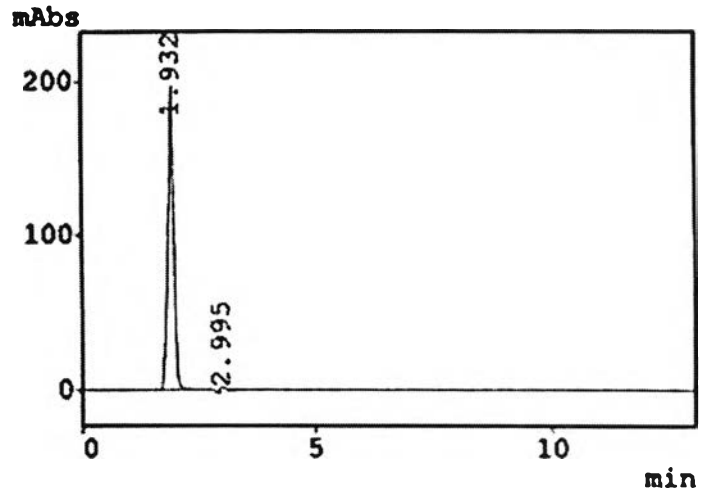


Figure G7 HPLC chromatogram of film base of formulation E3HPC (4:1)

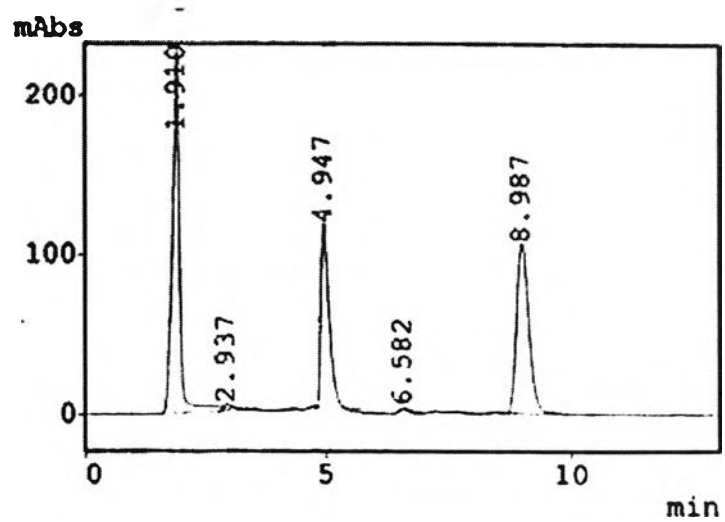


Figure G8 HPLC chromatogram of orally fast dissolving film of formulation E3HPC (4:1) containing *Garcinia mangostana* extract

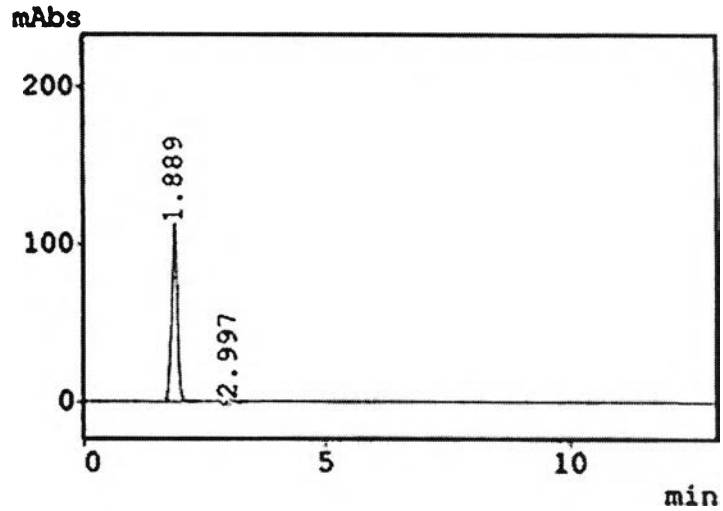


Figure G9 HPLC chromatogram of film base of formulation E3HPC (5:1)

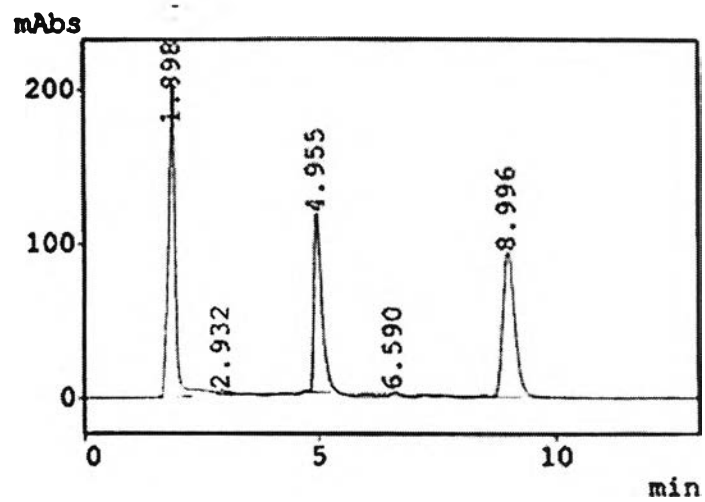


Figure G10 HPLC chromatogram of orally fast dissolving film of formulation E3HPC (5:1) containing *Garcinia mangostana* extract

VITA

Miss Nittaya Ruamkittham was born on January 18, 1978 in Bangkok, Thailand. She received her Bachelor's Degree in Pharmacy from the Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok, Thailand in 2000. Before the enrollment to the Master's degree program in Pharmacy at Chulalongkorn University in 2003, she worked at Srivichai2 Hospital, Bangkok.