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APPENDICES

APPENDIX A

Physicochemical Properties of Drug and Substances

1. **Lidocaine** (K. Groningsson,1985)

1.1 Synonyms

2-Diethylamino-N-(2,6-dimethylphenyl)acetamide, Lignocaine, Xylocaine

1.2 Molecular formulation

Lidocaine base: $C_{14}H_{22}N_2O$

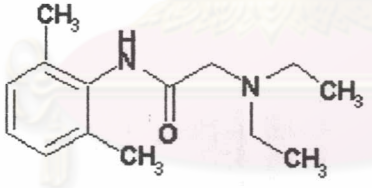
Lidocaine hydrochloride: $C_{14}H_{22}N_2O \bullet HCl$

1.3 Molecular weight

Lidocaine base: 243.34

Lidocaine hydrochloride: 270.82

1.4 Chemical structure



1.5 Appearance

Both the base and the hydrochloride are white odorless substances. The base crystallizes from n-hexane as fine needles while the hydrochloride is obtained as a microcrystalline powder from aqueous acetone

1.6 Solubility

Solubility (g/ml, 25°C) of lidocaine base and lidocaine hydrochloride

	Solvent			
	water	95% ethanol	chloroform	n-hexane
base	0.004	0.76	0.79	0.12
hydrochloride	0.68			

1.7 Melting point

Lidocaine base: 66.0-69.0°C

Lidocaine hydrochloride : 74.0-79.0°C

1.8 Dissociation constant

The pKa of lidocaine is 7.84.

1.9 Safety

Lidocaine is Na^+ channel blocker. It is commonly used as local anesthetic drugs for intraoral injection. The recommended by the American Dental Association; maximum recommended dose is 2.0 mg/lb (max. 300 mg).

2. Hydroxypropyl cellulose (Kibbe,2000)

2.1 Synonyms

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

2.2 Chemical name

Cellulose, 2-hydroxypropyl ether

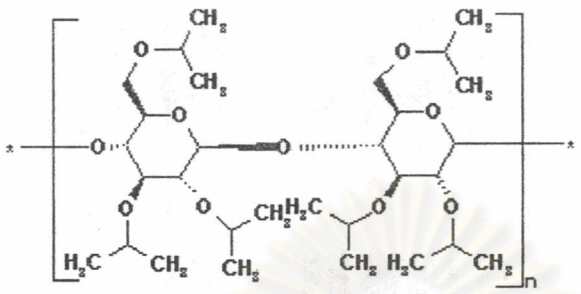
2.3 Molecular formulation

$(C_{18}H_{28}O_8)_n$

2.4 Molecular weight

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

2.5 Chemical structure



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 soluble and is precipitated as a highly swollen floc at a temperature between 40-45°C. All types have excellent solubility in either hot and cold polar organic liquids.

2.8 Melting point

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

2.9 Dissociation

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 an 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. Hydroxypropyl methylcellulose (Kibbe,2000)

3.1 Synonyms

Cellulose hydroxypropyl methyl ether, Methocel, methylcellulose propylene glycol ether, methyl hydroxypropylcellulose

3.2 Chemical name

Cellulose, 2-Hydroxypropyl methyl ether

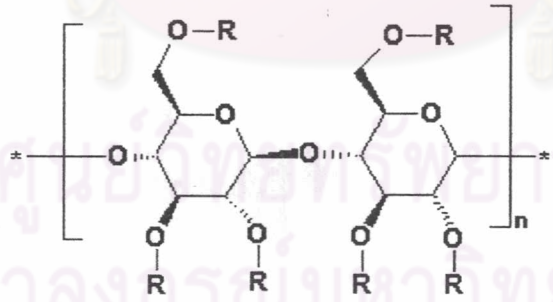
3.3 Molecular formulation

$C_8H_{15}O_6$-$(C_{10}H_{18}O_6)_n$-$C_8H_{15}O_5$

3.4 Molecular weight

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

3.5 Chemical structure



3.6 Appearance

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

3.7 Solubility

Hydroxypropyl methylcellulose is soluble in cold water, forming aviscous collidal solution, insoluble in alcohol, ether,chloroform, but soluble in mixtures of methly alcohol and methlene chloride.

3.8 Melting point

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

3.9 Acidity/alkalinity

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

3.10 Safety

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 laxative effect.

4. Ethyl cellulose (Kibbe,2000)

4.1 Synonyms

Ethyl cellulose, Ethocel

4.2 Chemical name

Cellulose, ethyl ether

4.3 Molecular formulation

$(C_{18}H_{28}O_8)_n$

4.4 Molecular weight

N.A.

4.5 Appearance

Ethyl cellulose is an odorless and tasteless, white or creamy-white colored granular powder.

4.6 Solubility

Insoluble in water, glycerin and propylene glycol but soluble in varying degrees in certain organic solvents, depending upon the ethoxy content.

4.7 Safety

Essentially non-toxic

5. Carbomer 934P

5.1 Synonyms

Carboxypolymethylene, carboxyvinyl polymer, acrylic acid polymer, carbopol

5.2 Chemical name

Carboxypolymethylene

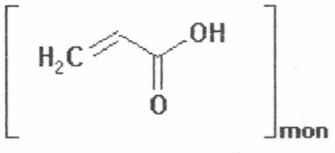
5.3 Molecular formulation

$-(C_3H_4O_2)_x \bullet (-C_3H_5\text{-Sucrose})_y-$

5.4 Molecular weight

$3x10^6$

5.5 Chemical structure



5.6 Appearance

A white, fluffy, acidic, hygroscopic powder with a slight characteristic odor

5.7 Typical properties

The pH of a 1% dispersion of carbomer in water is approximately 3.0. Carbomer is soluble in water, alcohol and glycerin. Agents that can neutralize carbomer include sodium hydroxide; potassium hydroxide; sodium bicarbonate; borax; amino acids; polar organic amines, such as triethanolamine, and lautyl and stearyl amines, which are used as gelling agents in non polar systems. One gram of carbomer is neutralized by approximately 400 mg of sodium hydroxide. Neutralized aqueous gels of carbomer are more viscous between pH 6 and pH 11. The viscosity is considerably reduced if the pH is <3 or >12. The viscosity is also reduced in the presence of strong electrolytes. Gels rapidly lose viscosity on exposure to sunlight, but this reaction can be minimized by the addition of antioxidant. Carbomer is hygroscopic.

5.8 Safety

No primary irritation or any evidence of sensitivity or allergic reaction in humans following topical application of dispersions containing carbomer has been observed.

6. Polyethylene glycol 400 (Kibbe,2000)

6.1 Synonyms

PEG; Macrogol; polyoxyethylene glycol

6.2 Chemical name

α-Hydro-ω-hyfroxypoly-(-oxy-1,2-ethanediyl)

6.3 Molecular formulation

$HOCH_2(CH_2OCH_2)_nCH_2OH$; n = 8-10

6.4 Molecular weight

380 - 420

6.5 Chemical structure

6.6 Appearance

Clear, colorless or slightly yellowish, viscous liquids. The odor is slight but characteristic, and the taste is bitter and slightly burning.

6.7 Solubility

Soluble in water, alcohols, glycols, acetone, glycerol and benzene.

6.7 Safety

Toxicity is low; PEG 400 is permitted as an additive to animal feeds and drinking water. LD_{50} = 43.6 g/kg (rat, oral). Skin irritation is low, but PEG 400 can cause a local stinging effect when used as suppository bases due to their hypertoxicity.

APPENDIX B

Analysis of Lidocaine

1. Validation of HPLC method

1.1 Specificity

Figure b1 and b2 showed typical chromatograms of lidocaine standard solutions. Lidocaine and methylparaben were eluted at 4.00-5.00 min and 6.00-7.00 min, respectively. Figure b3 showed the chromatogram in the presence of phosphate buffer and non-active ingredients, including HPMC E15, PEG 400, propylene glycol, carbopol 934p. It indicated that the other ingredients did not interfere with peaks of lidocaine and methylparaben. Thus, this method having high specificity could be used for analysis of lidocaine.

1.2 Accuracy

The accuracy of an analytical method was the closeness of the test results obtained by that method to the true value. It is usually calculated as percentage of recovery by the assay of the known added amount of analyte in the sample. The percentages of analytical recoveries of each concentration are shown in Table b1-b2. The mean of percentage of analytical recovered closely to 100%, with a low %CV indicated the high accuracy of this method. Thus, it could be used for analysis of lidocaine in all concentrations studied.

