Appendix 1 Effect of methanol concentration on extraction efficiency

A. LEV

Methanol concentration (%)	Peak height (cm)	Average (cm)	Recovery (%)	RSD (%)
1	5.4 5.5 5.4 5.4 5.4	5.42	71.56	0.83
10	4.9 4.8 4.8 4.8 4.4	4.74	60.91	4.11
20	2.1 2.0 2.3 2.1 2.2	2.14	20.20	5.33

Peak height of 4.12 μg mL^{-1} LEV standard solution is 7.55 cm

B. ETE

Methanol concentration (%)	Peak height (cm)	Average (cm)	Recovery (%)	RSD (%)
1	3.1 3.1 3.3 3.3 3.4	3.2	72	4.14
10	2.5 2.1 2.1 2.0 2.5	2.2	49.80	10.75
20	0.6 0.5 0.5 0.6 0.5	0.5	11.98	10.14

Peak height of 10 μg mL^{-1} ETE standard solution is 4.45 cm

Appendix 2 Calibration curve

A. LEV

(i) Standard method

Concentration (μg mL^{-1})	Peak Height (cm)	Average (cm)
	3.8	
2.06	3.9	3.83
	3.8	
	5.8	
3.09	5.9	5.93
	6.1	
	7.2	
4.12	7.2	7.17
	7.1	
	12.5	
7.21	11.9	12.03
	11.7	
	16.9	
10.30	16.8	16.77
	16.6	

(ii) Coupled with CMC

Concentration (ng mL^{-1})	Peak Height (cm)	Average (cm)
	1.60	
10.3	1.50	1.53
	1.50	
	2.20	
20.60	1.90	2.05
	2.20	
	1.90	
30.90	2.90	
	3.70	3.03
	2.50	
72.10	5.80	
	6.90	6.66
	7.30	
103.00	9.10	
	10.50	9.80

B. ETE

(i) Standard method

- 280 nm

Concentration ($\mu g\ mL^{-1}$)	Peak Height (cm)	Average (cm)
	0.35	
2	0.35	0.33
	0.30	
	0.60	
4	0.60	0.60
	0.60	
	1.10	
6	1.05	1.07
	1.05	
	1.40	
8	1.40	1.37
	1.30	
	1.60	
10	1.60	1.60
	1.60	
	2.40	
15	2.40	2.40
	2.40	
	3.10	
20	3.00	3.07
	3.10	

- 215 nm

Concentration ($\mu g\ mL^{-1}$)	Peak Height (cm)	Average (cm)
	0.7	
1	0.7	0.70
	0.7	
	1	
2	1.1	1.07
	1.1	
	2.4	
4	2.2	2.27
	2.2	
	3.9	
6	3.7	3.77
	3.7	
	4.75	
8	4.5	4.65
	4.7	
	6.05	

10	6.1	6.08
	6.1	
	8.75	
15	9	8.88
	8.9	
	11.5	
20	11.3	11.43
	11.5	

(ii) Coupled with CMC

Concentration (ng mL^{-1})	Peak Height (cm)	Average (cm)
	1.5	
20	1.5	1.53
	1.6	
	2.8	
40	2.8	2.80
	2.8	
	3.9	
60	3.8	3.83
	3.8	
	4.8	
80	4.7	4.83
	5	
	6.2	
100	6.5	6.33
	6.3	
	7.3	
120	7.2	7.27
	7.3	

Appendix 3 Determination of ETE in pharmaceutical preparations

		Standard method						Coupled with CMC					
Sample	Certified content (µg/tablet)	Peak height (cm)	Found [a] (µg/tablet)	Recovery (%)	Average (%)	sd	RSD (%)	Peak height (cm)	Found [b] (µg/tablet)	Recovery (%)	Average (%)	sd	RSD (%)
Minisiston	30	1.7	27.20	90.67	92.67	1.73	1.87	5.70	92.03	102.26	101.62	1.11	1.09
		1.75	28.10	93.67				5.60	90.30	100.33			
		1.75	28.10	93.67				5.70	92.03	102.26