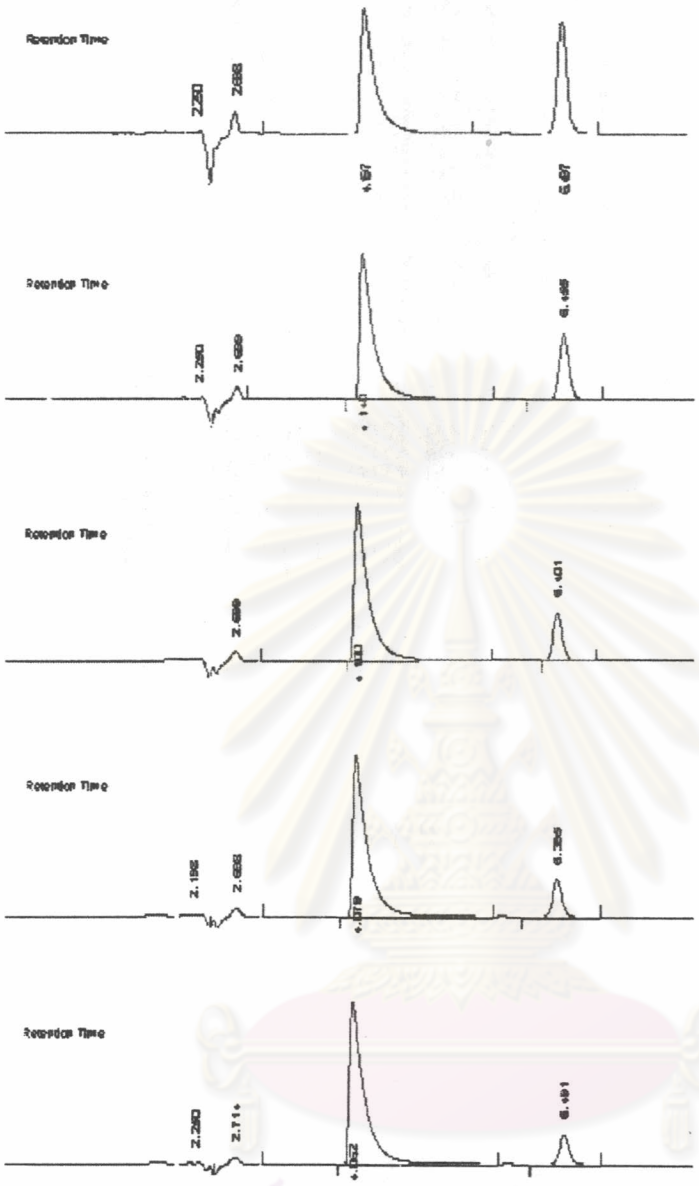


Figure b1 HPLC chromatograms of standard solutions of lidocaine base

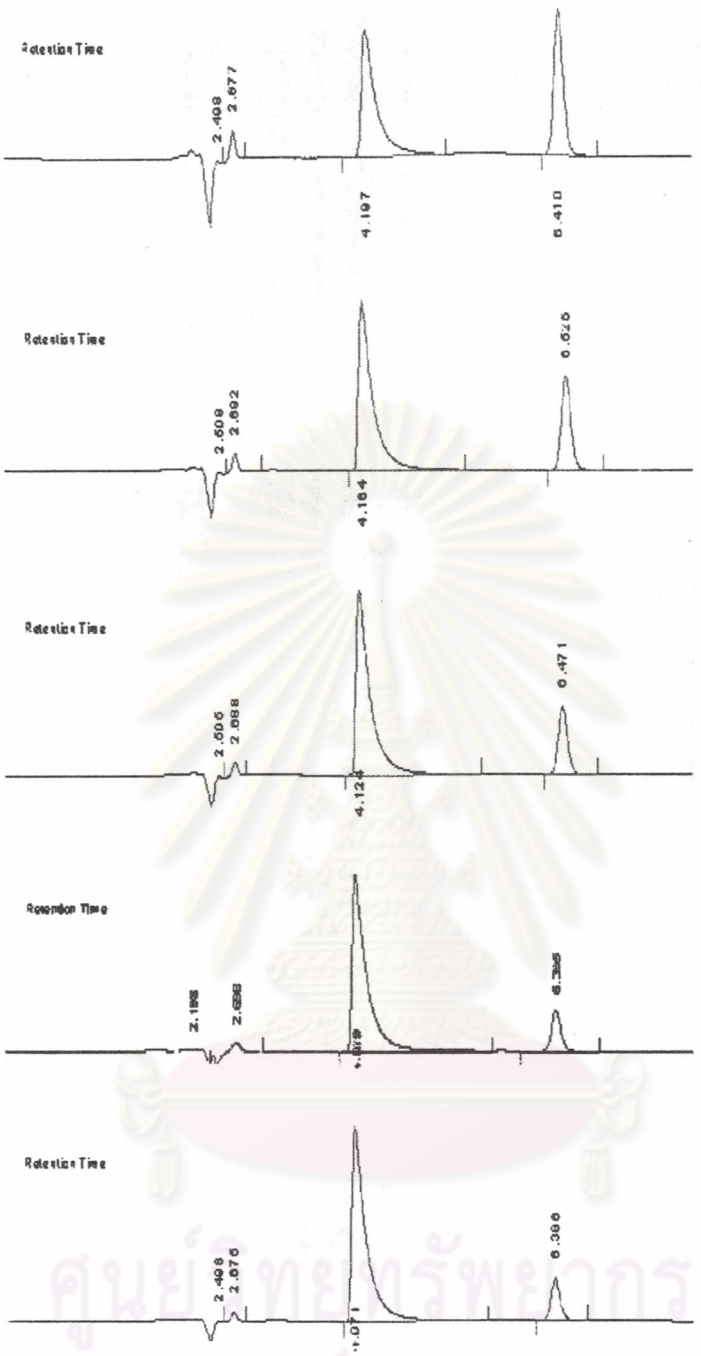


Figure b2 HPLC chromatograms of standard solutions of lidocaine HCl

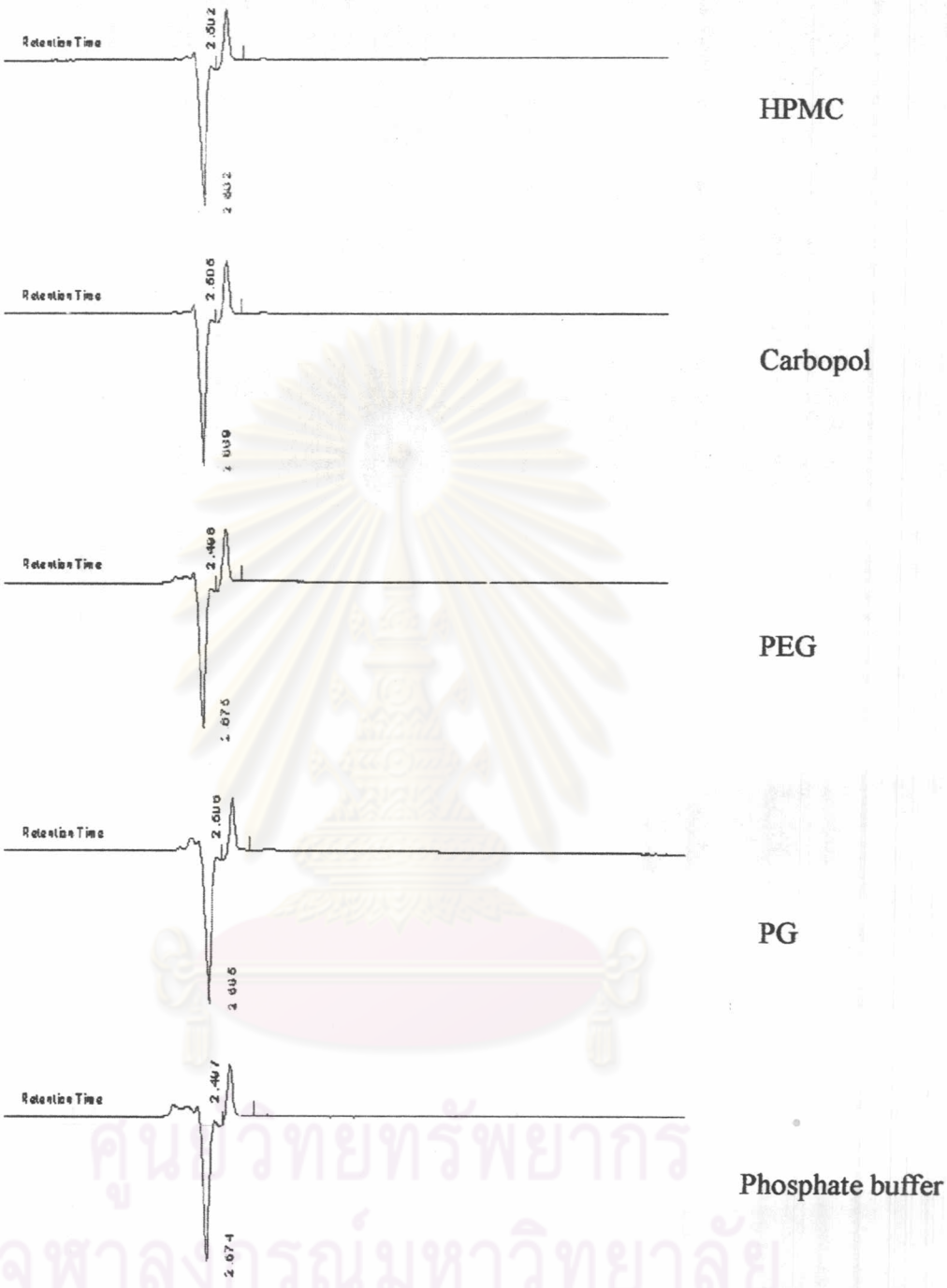


Figure b3 HPLC chromatograms of other ingredients in formulations

Table b1 Percentage of analytical recovery of Lidocaine base from the HPMC E15 films

Actual concentration of lidocaine base (μg/ml)	Calculated concentration of lidocaine base (μg/ml)	% analytical recovery
100	100.0085	100.0085
	99.9762	99.9762
	100.9887	100.9887
200	199.8947	99.94735
	200.1486	100.0743
	200.4785	100.2393
300	299.8915	99.96383
	300.0021	100.0007
	300.1547	100.0516
400	398.9835	99.74588
	399.9632	99.9908
	400.2510	100.0628
500	500.1478	100.0296
	500.3254	100.0651
	499.8752	99.97504
Mean		100.0746
SD		0.2723
%CV		0.2721

Table b2 Percentage of analytical recovery of Lidocaine HCl from the HPMC E15 films

Actual concentration of lidocaine HCl (μg/ml)	Calculated concentration of lidocaine HCl (μg/ml)	% analytical recovery
100	99.7850	99.7850
	100.2111	100.2111
	98.2147	98.2147
200	200.1450	100.0725
	198.9851	99.4925
	201.4567	100.7284
300	300.4558	100.1519
	300.0021	100.0007
	299.1578	99.7193
400	402.5646	100.6412
	400.2845	100.0711
	401.2454	100.3114
500	499.2765	99.8553
	502.0564	100.4113
	499.5875	99.9175
Mean		99.7225
SD		0.5899
%CV		0.5915

1.3 Precision

The precision of an analytical method was the degree of agreement among individual test results when the method was applied repeatedly to multiple samplings of a homogeneous sample. The precision of analytical method was usually expressed as the standard deviation or relative standard deviation (coefficient of variation). Tables b5 and b6 illustrated the data of within and between run precision, respectively. All coefficients of variation values were small so it indicated that the HPLC method used was precise for quantitative analysis of lidocaine concentration in the range studied.

Table b3 Data within run precision

Concentration of lidocaine base (μg/ml)	Peak area ratio					
	Set no.1	Set no.2	Set no.3	**Mean**	**SD**	**%CV**
100	1.639	1.625	1.631	1.632	0.007	0.4289
200	3.185	3.179	3.180	3.181	0.003	0.0943
300	4.894	4.890	4.909	4.898	0.010	0.2042
400	6.552	6.523	6.545	6.540	0.015	0.2294
500	8.280	8.302	8.321	8.301	0.021	0.2530
Concentration of lidocaine HCl (μg/ml)	Peak area ratio					
	Set no.1	Set no.2	Set no.3	**Mean**	**SD**	**%CV**
100	1.266	1.347	1.255	1.289	0.050	3.8790
200	2.536	2.488	2.475	2.500	0.032	1.2800
300	3.806	3.716	3.845	3.789	0.066	1.7419
400	5.076	5.248	5.154	5.159	0.086	1.6670
500	6.346	6.460	6.346	6.384	0.066	1.0338

Table b4 Data between run precision

Concentration of lidocaine base (μg/ml)	Peak area ratio					
	Day 1	Day 2	Day 3	**Mean**	**SD**	**%CV**
100	1.641	1.683	1.758	1.694	0.059	3.4829
200	3.174	3.267	3.245	3.229	0.049	1.5175
300	4.798	4.888	4.756	4.814	0.067	1.3918
400	6..661	6.632	6.785	6.709	0.108	1.6098
500	8.350	8.145	8.244	8.246	0.103	1.2491
Concentration of lidocaine HCl (μg/ml)	Peak area ratio					
	Day 1	Day 2	Day 3	**Mean**	**SD**	**%CV**
100	1.323	1.351	1.376	1.350	0.027	2.0000
200	2.514	2.399	2.482	2.465	0.059	2.3935
300	3.816	3.559	3.837	3.737	0.155	4.1477
400	5.045	5.118	5.147	5.103	0.053	1.0386
500	6.340	6.455	6.418	6.404	0.059	0.9213

1.4 Linearity

The linearity of analytical method was its ability to elicit test results that are directly. Or by a well-defined mathematical transformation, proportional to the concentration of analyte in samples within a given range. Figure b4 and b5 showed that the relationship between peak area ratios and lidocaine concentrations is linear with a correlation of determination (R^2) value of 0.9999 in lidocaine base and 0.9999 in lidocaine HCl. This result indicated that HPLC method was acceptable for qualitative analysis of lidocaine in the range studied.

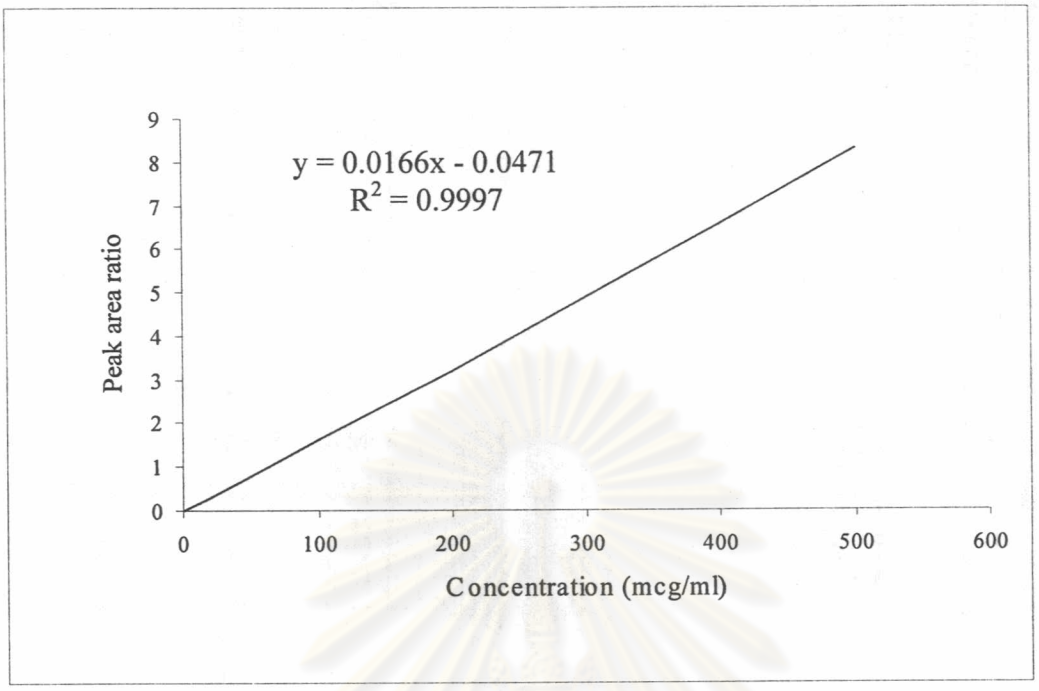


Figure b4 Standard curve of lidocaine base

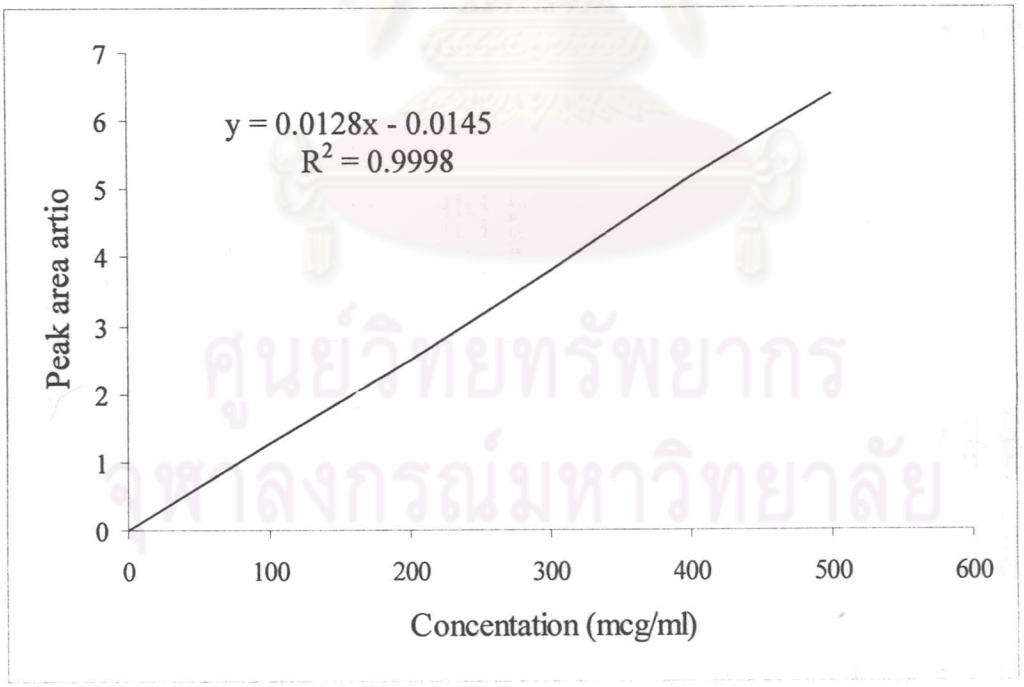


Figure b5 Standard curve of lidocaine HCl

2. System suitability

2.1 Resolution

Figure b4 and b5 showed typical chromatograms of lidocaine base and lidocaine HCl standard solutions respectively. The resolution volumes, which were calculated from a mean of five replicated injections, of lidocaine and its internal standard, methyl paraben, are presented in Table b5. All resolution values of lidocaine and methyl paraben were more than 1.0. Therefor, these two peaks were separated from each other.

Table b5 Resolution values between lidocaine and methyl paraben

Concentration of lidocaine base (μg/ml)	Concentration of methyl paraben (μg/ml)	Resolution value
100	1	10.38
200	1	10.52
300	1	10.82
400	1	10.30
500	1	10.30
Concentration of lidocaine HCl (μg/ml)	Concentration of methyl paraben (μg/ml)	Resolution value
100	1	9.50
200	1	10.27
300	1	10.37
400	1	10.16
500	1	10.10

2.2 Tailing factors

The tailing factors, which were calculated from a mean of the five replicated injections of each concentration (100, 200, 300, 400, and 500 μg/ml) of lidocaine and its internal standard, methyl paraben, are presented in Table b6.

Table b6 The tailing factors of lidocaine and methyl paraben

Concentration of lidocaine base (μg/ml)	Tailing factor
100	1.50
200	1.63
300	1.75
400	1.80
500	1.98
Methyl paraben	1.15
Concentration of lidocaine HCl (μg/ml)	Tailing factor
100	1.53
200	1.13
300	1.87
400	1.50
500	2.00
Methyl paraben	1.16

APPENDIX C
Results

Table c1 The thickness of prepared lidocaine mucoadhesive patches

formula	Measure point	Thickness (mm)		
		n_1	n_2	n_3
$E15_B$ 2:0.5	1	0.7500	0.6900	0.7400
	2	0.6700	0.7500	0.7750
	3	0.6800	0.6800	0.7400
	4	0.7100	0.7100	0.6650
	5	0.7800	0.6800	0.7150
	Mean	0.7180	0.7020	0.7270
	SD	0.0466	0.0295	0.0407
formula	Measure point	Thickness (mm)		
		n_1	n_2	n_3
$E15_B$ 2:1	1	0.7500	0.8300	0.8200
	2	0.7900	0.8500	0.8000
	3	0.7650	0.7600	0.7900
	4	0.7450	0.7450	0.7800
	5	0.8200	0.7900	0.6500
	Mean	0.7740	0.7950	0.7680
	SD	0.0311	0.0447	0.0676
formula	Measure point	Thickness (mm)		
		n_1	n_2	n_3
$E15_B$ 2:2	1	0.9200	1.1400	0.8900
	2	0.9900	0.9850	1.0900
	3	0.9800	0.9550	0.9400
	4	0.8400	0.8600	0.9000
	5	1.0600	1.1200	0.9850
	Mean	0.9580	1.0120	0.9610
	SD	0.0826	0.1174	0.0813
formula	Measure point	Thickness (mm)		
		n_1	n_2	n_3
HPC_B 2:2	1	0.560	0.455	0.460
	2	0.480	0.560	0.465
	3	0.435	0.445	0.495
	4	0.450	0.470	0.500
	5	0.485	0.455	0.480
	Mean	0.4820	0.4770	0.4800
	SD	0.0483	0.0472	0.0177

Table c1 The thickness of prepared lidocaine mucoadhesive patches (cont.)

formula	Measure point	Thickness (mm)		
		n_1	n_2	n_3
$E15_H$ 2:0.5	1	0.440	0.355	0.375
	2	0.425	0.420	0.340
	3	0.400	0.435	0.360
	4	0.425	0.425	0.365
	5	0.400	0.405	0.340
	Mean	0.4180	0.4080	0.3560
	SD	0.0175	0.0315	0.0156
formula	Measure point	Thickness (mm)		
		n_1	n_2	n_3
$E15_H$ 2:1	1	0.440	0.510	0.515
	2	0.430	0.560	0.450
	3	0.570	0.445	0.445
	4	0.560	0.440	0.400
	5	0.410	0.400	0.550
	Mean	0.4820	0.4710	0.4720
	SD	0.0766	0.0635	0.0599
formula	Measure point	Thickness (mm)		
		n_1	n_2	n_3
$E15_H$ 2:2	1	0.42	0.465	0.445
	2	0.4600	0.4450	0.4250
	3	0.4550	0.5500	0.5050
	4	0.5200	0.5350	0.4750
	5	0.5900	0.6000	0.5100
	Mean	0.4890	0.5190	0.4720
	SD	0.0669	0.0636	0.0370
formula	Measure point	Thickness (mm)		
		n_1	n_2	n_3
HPC_H 2:2	1	0.440	0.355	0.375
	2	0.425	0.420	0.340
	3	0.400	0.435	0.360
	4	0.425	0.425	0.365
	5	0.400	0.405	0.340
	Mean	0.4180	0.4080	0.3560
	SD	0.0175	0.0315	0.0156
formula	Measure point	Thickness (mm)		
		n_1	n_2	n_3
CS_{1H} 2:0.5	1	0.930	0.890	0.920
	2	0.910	0.910	0.955
	3	0.965	0.960	0.935
	4	0.955	0.915	0.905
	5	0.830	0.850	0.935
	Mean	0.9180	0.9050	0.9300
	SD	0.0537	0.0400	0.0187

Table c1 The thickness of prepared lidocaine mucoadhesive patches (cont.)

formula	Measure point	Thickness (mm)		
		n_1	n_2	n_3
CS_{1H} 2:1	1	0.940	0.950	1.015
	2	1.010	1.000	1.240
	3	1.000	1.015	1.065
	4	0.940	0.990	1.015
	5	0.915	1.170	1.135
	Mean	0.9610	1.0250	1.0940
	SD	0.0416	0.0846	0.0953
formula	Measure point	Thickness (mm)		
		n_1	n_2	n_3
CS_{1H} 2:2	1	1.010	1.120	1.075
	2	1.015	1.075	1.035
	3	1.060	1.055	1.020
	4	1.110	1.050	1.120
	5	1.080	1.045	1.070
	Mean	1.0550	1.0690	1.0640
	SD	0.0427	0.0307	0.0390
formula	Measure point	Thickness (mm)		
		n_1	n_2	n_3
CS_{2H} 2:0.5	1	0.960	0.895	0.980
	2	0.935	0.920	0.910
	3	1.010	0.940	0.905
	4	1.005	0.920	0.980
	5	0.955	0.905	0.995
	Mean	0.9730	0.9160	0.9540
	SD	0.0329	0.0171	0.0429
formula	Measure point	Thickness (mm)		
		n_1	n_2	n_3
CS_{2H} 2:1	1	0.935	1.055	0.995
	2	0.900	1.050	0.915
	3	0.970	1.050	0.985
	4	1.000	0.965	0.990
	5	0.980	0.995	1.015
	Mean	0.9570	1.0230	0.9800
	SD	0.0396	0.0407	0.0381
formula	Measure point	Thickness (mm)		
		n_1	n_2	n_3
CS_{2H} 2:2	1	0.950	0.995	1.010
	2	0.945	1.050	0.945
	3	1.005	0.960	0.920
	4	1.350	0.995	0.985
	5	0.990	0.930	1.010
	Mean	1.0480	0.9860	0.9740
	SD	0.1708	0.0449	0.0402

Table c2 Mucoadhesive of backing and free film of HPMC E15

Inorganic substance	%w/v in backing solution	Mucoadhesive force (N/cm^2)				
		No.1	No.2	No.3	**Mean**	**SD**
Aluminium hydroxide	0.1	-	-	-	-	-
	0.2	-	-	-	-	-
	0.3	-	-	-	-	-
	0.4	-	-	-	-	-
Dicalcium phosphate	0.1	5.445	4.868	5.265	5.193	0.295
	0.2	6.312	6.758	5.821	6.297	0.469
	0.3	6.859	6.425	6.537	6.607	0.225
	0.4	3.052	3.256	2.774	3.027	0.242
Calcium carbonate	0.1	5.758	5.217	5.912	5.629	0.365
	0.2	6.587	6.457	6.258	6.434	0.166
	0.3	7.158	7.458	8.661	7.759	0.795
	0.4	3.548	3.265	3.841	3.551	0.288

(-) the films could not removed from the glass plate

Table c3 Mucoadhesive of mucoadhesive layer

Carbopol 934P 1% (ml)	Mucoadhesive force (N/cm^2)				
	No.1	No.2	No.3	**Mean**	**SD**
4	4.259	5.258	4.256	4.591	0.578
5	5.647	6.214	6.365	6.075	0.379
6	7.852	7.158	6.542	7.184	0.655
7	7.516	8.136	5.895	7.182	1.157
8	8.258	6.147	7.256	7.220	1.056
9	7.265	7.369	6.148	6.927	0.677
10	7.326	7.892	8.124	7.781	0.410

Table c4 Content uniformity of mucoadhesive films

Sample no.	Content of drug (%)		
	Lidocaine base patch	Lidocaine HCl patch	Dentipatch®
1	98.84	102.65	98.77
2	98.45	101.47	99.65
3	100.36	99.06	98.06
4	100.31	100.22	99.98
5	98.39	101.01	99.80
6	100.85	100.03	99.82
7	102.28	98.65	99.56
8	101.60	103.13	98.04
9	99.56	97.26	100.54
10	98.19	102.08	96.59
Mean	99.88	100.56	99.08
SD	1.43	1.87	1.20

Table c5 Tensile properties of lidocaine mucoadhesive patches

Formula	Sample no.	%strain at auto break (%)	Young's modulus (Mpa)	Stress at ultimate (Mpa)
$E15_B$ 2:0.5	1	-	-	-
	2	-	-	-
	3	-	-	-
	4	-	-	-
	5	-	-	-
	6	-	-	-
	Mean	-	-	-
	SD	-	-	-
Formula	Sample no.	%strain at auto break (%)	Young's modulus (Mpa)	Stress at ultimate (Mpa)
$E15_B$ 2:1	1	4.83	6.60	4.50
	2	4.13	6.90	4.10
	3	5.17	6.35	4.90
	4	5.96	5.04	4.50
	5	4.25	5.74	4.00
	6	5.00	5.68	4.60
	Mean	4.89	6.05	4.43
	SD	0.67	0.69	0.33
Formula	Sample no.	%strain at auto break (%)	Young's modulus (Mpa)	Stress at ultimate (Mpa)
$E15_B$ 2:2	1	6.29	6.93	6.80
	2	8.00	7.06	6.60
	3	8.01	6.99	7.80
	4	7.38	7.58	8.80
	5	6.88	7.58	8.10
	6	8.46	9.45	6.40
	Mean	7.50	7.60	7.42
	SD	0.81	0.95	0.96
Formula	Sample no.	%strain at auto break (%)	Young's modulus (Mpa)	Stress at ultimate (Mpa)
HPC_B 2:2	1	--	--	--
	2	--	--	--
	3	--	--	--
	4	--	--	--
	5	--	--	--
	6	--	--	--
	Mean	--	--	--
	SD	--	--	--

Table c5 Tensile properties of lidocaine mucoadhesive patches (cont.)

Formula	Sample no.	%strain at auto break (%)	Young's modulus (Mpa)	Stress at ultimate (Mpa)
$E15_H$ 2:0.5	1	4.12	9.64	0.10
	2	4.67	7.28	0.10
	3	3.79	5.01	0.10
	4	4.42	8.17	0.10
	5	3.96	8.61	0.10
	6	5.47	8.38	0.10
	Mean	4.41	7.85	0.10
	SD	0.61	1.59	0.00
Formula	Sample no.	%strain at auto break (%)	Young's modulus (Mpa)	Stress at ultimate (Mpa)
$E15_H$ 2:1	1	165.74	1.91	75.00
	2	178.64	2.10	82.00
	3	161.70	2.64	74.21
	4	179.91	1.97	68.76
	5	166.74	2.36	75.15
	6	157.27	1.82	78.12
	Mean	168.34	2.13	75.54
	SD	9.12	0.31	4.39
Formula	Sample no.	%strain at auto break (%)	Young's modulus (Mpa)	Stress at ultimate (Mpa)
$E15_H$ 2:2	1	248.23	0.27	45.00
	2	255.07	0.29	51.90
	3	254.04	0.32	41.00
	4	240.72	0.36	68.00
	5	245.10	0.37	46.00
	6	256.08	0.27	58.00
	Mean	249.87	0.30	51.65
	SD	6.20	0.04	9.97
Formula	Sample no.	%strain at auto break (%)	Young's modulus (Mpa)	Stress at ultimate (Mpa)
HPC_H 2:2	1	--	--	--
	2	--	--	--
	3	--	--	--
	4	--	--	--
	5	--	--	--
	6	--	--	--
	Mean	--	--	--
	SD	--	--	--

Table c5 Tensile properties of lidocaine mucoadhesive patches (cont.)

Formula	Sample no.	%strain at auto break (%)	Young's modulus (Mpa)	Stress at ultimate (Mpa)
CS_{1H} 2:0.5	1	49.54	0.21	0.60
	2	58.92	0.27	0.70
	3	56.37	0.32	0.90
	4	48.52	0.24	0.90
	5	56.24	0.25	0.80
	6	55.74	0.27	0.70
	Mean	54.22	0.26	0.77
	SD	4.18	0.04	0.12
Formula	Sample no.	%strain at auto break (%)	Young's modulus (Mpa)	Stress at ultimate (Mpa)
CS_{1H} 2:1	1	67.50	0.04	0.80
	2	72.67	0.05	18.30
	3	65.04	0.03	1.00
	4	70.50	0.03	14.10
	5	64.83	0.03	9.70
	6	79.62	0.03	1.00
	Mean	70.03	0.04	7.48
	SD	5.61	0.01	7.67
Formula	Sample no.	%strain at auto break (%)	Young's modulus (Mpa)	Stress at ultimate (Mpa)
CS_{1H} 2:2	1	68.17	0.06	0.90
	2	75.84	0.05	0.80
	3	62.21	0.07	0.90
	4	83.63	0.06	0.90
	5	83.12	0.07	0.80
	6	78.13	0.07	0.80
	Mean	75.18	0.06	0.85
	SD	8.50	0.01	0.05
Formula	Sample no.	%strain at auto break (%)	Young's modulus (Mpa)	Stress at ultimate (Mpa)
CS_{2H} 2:0.5	1	59.37	0.05	17.70
	2	62.46	0.06	21.20
	3	65.46	0.06	23.00
	4	73.83	0.05	20.00
	5	75.38	0.04	21.20
	6	59.79	0.06	16.40
	Mean	66.05	0.05	19.92
	SD	7.00	0.01	2.45

Table c5 Tensile properties of lidocaine mucoadhesive patches (cont.)

Formula	Sample no.	%strain at auto break (%)	Young's modulus (Mpa)	Stress at ultimate (Mpa)
CS_{2H} 2:1	1	75.04	0.06	21.10
	2	78.37	0.08	20.50
	3	75.38	0.06	19.30
	4	85.46	0.06	20.70
	5	65.67	0.07	28.50
	6	69.08	0.06	20.30
	Mean	74.83	0.07	21.73
	SD	6.97	0.01	3.37
Formula	Sample no.	%strain at auto break (%)	Young's modulus (Mpa)	Stress at ultimate (Mpa)
CS_{2H} 2:2	1	86.71	0.08	18.36
	2	89.25	0.06	20.15
	3	82.14	0.09	18.45
	4	87.16	0.09	19.14
	5	84.03	0.07	18.21
	6	79.21	0.10	18.54
	Mean	84.75	0.08	18.81
	SD	3.69	0.01	0.73

(-) the films cannot be removed from the plate
(--) the film had tensile strength more than 10N

Table c6 Percentage moisture sorptin of lidocaine mucoadhesive patches film at various %RH after 1 day

Formulas	53%RH					75%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	4.17	4.35	5.26	4.59	0.58	9.52	9.09	12.00	10.20	1.57
Lidocaine HCl	5.00	3.85	5.56	4.80	0.87	17.39	11.11	23.53	17.34	6.21
Dentipatch®	2.56	2.63	1.80	2.33	0.46	8.19	7.98	8.24	8.14	0.14
Formulas	84%RH					94%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	12.00	13.04	8.00	11.01	2.66	12.00	12.50	8.00	10.83	2.47
Lidocaine HCl	19.05	22.22	21.05	20.77	1.60	15.79	27.27	15.79	19.62	6.63
Dentipatch®	10.15	10.90	10.59	10.55	0.38	12.18	11.95	11.64	11.92	0.27

Table c7 Percentage moisture sorptin of lidocaine mucoadhesive patches film at various %RH after 3 days

Formulas	53%RH					75%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	4.19	4.36	5.38	4.64	0.64	10.64	10.15	12.76	11.18	1.39
Lidocaine HCl	5.45	4.02	5.90	5.12	0.98	17.84	11.77	20.01	16.54	4.27
Dentipatch®	2.67	2.72	2.01	2.47	0.40	8.85	8.00	8.76	8.54	0.47
Formulas	84%RH					94%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	25.79	23.97	25.28	25.01	0.94	33.08	34.62	33.81	33.84	0.77
Lidocaine HCl	30.05	32.78	32.88	31.90	1.61	43.98	44.96	43.11	44.02	0.93
Dentipatch®	20.76	20.35	22.04	21.05	0.88	30.75	32.37	30.05	31.06	1.19

Table c8 Percentage moisture sorption of lidocaine mucoadhesive patches film at various %RH after 5 days

Formulas	53%RH					75%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	4.23	4.37	5.41	4.67	0.64	10.56	10.21	12.78	11.18	1.39
Lidocaine HCl	5.90	4.44	5.92	5.42	0.85	17.90	12.87	20.60	17.12	3.92
Dentipatch®	2.78	2.91	2.82	2.84	0.07	9.00	8.66	8.99	8.88	0.19
Formulas	84%RH					94%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	26.03	24.14	25.18	25.12	0.95	35.42	34.91	35.25	35.19	0.26
Lidocaine HCl	32.59	32.08	33.41	32.69	0.67	45.44	54.81	46.62	48.96	5.10
Dentipatch®	22.15	21.73	22.74	22.21	0.51	33.60	34.62	33.69	33.97	0.56

Table c9 Percentage moisture sorptin of lidocaine mucoadhesive patches film at various %RH after 7 days

Formulas	53%RH					75%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	4.21	4.24	5.50	4.65	0.74	11.02	10.34	12.74	11.37	1.24
Lidocaine HCl	5.93	4.34	5.94	5.40	0.92	18.25	13.00	20.78	17.34	3.97
Dentipatch®	2.79	2.94	2.85	2.86	0.08	9.52	8.75	9.03	9.10	0.39
Formulas	84%RH					94%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	26.08	24.45	25.66	25.40	0.85	36.13	39.62	42.21	39.32	3.05
Lidocaine HCl	32.88	32.42	33.84	33.05	0.72	47.36	60.64	50.89	52.96	6.88
Dentipatch®	23.97	22.40	22.85	23.07	0.81	36.43	36.68	36.72	36.61	0.16

Table c10 Percentage swelling of lidocaine mucoadhesive patches at various %RH after 1 days

Formulas	53%RH					75%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	0.75	0.64	0.89	0.76	0.13	1.86	1.12	1.50	1.49	0.37
Lidocaine HCl	1.74	1.46	1.33	1.51	0.21	2.99	3.04	1.75	2.59	0.73
Dentipatch®	0.33	0.46	0.51	0.43	0.09	2.00	2.53	0.99	1.84	0.78
Formulas	84%RH					94%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	5.99	4.25	4.16	4.80	1.03	10.71	10.59	9.78	10.36	0.51
Lidocaine HCl	5.45	5.69	4.86	5.33	0.43	15.44	18.93	18.72	17.70	1.96
Dentipatch®	5.37	4.03	3.77	4.39	0.86	8.65	7.41	6.80	7.62	0.94

Table c11 Percentage swelling of lidocaine mucoadhesive patches at various %RH after 3 days

Formulas	53%RH					75%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	2.87	3.14	3.20	3.07	0.18	7.10	5.99	8.75	7.28	1.39
Lidocaine HCl	5.82	3.94	5.47	5.08	1.00	11.48	11.25	10.12	10.95	0.73
Dentipatch®	1.54	1.57	1.89	1.67	0.19	5.47	6.28	4.47	5.41	0.91
Formulas	84%RH					94%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	10.01	10.57	8.32	9.63	1.17	11.63	15.52	10.98	12.71	2.46
Lidocaine HCl	15.16	10.36	10.83	12.12	2.65	16.50	22.57	20.46	19.84	3.08
Dentipatch®	12.30	8.73	7.65	9.56	2.43	10.85	9.12	9.29	9.75	0.95

Table c12 Percentage swelling of lidocaine mucoadhesive patches at various %RH after 5 days

Formulas	53%RH					75%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	3.04	3.50	3.99	3.51	0.48	11.01	17.12	11.75	13.29	3.33
Lidocaine HCl	6.74	5.27	7.65	6.55	1.20	12.38	20.05	16.65	16.36	3.84
Dentipatch®	1.84	2.68	2.97	2.50	0.59	9.80	8.43	10.94	9.72	1.26
Formulas	84%RH					94%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	11.63	17.54	11.65	13.61	3.41	17.16	15.65	12.05	14.95	2.63
Lidocaine HCl	19.15	17.64	12.56	16.45	3.45	16.87	19.88	18.61	18.45	1.51
Dentipatch®	10.87	8.45	8.63	9.32	1.35	12.36	14.34	10.69	12.46	1.83

Table c13 Percentage swelling of lidocaine mucoadhesive patches at various %RH after 7 days

Formulas	53%RH					75%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	3.55	3.76	4.04	3.78	0.25	15.92	21.11	17.25	18.09	2.70
Lidocaine HCl	6.72	5.29	7.83	6.61	1.27	20.00	19.13	22.55	20.56	1.78
Dentipatch®	1.87	2.84	2.99	2.57	0.61	15.11	14.80	14.45	14.79	0.33
Formulas	84%RH					94%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	20.73	18.02	17.51	18.75	1.73	20.49	22.84	20.05	21.13	1.5
Lidocaine HCl	25.81	18.53	16.21	20.18	5.01	24.19	25.46	17.34	22.33	4.37
Dentipatch®	14.16	18.52	18.16	16.95	2.42	18.34	20.09	19.31	19.25	0.88

Table c14 Detachment force of lidocaine mucoadhesive patches

Sample no.	Detachment force (N/cm^2)		
	Lidocaine base	Lidocaine HCl	Dentipatch®
No.1	9.185	5.369	8.361
No.2	8.145	6.148	8.154
No.3	7.542	5.189	8.745
No.4	9.268	5.478	8.459
No.5	9.147	4.985	8.214
No.6	9.259	6.478	8.235
No.7	8.457	5.179	8.147
No.8	8.698	6.258	8.254
No.9	7.952	6.745	7.986
No.10	8.547	5.423	8.221
Mean	8.620	5.725	8.278
SD	0.605	0.622	0.207

Table c15 Release of lidocaine through dialysis membrane

Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm^2)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**SD**
Saturated lidocaine base solution	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	5	3.317	3.143	3.981	3.480	0.442	0.048	0.045	0.057	0.050	0.00
	10	6.146	5.238	6.495	5.960	0.649	0.088	0.075	0.093	0.085	0.00
	15	9.429	9.708	10.476	9.871	0.542	0.135	0.139	0.150	0.141	0.00
	20	12.571	12.502	12.711	12.595	0.107	0.180	0.179	0.182	0.180	0.00
	30	19.695	20.533	19.486	19.905	0.554	0.282	0.294	0.279	0.285	0.00
	45	29.892	30.032	29.822	29.915	0.107	0.428	0.430	0.427	0.428	0.00
	60	39.251	41.835	39.740	40.275	1.373	0.562	0.599	0.569	0.577	0.02
	100	61.251	61.460	61.041	61.251	0.210	0.877	0.880	0.874	0.877	0.00
	140	77.244	78.571	78.083	77.966	0.671	1.106	1.125	1.118	1.116	0.01
	180	96.870	97.708	94.635	96.404	1.589	1.387	1.399	1.355	1.380	0.02

Table c15 Release of lidocaine through dialysis membrane (cont.)

Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm²)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**SI**
Saturated lidocaine HCl solution	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0
	5	3.143	3.660	3.122	3.308	0.305	16.432	14.739	15.925	15.699	0.8
	10	11.035	12.013	12.117	11.722	0.597	31.366	31.569	31.791	31.575	0.2
	15	17.328	16.804	18.243	17.458	0.728	45.835	44.097	47.116	45.683	1.5
	20	24.535	21.120	25.667	23.774	2.367	59.704	59.166	59.484	59.451	0.2
	30	32.281	34.278	33.042	33.200	1.008	71.461	70.581	71.288	71.110	0.4
	45	53.429	52.227	52.702	52.786	0.605	82.604	82.562	84.097	83.088	0.8
	60	62.536	60.916	60.937	61.463	0.930	91.101	92.101	90.241	91.148	0.9
	100	79.270	77.999	86.994	81.421	4.868	100.711	99.076	100.111	99.966	0.8
	140	87.036	91.663	93.999	90.899	3.544	106.917	109.447	107.852	108.072	1.2
	180	99.580	104.517	97.736	100.611	3.506	110.336	108.952	110.785	110.024	0.9
Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm²)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**S**
Lidocaine base patch	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0
	5	2.893	2.316	1.916	2.375	0.492	0.651	0.521	0.431	0.534	0.1
	10	6.027	4.840	6.284	5.717	0.770	1.356	1.089	1.414	1.286	0.1
	15	8.889	8.693	9.698	9.093	0.533	2.000	1.956	2.182	2.046	0.1
	20	10.311	9.747	11.409	10.489	0.845	2.320	2.193	2.567	2.360	0.1
	30	15.071	15.498	16.680	15.750	0.833	3.391	3.487	3.753	3.544	0.1
	45	20.844	20.036	22.138	21.006	1.060	4.690	4.508	4.981	4.726	0.2
	60	23.876	27.280	25.147	25.434	1.720	5.372	6.138	5.658	5.723	0.3
	100	33.929	35.711	33.902	34.514	1.037	7.634	8.035	7.628	7.766	0.2
	140	40.596	42.431	41.413	41.480	0.920	9.134	9.547	9.318	9.333	0.2
	180	51.324	53.142	51.049	51.839	1.137	11.548	11.957	11.486	11.664	0.2
Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm²)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**S**
Lidocaine HCl patch	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0
	5	4.022	3.987	4.107	4.039	0.062	0.905	0.897	0.924	0.909	0.0
	10	7.042	6.951	7.364	7.119	0.217	1.585	1.564	1.657	1.602	0.0
	15	9.631	9.644	9.916	9.730	0.161	2.167	2.170	2.231	2.189	0.0
	20	12.556	12.716	13.084	12.785	0.271	2.825	2.861	2.944	2.877	0.0
	30	17.778	18.889	18.698	18.455	0.594	4.000	4.250	4.207	4.152	0.1
	45	24.253	25.298	24.942	24.831	0.531	5.457	5.692	5.612	5.587	0.1
	60	29.831	30.909	30.850	30.530	0.606	6.712	6.955	6.941	6.869	0.1
	100	40.869	41.538	42.329	41.579	0.731	9.196	9.346	9.524	9.355	0.1
	140	47.920	49.471	49.698	49.030	0.968	10.782	11.131	11.182	11.032	0.2
	180	53.129	54.578	54.947	54.218	0.961	11.954	12.280	12.363	12.199	0.2
Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm²)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**S**
Dentipatch®	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0
	5	2.890	3.210	2.956	3.019	0.169	0.533	0.592	0.545	0.557	0.0
	10	5.792	5.992	5.732	5.839	0.136	1.068	1.105	1.057	1.077	0.0
	15	7.657	7.961	7.711	7.777	0.162	1.412	1.468	1.422	1.434	0.0
	20	9.794	10.076	9.870	9.913	0.146	1.806	1.858	1.820	1.828	0.0
	30	13.384	13.726	16.020	14.376	1.433	2.468	2.531	2.954	2.651	0.2
	45	18.910	19.447	20.634	19.664	0.882	3.487	3.586	3.805	3.626	0.1
	60	23.373	24.143	25.239	24.252	0.937	4.310	4.452	4.654	4.472	0.1
	100	35.645	36.291	37.603	36.513	0.998	6.573	6.692	6.934	6.733	0.1
	140	45.358	44.718	47.245	45.774	1.314	8.364	8.246	8.712	8.441	0.2
	180	55.803	51.643	53.205	53.550	2.101	10.290	9.523	9.811	9.875	0.3

Table c16 Release of lidocaine without dialysis membrane

Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm^2)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**SD**
Lidocaine base patch	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5	6.667	6.524	6.333	6.508	0.167	1.500	1.468	1.425	1.464	0.038
	10	7.556	7.547	10.356	8.486	1.619	1.700	1.698	2.330	1.909	0.364
	15	13.333	13.978	12.409	13.240	0.789	3.000	3.145	2.792	2.979	0.177
	20	16.347	17.707	16.680	16.911	0.709	3.678	3.984	3.753	3.805	0.159
	30	25.409	21.551	19.000	21.987	3.226	5.717	4.849	4.275	4.947	0.726
	45	26.778	30.991	30.093	29.287	2.219	6.025	6.973	6.771	6.590	0.499
	60	36.582	36.547	39.920	37.683	1.937	8.231	8.223	8.982	8.479	0.436
	100	52.196	52.533	53.271	52.667	0.550	11.744	11.820	11.986	11.850	0.124
	140	64.302	64.249	61.991	63.514	1.319	14.468	14.456	13.948	14.291	0.297
	180	71.269	76.511	75.342	74.374	2.752	16.036	17.215	16.952	16.734	0.619
Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm^2)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**SD**
Lidocaine HCl patch	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5	8.067	8.382	8.560	8.336	0.250	1.815	1.886	1.926	1.876	0.056
	10	11.413	12.688	11.711	11.937	0.667	2.568	2.855	2.635	2.686	0.150
	15	16.916	16.827	17.551	17.098	0.395	3.806	3.786	3.949	3.847	0.089
	20	20.284	21.669	20.301	20.752	0.795	4.564	4.876	4.568	4.669	0.179
	30	25.093	29.089	29.403	27.862	2.403	5.646	6.545	6.616	6.269	0.541
	45	39.087	40.695	43.782	41.188	2.386	8.795	9.156	9.851	9.267	0.537
	60	51.317	55.733	51.698	52.916	2.447	11.546	12.540	11.632	11.906	0.551
	100	70.484	68.227	66.916	68.542	1.805	15.859	15.351	15.056	15.422	0.406
	140	83.000	77.120	84.369	81.496	3.851	18.675	17.352	18.983	18.337	0.867
	180	100.644	95.845	95.842	97.444	2.772	22.645	21.565	21.565	21.925	0.624
Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm^2)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**SD**
Dentipatch®	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5	8.107	7.706	7.549	7.787	0.288	1.495	1.421	1.392	1.436	0.053
	10	13.080	12.608	12.364	12.684	0.364	2.412	2.325	2.280	2.339	0.067
	15	16.020	15.418	15.184	15.540	0.431	2.954	2.843	2.800	2.866	0.079
	20	20.705	20.201	19.799	20.235	0.454	3.818	3.725	3.651	3.731	0.084
	30	26.727	25.873	25.342	25.981	0.699	4.929	4.771	4.673	4.791	0.129
	45	34.225	33.341	32.538	33.368	0.844	6.311	6.148	6.000	6.153	0.156
	60	40.857	39.767	38.894	39.839	0.984	7.534	7.333	7.172	7.346	0.181
	100	54.517	54.149	53.563	54.076	0.481	10.053	9.985	9.877	9.972	0.089
	140	65.201	64.826	63.769	64.599	0.743	12.023	11.954	11.759	11.912	0.137
	180	77.739	76.381	76.781	76.967	0.697	14.335	14.085	14.159	14.193	0.129

Table c17 Content of lidocaine mucoadhesive patches in various conditions

Condition	Day	Sample	Content of drug (%)		
			Lidocaine base patch	Lidocaine HCl patch	Dentipatch®
25°C, 0%RH	0 days	1	102.71	103.54	100.86
		2	101.54	101.75	100.42
		3	103.58	101.22	99.84
		Mean	**102.61**	**102.17**	**100.37**
		SD	1.02	1.22	0.51
	after 30 days	1	102.34	99.56	98.24
		2	102.50	102.85	99.12
		3	103.20	100.41	100.76
		Mean	**102.68**	**100.94**	**99.37**
		SD	**0.46**	**1.71**	**1.28**
	after 60 days	1	101.39	100.17	99.32
		2	104.01	103.22	98.73
		3	101.38	99.96	100.45
		Mean	**102.26**	**101.12**	**99.50**
		SD	**1.52**	**1.82**	**0.87**
	after 90 days	1	101.53	99.28	99.67
		2	100.12	100.60	98.79
		3	99.65	98.53	99.98
		Mean	**100.43**	**99.47**	**99.48**
		SD	**0.98**	**1.05**	**0.62**
	after 120 days	1	100.05	101.18	99.19
		2	99.16	99.62	100.06
		3	99.58	99.22	100.18
		Mean	**99.60**	**100.01**	**99.81**
		SD	**0.45**	**1.04**	**0.54**
25°C, 75%RH	after 30 days	1	100.04	98.68	97.61
		2	101.18	96.53	97.45
		3	101.31	97.11	97.83
		Mean	**100.84**	**97.44**	**97.63**
		SD	**0.70**	**1.11**	**0.19**
	after 60 days	1	92.12	91.43	95.97
		2	91.98	94.00	91.81
		3	92.32	92.95	90.94
		Mean	**92.14**	**92.79**	**92.91**
		SD	**0.17**	**1.29**	**2.69**
	after 90 days	1	90.24	89.17	90.44
		2	92.15	89.72	89.72
		3	90.41	90.53	91.84
		Mean	**90.93**	**89.81**	**90.67**
		SD	**1.06**	**0.68**	**1.08**
	after 120 days	1	92.21	90.44	92.27
		2	92.89	89.26	90.84
		3	90.14	91.79	89.06
		Mean	**91.75**	**90.50**	**90.72**
		SD	**1.43**	**1.27**	**1.61**

Table c7 Percentage moisture sorptin of lidocaine mucoadhesive patches film at various %RH after 3 days

Formulas	53%RH					75%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	4.19	4.36	5.38	4.64	0.64	10.64	10.15	12.76	11.18	1.39
Lidocaine HCl	5.45	4.02	5.90	5.12	0.98	17.84	11.77	20.01	16.54	4.27
Dentipatch®	2.67	2.72	2.01	2.47	0.40	8.85	8.00	8.76	8.54	0.47
Formulas	84%RH					94%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	25.79	23.97	25.28	25.01	0.94	33.08	34.62	33.81	33.84	0.77
Lidocaine HCl	30.05	32.78	32.88	31.90	1.61	43.98	44.96	43.11	44.02	0.93
Dentipatch®	20.76	20.35	22.04	21.05	0.88	30.75	32.37	30.05	31.06	1.19

Table c8 Percentage moisture sorption of lidocaine mucoadhesive patches film at various %RH after 5 days

Formulas	53%RH					75%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	4.23	4.37	5.41	4.67	0.64	10.56	10.21	12.78	11.18	1.39
Lidocaine HCl	5.90	4.44	5.92	5.42	0.85	17.90	12.87	20.60	17.12	3.92
Dentipatch®	2.78	2.91	2.82	2.84	0.07	9.00	8.66	8.99	8.88	0.19
Formulas	84%RH					94%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	26.03	24.14	25.18	25.12	0.95	35.42	34.91	35.25	35.19	0.26
Lidocaine HCl	32.59	32.08	33.41	32.69	0.67	45.44	54.81	46.62	48.96	5.10
Dentipatch®	22.15	21.73	22.74	22.21	0.51	33.60	34.62	33.69	33.97	0.56

Table c9 Percentage moisture sorptin of lidocaine mucoadhesive patches film at various %RH after 7 days

Formulas	53%RH					75%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	4.21	4.24	5.50	4.65	0.74	11.02	10.34	12.74	11.37	1.24
Lidocaine HCl	5.93	4.34	5.94	5.40	0.92	18.25	13.00	20.78	17.34	3.97
Dentipatch®	2.79	2.94	2.85	2.86	0.08	9.52	8.75	9.03	9.10	0.39
Formulas	84%RH					94%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	26.08	24.45	25.66	25.40	0.85	36.13	39.62	42.21	39.32	3.05
Lidocaine HCl	32.88	32.42	33.84	33.05	0.72	47.36	60.64	50.89	52.96	6.88
Dentipatch®	23.97	22.40	22.85	23.07	0.81	36.43	36.68	36.72	36.61	0.16

Table c10 Percentage swelling of lidocaine mucoadhesive patches at various %RH after 1 days

Formulas	53%RH					75%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	0.75	0.64	0.89	0.76	0.13	1.86	1.12	1.50	1.49	0.37
Lidocaine HCl	1.74	1.46	1.33	1.51	0.21	2.99	3.04	1.75	2.59	0.73
Dentipatch®	0.33	0.46	0.51	0.43	0.09	2.00	2.53	0.99	1.84	0.78
Formulas	84%RH					94%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	5.99	4.25	4.16	4.80	1.03	10.71	10.59	9.78	10.36	0.51
Lidocaine HCl	5.45	5.69	4.86	5.33	0.43	15.44	18.93	18.72	17.70	1.96
Dentipatch®	5.37	4.03	3.77	4.39	0.86	8.65	7.41	6.80	7.62	0.94

Table c11 Percentage swelling of lidocaine mucoatlhesive patches at various %RH after 3 days

Formulas	53%RH					75%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	2.87	3.14	3.20	3.07	0.18	7.10	5.99	8.75	7.28	1.39
Lidocaine HCl	5.82	3.94	5.47	5.08	1.00	11.48	11.25	10.12	10.95	0.73
Dentipatch®	1.54	1.57	1.89	1.67	0.19	5.47	6.28	4.47	5.41	0.91
Formulas	84%RH					94%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	10.01	10.57	8.32	9.63	1.17	11.63	15.52	10.98	12.71	2.46
Lidocaine HCl	15.16	10.36	10.83	12.12	2.65	16.50	22.57	20.46	19.84	3.08
Dentipatch®	12.30	8.73	7.65	9.56	2.43	10.85	9.12	9.29	9.75	0.95

Table c12 Percentage swelling of lidocaine mucoadhesive patches at various %RH after 5 days

Formulas	53%RH					75%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	3.04	3.50	3.99	3.51	0.48	11.01	17.12	11.75	13.29	3.33
Lidocaine HCl	6.74	5.27	7.65	6.55	1.20	12.38	20.05	16.65	16.36	3.84
Dentipatch®	1.84	2.68	2.97	2.50	0.59	9.80	8.43	10.94	9.72	1.26
Formulas	84%RH					94%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	11.63	17.54	11.65	13.61	3.41	17.16	15.65	12.05	14.95	2.63
Lidocaine HCl	19.15	17.64	12.56	16.45	3.45	16.87	19.88	18.61	18.45	1.51
Dentipatch®	10.87	8.45	8.63	9.32	1.35	12.36	14.34	10.69	12.46	1.83

Table c13 Percentage swelling of lidocaine mucoadhesive patches at various %RH after 7 days

Formulas	53%RH					75%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	3.55	3.76	4.04	3.78	0.25	15.92	21.11	17.25	18.09	2.70
Lidocaine HCl	6.72	5.29	7.83	6.61	1.27	20.00	19.13	22.55	20.56	1.78
Dentipatch®	1.87	2.84	2.99	2.57	0.61	15.11	14.80	14.45	14.79	0.33
Formulas	84%RH					94%RH				
	No.1	No.2	No.3	**Mean**	**SD**	No.1	No.2	No.3	**Mean**	**SD**
Lidocaine base	20.73	18.02	17.51	18.75	1.73	20.49	22.84	20.05	21.13	1.5
Lidocaine HCl	25.81	18.53	16.21	20.18	5.01	24.19	25.46	17.34	22.33	4.37
Dentipatch®	14.16	18.52	18.16	16.95	2.42	18.34	20.09	19.31	19.25	0.88

Table c14 Detachment force of lidocaine mucoadhesive patches

Sample no.	Detachment force (N/cm^2)		
	Lidocaine base	Lidocaine HCl	Dentipatch®
No.1	9.185	5.369	8.361
No.2	8.145	6.148	8.154
No.3	7.542	5.189	8.745
No.4	9.268	5.478	8.459
No.5	9.147	4.985	8.214
No.6	9.259	6.478	8.235
No.7	8.457	5.179	8.147
No.8	8.698	6.258	8.254
No.9	7.952	6.745	7.986
No.10	8.547	5.423	8.221
Mean	8.620	5.725	8.278
SD	0.605	0.622	0.207

Table c15 Release of lidocaine through dialysis membrane

Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm^2)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**SD**
Saturated lidocaine base solution	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
	5	3.317	3.143	3.981	3.480	0.442	0.048	0.045	0.057	0.050	0.00
	10	6.146	5.238	6.495	5.960	0.649	0.088	0.075	0.093	0.085	0.00
	15	9.429	9.708	10.476	9.871	0.542	0.135	0.139	0.150	0.141	0.00
	20	12.571	12.502	12.711	12.595	0.107	0.180	0.179	0.182	0.180	0.00
	30	19.695	20.533	19.486	19.905	0.554	0.282	0.294	0.279	0.285	0.00
	45	29.892	30.032	29.822	29.915	0.107	0.428	0.430	0.427	0.428	0.00
	60	39.251	41.835	39.740	40.275	1.373	0.562	0.599	0.569	0.577	0.02
	100	61.251	61.460	61.041	61.251	0.210	0.877	0.880	0.874	0.877	0.00
	140	77.244	78.571	78.083	77.966	0.671	1.106	1.125	1.118	1.116	0.01
	180	96.870	97.708	94.635	96.404	1.589	1.387	1.399	1.355	1.380	0.02

Table c15 Release of lidocaine through dialysis membrane (cont.)

Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm^2)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**SI**
Saturated lidocaine HCl solution	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0
	5	3.143	3.660	3.122	3.308	0.305	16.432	14.739	15.925	15.699	0.8
	10	11.035	12.013	12.117	11.722	0.597	31.366	31.569	31.791	31.575	0.2
	15	17.328	16.804	18.243	17.458	0.728	45.835	44.097	47.116	45.683	1.5
	20	24.535	21.120	25.667	23.774	2.367	59.704	59.166	59.484	59.451	0.2
	30	32.281	34.278	33.042	33.200	1.008	71.461	70.581	71.288	71.110	0.4
	45	53.429	52.227	52.702	52.786	0.605	82.604	82.562	84.097	83.088	0.8
	60	62.536	60.916	60.937	61.463	0.930	91.101	92.101	90.241	91.148	0.9
	100	79.270	77.999	86.994	81.421	4.868	100.711	99.076	100.111	99.966	0.8
	140	87.036	91.663	93.999	90.899	3.544	106.917	109.447	107.852	108.072	1.2
	180	99.580	104.517	97.736	100.611	3.506	110.336	108.952	110.785	110.024	0.9
Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm^2)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**SI**
Lidocaine base patch	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0
	5	2.893	2.316	1.916	2.375	0.492	0.651	0.521	0.431	0.534	0.1
	10	6.027	4.840	6.284	5.717	0.770	1.356	1.089	1.414	1.286	0.1
	15	8.889	8.693	9.698	9.093	0.533	2.000	1.956	2.182	2.046	0.1
	20	10.311	9.747	11.409	10.489	0.845	2.320	2.193	2.567	2.360	0.1
	30	15.071	15.498	16.680	15.750	0.833	3.391	3.487	3.753	3.544	0.1
	45	20.844	20.036	22.138	21.006	1.060	4.690	4.508	4.981	4.726	0.2
	60	23.876	27.280	25.147	25.434	1.720	5.372	6.138	5.658	5.723	0.3
	100	33.929	35.711	33.902	34.514	1.037	7.634	8.035	7.628	7.766	0.2
	140	40.596	42.431	41.413	41.480	0.920	9.134	9.547	9.318	9.333	0.2
	180	51.324	53.142	51.049	51.839	1.137	11.548	11.957	11.486	11.664	0.2
Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm^2)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**SI**
Lidocaine HCl patch	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0
	5	4.022	3.987	4.107	4.039	0.062	0.905	0.897	0.924	0.909	0.0
	10	7.042	6.951	7.364	7.119	0.217	1.585	1.564	1.657	1.602	0.0
	15	9.631	9.644	9.916	9.730	0.161	2.167	2.170	2.231	2.189	0.0
	20	12.556	12.716	13.084	12.785	0.271	2.825	2.861	2.944	2.877	0.0
	30	17.778	18.889	18.698	18.455	0.594	4.000	4.250	4.207	4.152	0.1
	45	24.253	25.298	24.942	24.831	0.531	5.457	5.692	5.612	5.587	0.1
	60	29.831	30.909	30.850	30.530	0.606	6.712	6.955	6.941	6.869	0.1
	100	40.869	41.538	42.329	41.579	0.731	9.196	9.346	9.524	9.355	0.1
	140	47.920	49.471	49.698	49.030	0.968	10.782	11.131	11.182	11.032	0.2
	180	53.129	54.578	54.947	54.218	0.961	11.954	12.280	12.363	12.199	0.2
Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm^2)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**SI**
Dentipatch®	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0
	5	2.890	3.210	2.956	3.019	0.169	0.533	0.592	0.545	0.557	0.0
	10	5.792	5.992	5.732	5.839	0.136	1.068	1.105	1.057	1.077	0.0
	15	7.657	7.961	7.711	7.777	0.162	1.412	1.468	1.422	1.434	0.0
	20	9.794	10.076	9.870	9.913	0.146	1.806	1.858	1.820	1.828	0.0
	30	13.384	13.726	16.020	14.376	1.433	2.468	2.531	2.954	2.651	0.2
	45	18.910	19.447	20.634	19.664	0.882	3.487	3.586	3.805	3.626	0.1
	60	23.373	24.143	25.239	24.252	0.937	4.310	4.452	4.654	4.472	0.1
	100	35.645	36.291	37.603	36.513	0.998	6.573	6.692	6.934	6.733	0.1
	140	45.358	44.718	47.245	45.774	1.314	8.364	8.246	8.712	8.441	0.2
	180	55.803	51.643	53.205	53.550	2.101	10.290	9.523	9.811	9.875	0.3

Table c16 Release of lidocaine without dialysis membrane

Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm^2)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**SD**
Lidocaine base patch	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5	6.667	6.524	6.333	6.508	0.167	1.500	1.468	1.425	1.464	0.038
	10	7.556	7.547	10.356	8.486	1.619	1.700	1.698	2.330	1.909	0.364
	15	13.333	13.978	12.409	13.240	0.789	3.000	3.145	2.792	2.979	0.177
	20	16.347	17.707	16.680	16.911	0.709	3.678	3.984	3.753	3.805	0.159
	30	25.409	21.551	19.000	21.987	3.226	5.717	4.849	4.275	4.947	0.726
	45	26.778	30.991	30.093	29.287	2.219	6.025	6.973	6.771	6.590	0.499
	60	36.582	36.547	39.920	37.683	1.937	8.231	8.223	8.982	8.479	0.436
	100	52.196	52.533	53.271	52.667	0.550	11.744	11.820	11.986	11.850	0.124
	140	64.302	64.249	61.991	63.514	1.319	14.468	14.456	13.948	14.291	0.297
	180	71.269	76.511	75.342	74.374	2.752	16.036	17.215	16.952	16.734	0.619
Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm^2)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**SD**
Lidocaine HCl patch	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5	8.067	8.382	8.560	8.336	0.250	1.815	1.886	1.926	1.876	0.056
	10	11.413	12.688	11.711	11.937	0.667	2.568	2.855	2.635	2.686	0.150
	15	16.916	16.827	17.551	17.098	0.395	3.806	3.786	3.949	3.847	0.089
	20	20.284	21.669	20.301	20.752	0.795	4.564	4.876	4.568	4.669	0.179
	30	25.093	29.089	29.403	27.862	2.403	5.646	6.545	6.616	6.269	0.541
	45	39.087	40.695	43.782	41.188	2.386	8.795	9.156	9.851	9.267	0.537
	60	51.317	55.733	51.698	52.916	2.447	11.546	12.540	11.632	11.906	0.551
	100	70.484	68.227	66.916	68.542	1.805	15.859	15.351	15.056	15.422	0.406
	140	83.000	77.120	84.369	81.496	3.851	18.675	17.352	18.983	18.337	0.867
	180	100.644	95.845	95.842	97.444	2.772	22.645	21.565	21.565	21.925	0.624
Formula	Time (min)	% Cumulative amount					Cumulative amount (mg/cm^2)				
		No.1	No.2	No.3	**mean**	**SD**	No.1	No.2	No.3	**mean**	**SD**
Dentipatch®	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5	8.107	7.706	7.549	7.787	0.288	1.495	1.421	1.392	1.436	0.053
	10	13.080	12.608	12.364	12.684	0.364	2.412	2.325	2.280	2.339	0.067
	15	16.020	15.418	15.184	15.540	0.431	2.954	2.843	2.800	2.866	0.079
	20	20.705	20.201	19.799	20.235	0.454	3.818	3.725	3.651	3.731	0.084
	30	26.727	25.873	25.342	25.981	0.699	4.929	4.771	4.673	4.791	0.129
	45	34.225	33.341	32.538	33.368	0.844	6.311	6.148	6.000	6.153	0.156
	60	40.857	39.767	38.894	39.839	0.984	7.534	7.333	7.172	7.346	0.181
	100	54.517	54.149	53.563	54.076	0.481	10.053	9.985	9.877	9.972	0.089
	140	65.201	64.826	63.769	64.599	0.743	12.023	11.954	11.759	11.912	0.137
	180	77.739	76.381	76.781	76.967	0.697	14.335	14.085	14.159	14.193	0.129

Table c17 Content of lidocaine mucoadhesive patches in various conditions

Condition	Day	Sample	Content of drug (%)		
			Lidocaine base patch	Lidocaine HCl patch	Dentipatch®
25°C, 0%RH	0 days	1	102.71	103.54	100.86
		2	101.54	101.75	100.42
		3	103.58	101.22	99.84
		Mean	**102.61**	**102.17**	**100.37**
		SD	1.02	1.22	0.51
	after 30 days	1	102.34	99.56	98.24
		2	102.50	102.85	99.12
		3	103.20	100.41	100.76
		Mean	**102.68**	**100.94**	**99.37**
		SD	**0.46**	**1.71**	**1.28**
	after 60 days	1	101.39	100.17	99.32
		2	104.01	103.22	98.73
		3	101.38	99.96	100.45
		Mean	**102.26**	**101.12**	**99.50**
		SD	**1.52**	**1.82**	**0.87**
	after 90 days	1	101.53	99.28	99.67
		2	100.12	100.60	98.79
		3	99.65	98.53	99.98
		Mean	**100.43**	**99.47**	**99.48**
		SD	**0.98**	**1.05**	**0.62**
	after 120 days	1	100.05	101.18	99.19
		2	99.16	99.62	100.06
		3	99.58	99.22	100.18
		Mean	**99.60**	**100.01**	**99.81**
		SD	**0.45**	**1.04**	**0.54**
25°C, 75%RH	after 30 days	1	100.04	98.68	97.61
		2	101.18	96.53	97.45
		3	101.31	97.11	97.83
		Mean	**100.84**	**97.44**	**97.63**
		SD	**0.70**	**1.11**	**0.19**
	after 60 days	1	92.12	91.43	95.97
		2	91.98	94.00	91.81
		3	92.32	92.95	90.94
		Mean	**92.14**	**92.79**	**92.91**
		SD	**0.17**	**1.29**	**2.69**
	after 90 days	1	90.24	89.17	90.44
		2	92.15	89.72	89.72
		3	90.41	90.53	91.84
		Mean	**90.93**	**89.81**	**90.67**
		SD	**1.06**	**0.68**	**1.08**
	after 120 days	1	92.21	90.44	92.27
		2	92.89	89.26	90.84
		3	90.14	91.79	89.06
		Mean	**91.75**	**90.50**	**90.72**
		SD	**1.43**	**1.27**	**1.61**

Table c17 Content of lidocaine mucoadhesive patches in various conditions (cont.)

Condition	Day	Sample	Content of drug (%)		
			Lidocaine base	Lidocaine HCl	Dentipatch®
45°C, 75%RH	after 30 days	1	93.34	92.02	94.16
		2	91.01	90.15	95.15
		3	93.28	91.76	96.73
		Mean	**92.54**	**91.31**	**95.35**
		SD	**1.33**	**1.01**	**1.30**
	after 60 days	1	92.23	90.66	93.25
		2	92.49	92.14	92.14
		3	91.97	92.86	92.61
		Mean	**92.23**	**91.89**	**92.67**
		SD	**0.26**	**1.12**	**0.56**
	after 90 days	1	89.02	86.88	90.45
		2	87.16	85.92	89.51
		3	89.97	88.34	91.97
		Mean	**88.72**	**87.05**	**90.64**
		SD	**1.43**	**1.22**	**1.24**
	after 120 days	1	89.84	88.36	89.59
		2	90.56	86.32	90.56
		3	88.38	89.67	91.30
		Mean	**89.59**	**88.12**	**90.48**
		SD	**1.11**	**1.69**	**0.86**

APPENDIX D
Statistical Analysis

The statistical significance was calculated by Scheffe's equation

Table d1 An example of ANOVA table of detachment force between backing and drug free films

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	53.496	7	7.642	47.298	.000
Within Groups	2.585	16	.162		
Total	56.081	23			

Table d2 Multiple comparisons of the detachment force between backing and drug free films

(I) NUMBER	(J) NUMBER	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
dicalcium phosphate0.1	dicalcium phosphate0.2	-1.1073	.3282	.004	-1.8031	-.4116
	dicalcium phosphate0.3	-1.4143	.3282	.001	-2.1101	-.7186
	dicalcium phosphate0.4	2.1653	.3282	.000	1.4696	2.8611
	calcium carbonate0.1	-.4363	.3282	.202	-1.1321	.2594
	calcium carbonate0.2	-1.2413	.3282	.002	-1.9371	-.5456
	calcium carbonate0.3	-2.5663	.3282	.000	-3.2621	-1.8706
	calcium carbonate0.4	1.6413	.3282	.000	.9456	2.3371
dicalcium phosphate0.2	dicalcium phosphate0.1	1.1073	.3282	.004	.4116	1.8031
	dicalcium phosphate0.3	-.3070	.3282	.363	-1.0028	.3888
	dicalcium phosphate0.4	3.2727	.3282	.000	2.5769	3.9684
	calcium carbonate0.1	.6710	.3282	.058	-2.4766E-02	1.3668
	calcium carbonate0.2	-.1340	.3282	.688	-.8298	.5618
	calcium carbonate0.3	-1.4590	.3282	.000	-2.1548	-.7632
	calcium carbonate0.4	2.7487	.3282	.000	2.0529	3.4444
dicalcium phosphate0.3	dicalcium phosphate0.1	1.4143	.3282	.001	.7186	2.1101
	dicalcium phosphate0.2	.3070	.3282	.363	-.3888	1.0028
	dicalcium phosphate0.4	3.5797	.3282	.000	2.8839	4.2754
	calcium carbonate0.1	.9780	.3282	.009	.2822	1.6738
	calcium carbonate0.2	.1730	.3282	.605	-.5228	.8688
	calcium carbonate0.3	-1.1520	.3282	.003	-1.8478	-.4562
	calcium carbonate0.4	3.0557	.3282	.000	2.3599	3.7514
dicalcium phosphate0.4	dicalcium phosphate0.1	-2.1653	.3282	.000	-2.8611	-1.4696
	dicalcium phosphate0.2	-3.2727	.3282	.000	-3.9684	-2.5769
	dicalcium phosphate0.3	-3.5797	.3282	.000	-4.2754	-2.8839
	calcium carbonate0.1	-2.6017	.3282	.000	-3.2974	-1.9059
	calcium carbonate0.2	-3.4067	.3282	.000	-4.1024	-2.7109
	calcium carbonate0.3	-4.7317	.3282	.000	-5.4274	-4.0359
	calcium carbonate0.4	-.5240	.3282	.130	-1.2198	.1718

Table d2 Multiple comparisons of the detachment force between backing and drug free films (cont.)

calcium carbonate0.1	dicalcium phosphate0.1	.4363	.3282	.202	-.2594	1.1321
	dicalcium phosphate0.2	-.6710	.3282	.058	-1.3668	2.477E-02
	dicalcium phosphate0.3	-.9780	.3282	.009	-1.6738	-.2822
	dicalcium phosphate0.4	2.6017	.3282	.000	1.9059	3.2974
	calcium carbonate0.2	-.8050	.3282	.026	-1.5008	-.1092
	calcium carbonate0.3	-2.1300	.3282	.000	-2.8258	-1.4342
	calcium carbonate0.4	2.0777	.3282	.000	1.3819	2.7734
calcium carbonate0.2	dicalcium phosphate0.1	1.2413	.3282	.002	.5456	1.9371
	dicalcium phosphate0.2	.1340	.3282	.688	-.5618	.8298
	dicalcium phosphate0.3	-.1730	.3282	.605	-.8688	.5228
	dicalcium phosphate0.4	3.4067	.3282	.000	2.7109	4.1024
	calcium carbonate0.1	.8050	.3282	.026	.1092	1.5008
	calcium carbonate0.3	-1.3250	.3282	.001	-2.0208	-.6292
	calcium carbonate0.4	2.8827	.3282	.000	2.1869	3.5784
calcium carbonate0.3	dicalcium phosphate0.1	2.5663	.3282	.000	1.8706	3.2621
	dicalcium phosphate0.2	1.4590	.3282	.000	.7632	2.1548
	dicalcium phosphate0.3	1.1520	.3282	.003	.4562	1.8478
	dicalcium phosphate0.4	4.7317	.3282	.000	4.0359	5.4274
	calcium carbonate0.1	2.1300	.3282	.000	1.4342	2.8258
	calcium carbonate0.2	1.3250	.3282	.001	.6292	2.0208
	calcium carbonate0.4	4.2077	.3282	.000	3.5119	4.9034
calcium carbonate0.4	dicalcium phosphate0.1	-1.6413	.3282	.000	-2.3371	-.9456
	dicalcium phosphate0.2	-2.7487	.3282	.000	-3.4444	-2.0529
	dicalcium phosphate0.3	-3.0557	.3282	.000	-3.7514	-2.3599
	dicalcium phosphate0.4	.5240	.3282	.130	-.1718	1.2198
	calcium carbonate0.1	-2.0777	.3282	.000	-2.7734	-1.3819
	calcium carbonate0.2	-2.8827	.3282	.000	-3.5784	-2.1869
	calcium carbonate0.3	-4.2077	.3282	.000	-4.9034	-3.5119

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

Table d3 Multiple comparisons of the detachment force of mucoadhesive layer

(I) NUMBER	(J) NUMBER	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
carbopol 4 ml	carbopol 5 ml	-1.4843	.6162	.030	-2.8060	-.1626
	carbopol 6ml	-2.5930	.6162	.001	-3.9147	-1.2713
	carbopol 7 ml	-2.5913	.6162	.001	-3.9130	-1.2696
	carbopol 8 ml	-2.6293	.6162	.001	-3.9510	-1.3076
	carbopol 9 ml	-2.3363	.6162	.002	-3.6580	-1.0146
	carbopol 10 ml	-3.1897	.6162	.000	-4.5114	-1.8680
carbopol 5 ml	carbopol 4 ml	1.4843	.6162	.030	.1626	2.8060
	carbopol 6ml	-1.1087	.6162	.094	-2.4304	.2130
	carbopol 7 ml	-1.1070	.6162	.094	-2.4287	.2147
	carbopol 8 ml	-1.1450	.6162	.084	-2.4667	.1767
	carbopol 9 ml	-.8520	.6162	.188	-2.1737	.4697
	carbopol 10 ml	-1.7053	.6162	.015	-3.0270	-.3836
carbopol 6ml	carbopol 4 ml	2.5930	.6162	.001	1.2713	3.9147
	carbopol 5 ml	1.1087	.6162	.094	-.2130	2.4304
	carbopol 7 ml	1.667E-03	.6162	.998	-1.3200	1.3234
	carbopol 8 ml	-3.6333E-02	.6162	.954	-1.3580	1.2854
	carbopol 9 ml	.2567	.6162	.683	-1.0650	1.5784
	carbopol 10 ml	-.5967	.6162	.349	-1.9184	.7250
carbopol 7 ml	carbopol 4 ml	2.5913	.6162	.001	1.2696	3.9130
	carbopol 5 ml	1.1070	.6162	.094	-.2147	2.4287
	carbopol 6ml	-1.6667E-03	.6162	.998	-1.3234	1.3200
	carbopol 8 ml	-3.8000E-02	.6162	.952	-1.3597	1.2837
	carbopol 9 ml	.2550	.6162	.685	-1.0667	1.5767
	carbopol 10 ml	-.5983	.6162	.348	-1.9200	.7234
carbopol 8 ml	carbopol 4 ml	2.6293	.6162	.001	1.3076	3.9510
	carbopol 5 ml	1.1450	.6162	.084	-.1767	2.4667
	carbopol 6ml	3.633E-02	.6162	.954	-1.2854	1.3580
	carbopol 7 ml	3.800E-02	.6162	.952	-1.2837	1.3597
	carbopol 9 ml	.2930	.6162	.642	-1.0287	1.6147
	carbopol 10 ml	-.5603	.6162	.379	-1.8820	.7614
carbopol 9 ml	carbopol 4 ml	2.3363	.6162	.002	1.0146	3.6580
	carbopol 5 ml	.8520	.6162	.188	-.4697	2.1737
	carbopol 6ml	-.2567	.6162	.683	-1.5784	1.0650
	carbopol 7 ml	-.2550	.6162	.685	-1.5767	1.0667
	carbopol 8 ml	-.2930	.6162	.642	-1.6147	1.0287
	carbopol 10 ml	-.8533	.6162	.188	-2.1750	.4684
carbopol 10 ml	carbopol 4 ml	3.1897	.6162	.000	1.8680	4.5114
	carbopol 5 ml	1.7053	.6162	.015	.3836	3.0270
	carbopol 6ml	.5967	.6162	.349	-.7250	1.9184
	carbopol 7 ml	.5983	.6162	.348	-.7234	1.9200
	carbopol 8 ml	.5603	.6162	.379	-.7614	1.8820
	carbopol 9 ml	.8533	.6162	.188	-.4684	2.1750

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

Table d4 Multiple comparisons of the detachment force of mucoadhesive patches

(I) NUMBER	(J) NUMBER	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Lidocaine base patch	Lidocaine HCl patch	2.8948	.2304	.000	2.4221	3.3675
	Dentipatch	.3424	.2304	.149	-.1303	.8151
Lidocaine HCl patch	Lidocaine base patch	-2.8948	.2304	.000	-3.3675	-2.4221
	Dentipatch	-2.5524	.2304	.000	-3.0251	-2.0797
Dentipatch	Lidocaine base patch	-.3424	.2304	.149	-.8151	.1303
	Lidocaine HCl patch	2.5524	.2304	.000	2.0797	3.0251

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

Table d5 Multiple comparisons of percent strain at auto break of mucoadhesive films

(I) NUMBER	(J) NUMBER	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
E15B 1:0.5	E15B 1:1	-2.6133	3.2815	.429	-9.1896	3.9630
	E15H 1:0.25	.4850	3.2815	.883	-6.0913	7.0613
	E15H 1:0.5	-163.4433	3.2815	.000	-170.0196	-156.8670
	E15H 1:1	-244.9833	3.2815	.000	-251.5596	-238.4070
	CS1H 1:0.25	-49.3317	3.2815	.000	-55.9080	-42.7554
	CS1H 1:0.5	-65.1367	3.2815	.000	-71.7130	-58.5604
	CS1H 1:1	-70.2933	3.2815	.000	-76.8696	-63.7170
	CS2H 1:0.25	-61.1583	3.2815	.000	-67.7346	-54.5820
	CS2H 1:0.5	-69.9433	3.2815	.000	-76.5196	-63.3670
	CS2H 1:1	-79.8600	3.2815	.000	-86.4363	-73.2837
E15B 1:1	E15B 1:0.5	2.6133	3.2815	.429	-3.9630	9.1896
	E15H 1:0.25	3.0983	3.2815	.349	-3.4780	9.6746
	E15H 1:0.5	-160.8300	3.2815	.000	-167.4063	-154.2537
	E15H 1:1	-242.3700	3.2815	.000	-248.9463	-235.7937
	CS1H 1:0.25	-46.7183	3.2815	.000	-53.2946	-40.1420
	CS1H 1:0.5	-62.5233	3.2815	.000	-69.0996	-55.9470
	CS1H 1:1	-67.6800	3.2815	.000	-74.2563	-61.1037
	CS2H 1:0.25	-58.5450	3.2815	.000	-65.1213	-51.9687
	CS2H 1:0.5	-67.3300	3.2815	.000	-73.9063	-60.7537
	CS2H 1:1	-77.2467	3.2815	.000	-83.8230	-70.6704
E15H 1:0.25	E15B 1:0.5	-.4850	3.2815	.883	-7.0613	6.0913
	E15B 1:1	-3.0983	3.2815	.349	-9.6746	3.4780
	E15H 1:0.5	-163.9283	3.2815	.000	-170.5046	-157.3520
	E15H 1:1	-245.4683	3.2815	.000	-252.0446	-238.8920
	CS1H 1:0.25	-49.8167	3.2815	.000	-56.3930	-43.2404
	CS1H 1:0.5	-65.6217	3.2815	.000	-72.1980	-59.0454
	CS1H 1:1	-70.7783	3.2815	.000	-77.3546	-64.2020
	CS2H 1:0.25	-61.6433	3.2815	.000	-68.2196	-55.0670
	CS2H 1:0.5	-70.4283	3.2815	.000	-77.0046	-63.8520
	CS2H 1:1	-80.3450	3.2815	.000	-86.9213	-73.7687
E15H 1:0.5	E15B 1:0.5	163.4433	3.2815	.000	156.8670	170.0196
	E15B 1:1	160.8300	3.2815	.000	154.2537	167.4063
	E15H 1:0.25	163.9283	3.2815	.000	157.3520	170.5046
	E15H 1:1	-81.5400	3.2815	.000	-88.1163	-74.9637
	CS1H 1:0.25	114.1117	3.2815	.000	107.5354	120.6880
	CS1H 1:0.5	98.3067	3.2815	.000	91.7304	104.8830
	CS1H 1:1	93.1500	3.2815	.000	86.5737	99.7263
	CS2H 1:0.25	102.2850	3.2815	.000	95.7087	108.8613
	CS2H 1:0.5	93.5000	3.2815	.000	86.9237	100.0763
	CS2H 1:1	83.5833	3.2815	.000	77.0070	90.1596

Table d5 Mu ltiple comparisons of percent strain at auto break of mucoadhesive films (Cont.)

E15H 1:1	E15B 1:0.5	244.9833	3.2815	.000	238.4070	251.5596
	E15B 1:1	242.3700	3.2815	.000	235.7937	248.9463
	E15H 1:0.25	245.4683	3.2815	.000	238.8920	252.0446
	E15H 1:0.5	81.5400	3.2815	.000	74.9637	88.1163
	CS1H 1:0.25	195.6517	3.2815	.000	189.0754	202.2280
	CS1H 1:0.5	179.8467	3.2815	.000	173.2704	186.4230
	CS1H 1:1	174.6900	3.2815	.000	168.1137	181.2663
	CS2H 1:0.25	183.8250	3.2815	.000	177.2487	190.4013
	CS2H 1:0.5	175.0400	3.2815	.000	168.4637	181.6163
	CS2H 1:1	165.1233	3.2815	.000	158.5470	171.6996
CS1H 1:0.25	E15B 1:0.5	49.3317	3.2815	.000	42.7554	55.9080
	E15B 1:1	46.7183	3.2815	.000	40.1420	53.2946
	E15H 1:0.25	49.8167	3.2815	.000	43.2404	56.3930
	E15H 1:0.5	-114.1117	3.2815	.000	-120.6880	-107.5354
	E15H 1:1	-195.6517	3.2815	.000	-202.2280	-189.0754
	CS1H 1:0.5	-15.8050	3.2815	.000	-22.3813	-9.2287
	CS1H 1:1	-20.9617	3.2815	.000	-27.5380	-14.3854
	CS2H 1:0.25	-11.8267	3.2815	.001	-18.4030	-5.2504
	CS2H 1:0.5	-20.6117	3.2815	.000	-27.1880	-14.0354
	CS2H 1:1	-30.5283	3.2815	.000	-37.1046	-23.9520
CS1H 1:0.5	E15B 1:0.5	65.1367	3.2815	.000	58.5604	71.7130
	E15B 1:1	62.5233	3.2815	.000	55.9470	69.0996
	E15H 1:0.25	65.6217	3.2815	.000	59.0454	72.1980
	E15H 1:0.5	-98.3067	3.2815	.000	-104.8830	-91.7304
	E15H 1:1	-179.8467	3.2815	.000	-186.4230	-173.2704
	CS1H 1:0.25	15.8050	3.2815	.000	9.2287	22.3813
	CS1H 1:1	-5.1567	3.2815	.122	-11.7330	1.4196
	CS2H 1:0.25	3.9783	3.2815	.231	-2.5980	10.5546
	CS2H 1:0.5	-4.8067	3.2815	.149	-11.3830	1.7696
	CS2H 1:1	-14.7233	3.2815	.000	-21.2996	-8.1470
CS1H 1:1	E15B 1:0.5	70.2933	3.2815	.000	63.7170	76.8696
	E15B 1:1	67.6800	3.2815	.000	61.1037	74.2563
	E15H 1:0.25	70.7783	3.2815	.000	64.2020	77.3546
	E15H 1:0.5	-93.1500	3.2815	.000	-99.7263	-86.5737
	E15H 1:1	-174.6900	3.2815	.000	-181.2663	-168.1137
	CS1H 1:0.25	20.9617	3.2815	.000	14.3854	27.5380
	CS1H 1:0.5	5.1567	3.2815	.122	-1.4196	11.7330
	CS2H 1:0.25	9.1350	3.2815	.007	2.5587	15.7113
	CS2H 1:0.5	.3500	3.2815	.915	-6.2263	6.9263
	CS2H 1:1	-9.5667	3.2815	.005	-16.1430	-2.9904
CS2H 1:0.25	E15B 1:0.5	61.1583	3.2815	.000	54.5820	67.7346
	E15B 1:1	58.5450	3.2815	.000	51.9687	65.1213
	E15H 1:0.25	61.6433	3.2815	.000	55.0670	68.2196
	E15H 1:0.5	-102.2850	3.2815	.000	-108.8613	-95.7087
	E15H 1:1	-183.8250	3.2815	.000	-190.4013	-177.2487
	CS1H 1:0.25	11.8267	3.2815	.001	5.2504	18.4030
	CS1H 1:0.5	-3.9783	3.2815	.231	-10.5546	2.5980
	CS1H 1:1	-9.1350	3.2815	.007	-15.7113	-2.5587
	CS2H 1:0.5	-8.7850	3.2815	.010	-15.3613	-2.2087
	CS2H 1:1	-18.7017	3.2815	.000	-25.2780	-12.1254

Table d5 Mu ltiple comparisons of percent strain at auto break of mucoadhesive films (Cont.)

CS2H 1:0.5	E15B 1:0.5	69.9433	3.2815	.000	63.3670	76.5196
	E15B 1:1	67.3300	3.2815	.000	60.7537	73.9063
	E15H 1:0.25	70.4283	3.2815	.000	63.8520	77.0046
	E15H 1:0.5	-93.5000	3.2815	.000	-100.0763	-86.9237
	E15H 1:1	-175.0400	3.2815	.000	-181.6163	-168.4637
	CS1H 1:0.25	20.6117	3.2815	.000	14.0354	27.1880
	CS1H 1:0.5	4.8067	3.2815	.149	-1.7696	11.3830
	CS1H 1:1	-.3500	3.2815	.915	-6.9263	6.2263
	CS2H 1:0.25	8.7850	3.2815	.010	2.2087	15.3613
	CS2H 1:1	-9.9167	3.2815	.004	-16.4930	-3.3404
CS2H 1:1	E15B 1:0.5	79.8600	3.2815	.000	73.2837	86.4363
	E15B 1:1	77.2467	3.2815	.000	70.6704	83.8230
	E15H 1:0.25	80.3450	3.2815	.000	73.7687	86.9213
	E15H 1:0.5	-83.5833	3.2815	.000	-90.1596	-77.0070
	E15H 1:1	-165.1233	3.2815	.000	-171.6996	-158.5470
	CS1H 1:0.25	30.5283	3.2815	.000	23.9520	37.1046
	CS1H 1:0.5	14.7233	3.2815	.000	8.1470	21.2996
	CS1H 1:1	9.5667	3.2815	.005	2.9904	16.1430
	CS2H 1:0.25	18.7017	3.2815	.000	12.1254	25.2780
	CS2H 1:0.5	9.9167	3.2815	.004	3.3404	16.4930

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

Table d6 Multiple comparisons of Young's modulus of mucoadhesive films

(I) NUMBER	(J) NUMBER	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
E15B 1:0.5	E15B 1:1	-1.5467	.3478	.000	-2.2437	-.8496
	E15H 1:0.25	-1.7967	.3478	.000	-2.4937	-1.0996
	E15H 1:0.5	3.9183	.3478	.000	3.2213	4.6154
	E15H 1:1	5.7383	.3478	.000	5.0413	6.4354
	CS1H 1:0.25	5.7917	.3478	.000	5.0946	6.4887
	CS1H 1:0.5	6.0167	.3478	.000	5.3196	6.7137
	CS1H 1:1	5.9883	.3478	.000	5.2913	6.6854
	CS2H 1:0.25	5.9983	.3478	.000	5.3013	6.6954
	CS2H 1:0.5	5.9867	.3478	.000	5.2896	6.6837
	CS2H 1:1	5.9700	.3478	.000	5.2729	6.6671
E15B 1:1	E15B 1:0.5	1.5467	.3478	.000	.8496	2.2437
	E15H 1:0.25	-.2500	.3478	.475	-.9471	.4471
	E15H 1:0.5	5.4650	.3478	.000	4.7679	6.1621
	E15H 1:1	7.2850	.3478	.000	6.5879	7.9821
	CS1H 1:0.25	7.3383	.3478	.000	6.6413	8.0354
	CS1H 1:0.5	7.5633	.3478	.000	6.8663	8.2604
	CS1H 1:1	7.5350	.3478	.000	6.8379	8.2321
	CS2H 1:0.25	7.5450	.3478	.000	6.8479	8.2421
	CS2H 1:0.5	7.5333	.3478	.000	6.8363	8.2304
	CS2H 1:1	7.5167	.3478	.000	6.8196	8.2137

Table d6 Multiple comparisons of Young's modulus of mucoadhesive films (Cont.)

E15H 1:0.25	E15B 1:0.5	1.7967	.3478	.000	1.0996	2.4937
	E15B 1:1	.2500	.3478	.475	-.4471	.9471
	E15H 1:0.5	5.7150	.3478	.000	5.0179	6.4121
	E15H 1:1	7.5350	.3478	.000	6.8379	8.2321
	CS1H 1:0.25	7.5883	.3478	.000	6.8913	8.2854
	CS1H 1:0.5	7.8133	.3478	.000	7.1163	8.5104
	CS1H 1:1	7.7850	.3478	.000	7.0879	8.4821
	CS2H 1:0.25	7.7950	.3478	.000	7.0979	8.4921
	CS2H 1:0.5	7.7833	.3478	.000	7.0863	8.4804
	CS2H 1:1	7.7667	.3478	.000	7.0696	8.4637
E15H 1:0.5	E15B 1:0.5	-3.9183	.3478	.000	-4.6154	-3.2213
	E15B 1:1	-5.4650	.3478	.000	-6.1621	-4.7679
	E15H 1:0.25	-5.7150	.3478	.000	-6.4121	-5.0179
	E15H 1:1	1.8200	.3478	.000	1.1229	2.5171
	CS1H 1:0.25	1.8733	.3478	.000	1.1763	2.5704
	CS1H 1:0.5	2.0983	.3478	.000	1.4013	2.7954
	CS1H 1:1	2.0700	.3478	.000	1.3729	2.7671
	CS2H 1:0.25	2.0800	.3478	.000	1.3829	2.7771
	CS2H 1:0.5	2.0683	.3478	.000	1.3713	2.7654
	CS2H 1:1	2.0517	.3478	.000	1.3546	2.7487
E15H 1:1	E15B 1:0.5	-5.7383	.3478	.000	-6.4354	-5.0413
	E15B 1:1	-7.2850	.3478	.000	-7.9821	-6.5879
	E15H 1:0.25	-7.5350	.3478	.000	-8.2321	-6.8379
	E15H 1:0.5	-1.8200	.3478	.000	-2.5171	-1.1229
	CS1H 1:0.25	5.333E-02	.3478	.879	-.6437	.7504
	CS1H 1:0.5	.2783	.3478	.427	-.4187	.9754
	CS1H 1:1	.2500	.3478	.475	-.4471	.9471
	CS2H 1:0.25	.2600	.3478	.458	-.4371	.9571
	CS2H 1:0.5	.2483	.3478	.478	-.4487	.9454
	CS2H 1:1	.2317	.3478	.508	-.4654	.9287
CS1H 1:0.25	E15B 1:0.5	-5.7917	.3478	.000	-6.4887	-5.0946
	E15B 1:1	-7.3383	.3478	.000	-8.0354	-6.6413
	E15H 1:0.25	-7.5883	.3478	.000	-8.2854	-6.8913
	E15H 1:0.5	-1.8733	.3478	.000	-2.5704	-1.1763
	E15H 1:1	-5.3333E-02	.3478	.879	-.7504	.6437
	CS1H 1:0.5	.2250	.3478	.520	-.4721	.9221
	CS1H 1:1	.1967	.3478	.574	-.5004	.8937
	CS2H 1:0.25	.2067	.3478	.555	-.4904	.9037
	CS2H 1:0.5	.1950	.3478	.577	-.5021	.8921
	CS2H 1:1	.1783	.3478	.610	-.5187	.8754
CS1H 1:0.5	E15B 1:0.5	-6.0167	.3478	.000	-6.7137	-5.3196
	E15B 1:1	-7.5633	.3478	.000	-8.2604	-6.8663
	E15H 1:0.25	-7.8133	.3478	.000	-8.5104	-7.1163
	E15H 1:0.5	-2.0983	.3478	.000	-2.7954	-1.4013
	E15H 1:1	-.2783	.3478	.427	-.9754	.4187
	CS1H 1:0.25	-.2250	.3478	.520	-.9221	.4721
	CS1H 1:1	-2.8333E-02	.3478	.935	-.7254	.6687
	CS2H 1:0.25	-1.8333E-02	.3478	.958	-.7154	.6787
	CS2H 1:0.5	-3.0000E-02	.3478	.932	-.7271	.6671
	CS2H 1:1	-4.6667E-02	.3478	.894	-.7437	.6504

Table d6 Multiple comparisons of Young's modulus of mucoadhesive films (Cont.)

CS1H 1:1	E15B 1:0.5	-5.9883	.3478	.000	-6.6854	-5.2913
	E15B 1:1	-7.5350	.3478	.000	-8.2321	-6.8379
	E15H 1:0.25	-7.7850	.3478	.000	-8.4821	-7.0879
	E15H 1:0.5	-2.0700	.3478	.000	-2.7671	-1.3729
	E15H 1:1	-.2500	.3478	.475	-.9471	.4471
	CS1H 1:0.25	-.1967	.3478	.574	-.8937	.5004
	CS1H 1:0.5	2.833E-02	.3478	.935	-.6687	.7254
	CS2H 1:0.25	1.000E-02	.3478	.977	-.6871	.7071
	CS2H 1:0.5	-1.6667E-03	.3478	.996	-.6987	.6954
	CS2H 1:1	-1.8333E-02	.3478	.958	-.7154	.6787
CS2H 1:0.25	E15B 1:0.5	-5.9983	.3478	.000	-6.6954	-5.3013
	E15B 1:1	-7.5450	.3478	.000	-8.2421	-6.8479
	E15H 1:0.25	-7.7950	.3478	.000	-8.4921	-7.0979
	E15H 1:0.5	-2.0800	.3478	.000	-2.7771	-1.3829
	E15H 1:1	-.2600	.3478	.458	-.9571	.4371
	CS1H 1:0.25	-.2067	.3478	.555	-.9037	.4904
	CS1H 1:0.5	1.833E-02	.3478	.958	-.6787	.7154
	CS1H 1:1	-1.0000E-02	.3478	.977	-.7071	.6871
	CS2H 1:0.5	-1.1667E-02	.3478	.973	-.7087	.6854
	CS2H 1:1	-2.8333E-02	.3478	.935	-.7254	.6687
CS2H 1:0.5	E15B 1:0.5	-5.9867	.3478	.000	-6.6837	-5.2896
	E15B 1:1	-7.5333	.3478	.000	-8.2304	-6.8363
	E15H 1:0.25	-7.7833	.3478	.000	-8.4804	-7.0863
	E15H 1:0.5	-2.0683	.3478	.000	-2.7654	-1.3713
	E15H 1:1	-.2483	.3478	.478	-.9454	.4487
	CS1H 1:0.25	-.1950	.3478	.577	-.8921	.5021
	CS1H 1:0.5	3.000E-02	.3478	.932	-.6671	.7271
	CS1H 1:1	1.667E-03	.3478	.996	-.6954	.6987
	CS2H 1:0.25	1.167E-02	.3478	.973	-.6854	.7087
	CS2H 1:1	-1.6667E-02	.3478	.962	-.7137	.6804
CS2H 1:1	E15B 1:0.5	-5.9700	.3478	.000	-6.6671	-5.2729
	E15B 1:1	-7.5167	.3478	.000	-8.2137	-6.8196
	E15H 1:0.25	-7.7667	.3478	.000	-8.4637	-7.0696
	E15H 1:0.5	-2.0517	.3478	.000	-2.7487	-1.3546
	E15H 1:1	-.2317	.3478	.508	-.9287	.4654
	CS1H 1:0.25	-.1783	.3478	.610	-.8754	.5187
	CS1H 1:0.5	4.667E-02	.3478	.894	-.6504	.7437
	CS1H 1:1	1.833E-02	.3478	.958	-.6787	.7154
	CS2H 1:0.25	2.833E-02	.3478	.935	-.6687	.7254
	CS2H 1:0.5	1.667E-02	.3478	.962	-.6804	.7137

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

Table d7 Multiple comparisons of tensile strength of mucoadhesive films

(I) NUMBER	(J) NUMBER	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
E15B 1:0.5	E15B 1:1	-2.9833	2.4409	.227	-7.8749	1.9083
	E15H 1:0.25	4.3333	2.4409	.081	-.5583	9.2249
	E15H 1:0.5	-71.1067	2.4409	.000	-75.9983	-66.2151
	E15H 1:1	-47.2167	2.4409	.000	-52.1083	-42.3251
	CS1H 1:0.25	3.6667	2.4409	.139	-1.2249	8.5583
	CS1H 1:0.5	-3.0500	2.4409	.217	-7.9416	1.8416
	CS1H 1:1	3.5833	2.4409	.148	-1.3083	8.4749
	CS2H 1:0.25	-15.4833	2.4409	.000	-20.3749	-10.5917
	CS2H 1:0.5	-17.3000	2.4409	.000	-22.1916	-12.4084
	CS2H 1:1	-14.3750	2.4409	.000	-19.2666	-9.4834
E15B 1:1	E15B 1:0.5	2.9833	2.4409	.227	-1.9083	7.8749
	E15H 1:0.25	7.3167	2.4409	.004	2.4251	12.2083
	E15H 1:0.5	-68.1233	2.4409	.000	-73.0149	-63.2317
	E15H 1:1	-44.2333	2.4409	.000	-49.1249	-39.3417
	CS1H 1:0.25	6.6500	2.4409	.009	1.7584	11.5416
	CS1H 1:0.5	-6.6667E-02	2.4409	.978	-4.9583	4.8249
	CS1H 1:1	6.5667	2.4409	.009	1.6751	11.4583
	CS2H 1:0.25	-12.5000	2.4409	.000	-17.3916	-7.6084
	CS2H 1:0.5	-14.3167	2.4409	.000	-19.2083	-9.4251
	CS2H 1:1	-11.3917	2.4409	.000	-16.2833	-6.5001
E15H 1:0.25	E15B 1:0.5	-4.3333	2.4409	.081	-9.2249	.5583
	E15B 1:1	-7.3167	2.4409	.004	-12.2083	-2.4251
	E15H 1:0.5	-75.4400	2.4409	.000	-80.3316	-70.5484
	E15H 1:1	-51.5500	2.4409	.000	-56.4416	-46.6584
	CS1H 1:0.25	-.6667	2.4409	.786	-5.5583	4.2249
	CS1H 1:0.5	-7.3833	2.4409	.004	-12.2749	-2.4917
	CS1H 1:1	-.7500	2.4409	.760	-5.6416	4.1416
	CS2H 1:0.25	-19.8167	2.4409	.000	-24.7083	-14.9251
	CS2H 1:0.5	-21.6333	2.4409	.000	-26.5249	-16.7417
	CS2H 1:1	-18.7083	2.4409	.000	-23.5999	-13.8167
E15H 1:0.5	E15B 1:0.5	71.1067	2.4409	.000	66.2151	75.9983
	E15B 1:1	68.1233	2.4409	.000	63.2317	73.0149
	E15H 1:0.25	75.4400	2.4409	.000	70.5484	80.3316
	E15H 1:1	23.8900	2.4409	.000	18.9984	28.7816
	CS1H 1:0.25	74.7733	2.4409	.000	69.8817	79.6649
	CS1H 1:0.5	68.0567	2.4409	.000	63.1651	72.9483
	CS1H 1:1	74.6900	2.4409	.000	69.7984	79.5816
	CS2H 1:0.25	55.6233	2.4409	.000	50.7317	60.5149
	CS2H 1:0.5	53.8067	2.4409	.000	48.9151	58.6983
	CS2H 1:1	56.7317	2.4409	.000	51.8401	61.6233
E15H 1:1	E15B 1:0.5	47.2167	2.4409	.000	42.3251	52.1083
	E15B 1:1	44.2333	2.4409	.000	39.3417	49.1249
	E15H 1:0.25	51.5500	2.4409	.000	46.6584	56.4416
	E15H 1:0.5	-23.8900	2.4409	.000	-28.7816	-18.9984
	CS1H 1:0.25	50.8833	2.4409	.000	45.9917	55.7749
	CS1H 1:0.5	44.1667	2.4409	.000	39.2751	49.0583
	CS1H 1:1	50.8000	2.4409	.000	45.9084	55.6916
	CS2H 1:0.25	31.7333	2.4409	.000	26.8417	36.6249
	CS2H 1:0.5	29.9167	2.4409	.000	25.0251	34.8083
	CS2H 1:1	32.8417	2.4409	.000	27.9501	37.7333

Table d7 Multiple comparisons of tensile strength of mucoadhesive films (Cont.)

CS1H 1:0.25	E15B 1:0.5	-3.6667	2.4409	.139	-8.5583	1.2249
	E15B 1:1	-6.6500	2.4409	.009	-11.5416	-1.7584
	E15H 1:0.25	.6667	2.4409	.786	-4.2249	5.5583
	E15H 1:0.5	-74.7733	2.4409	.000	-79.6649	-69.8817
	E15H 1:1	-50.8833	2.4409	.000	-55.7749	-45.9917
	CS1H 1:0.5	-6.7167	2.4409	.008	-11.6083	-1.8251
	CS1H 1:1	-8.3333E-02	2.4409	.973	-4.9749	4.8083
	CS2H 1:0.25	-19.1500	2.4409	.000	-24.0416	-14.2584
	CS2H 1:0.5	-20.9667	2.4409	.000	-25.8583	-16.0751
	CS2H 1:1	-18.0417	2.4409	.000	-22.9333	-13.1501
CS1H 1:0.5	E15B 1:0.5	3.0500	2.4409	.217	-1.8416	7.9416
	E15B 1:1	6.667E-02	2.4409	.978	-4.8249	4.9583
	E15H 1:0.25	7.3833	2.4409	.004	2.4917	12.2749
	E15H 1:0.5	-68.0567	2.4409	.000	-72.9483	-63.1651
	E15H 1:1	-44.1667	2.4409	.000	-49.0583	-39.2751
	CS1H 1:0.25	6.7167	2.4409	.008	1.8251	11.6083
	CS1H 1:1	6.6333	2.4409	.009	1.7417	11.5249
	CS2H 1:0.25	-12.4333	2.4409	.000	-17.3249	-7.5417
	CS2H 1:0.5	-14.2500	2.4409	.000	-19.1416	-9.3584
	CS2H 1:1	-11.3250	2.4409	.000	-16.2166	-6.4334
CS1H 1:1	E15B 1:0.5	-3.5833	2.4409	.148	-8.4749	1.3083
	E15B 1:1	-6.5667	2.4409	.009	-11.4583	-1.6751
	E15H 1:0.25	.7500	2.4409	.760	-4.1416	5.6416
	E15H 1:0.5	-74.6900	2.4409	.000	-79.5816	-69.7984
	E15H 1:1	-50.8000	2.4409	.000	-55.6916	-45.9084
	CS1H 1:0.25	8.333E-02	2.4409	.973	-4.8083	4.9749
	CS1H 1:0.5	-6.6333	2.4409	.009	-11.5249	-1.7417
	CS2H 1:0.25	-19.0667	2.4409	.000	-23.9583	-14.1751
	CS2H 1:0.5	-20.8833	2.4409	.000	-25.7749	-15.9917
	CS2H 1:1	-17.9583	2.4409	.000	-22.8499	-13.0667
CS2H 1:0.25	E15B 1:0.5	15.4833	2.4409	.000	10.5917	20.3749
	E15B 1:1	12.5000	2.4409	.000	7.6084	17.3916
	E15H 1:0.25	19.8167	2.4409	.000	14.9251	24.7083
	E15H 1:0.5	-55.6233	2.4409	.000	-60.5149	-50.7317
	E15H 1:1	-31.7333	2.4409	.000	-36.6249	-26.8417
	CS1H 1:0.25	19.1500	2.4409	.000	14.2584	24.0416
	CS1H 1:0.5	12.4333	2.4409	.000	7.5417	17.3249
	CS1H 1:1	19.0667	2.4409	.000	14.1751	23.9583
	CS2H 1:0.5	-1.8167	2.4409	.460	-6.7083	3.0749
	CS2H 1:1	1.1083	2.4409	.652	-3.7833	5.9999
CS2H 1:0.5	E15B 1:0.5	17.3000	2.4409	.000	12.4084	22.1916
	E15B 1:1	14.3167	2.4409	.000	9.4251	19.2083
	E15H 1:0.25	21.6333	2.4409	.000	16.7417	26.5249
	E15H 1:0.5	-53.8067	2.4409	.000	-58.6983	-48.9151
	E15H 1:1	-29.9167	2.4409	.000	-34.8083	-25.0251
	CS1H 1:0.25	20.9667	2.4409	.000	16.0751	25.8583
	CS1H 1:0.5	14.2500	2.4409	.000	9.3584	19.1416
	CS1H 1:1	20.8833	2.4409	.000	15.9917	25.7749
	CS2H 1:0.25	1.8167	2.4409	.460	-3.0749	6.7083
	CS2H 1:1	2.9250	2.4409	.236	-1.9666	7.8166

Table d7 Multiple comparisons of tensile strength of mucoadhesive films (Cont.)

CS2H 1:1	E15B 1:0.5	14.3750	2.4409	.000	9.4834	19.2666
	E15B 1:1	11.3917	2.4409	.000	6.5001	16.2833
	E15H 1:0.25	18.7083	2.4409	.000	13.8167	23.5999
	E15H 1:0.5	-56.7317	2.4409	.000	-61.6233	-51.8401
	E15H 1:1	-32.8417	2.4409	.000	-37.7333	-27.9501
	CS1H 1:0.25	18.0417	2.4409	.000	13.1501	22.9333
	CS1H 1:0.5	11.3250	2.4409	.000	6.4334	16.2166
	CS1H 1:1	17.9583	2.4409	.000	13.0667	22.8499
	CS2H 1:0.25	-1.1083	2.4409	.652	-5.9999	3.7833
	CS2H 1:0.5	-2.9250	2.4409	.236	-7.8166	1.9666

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

VITAE

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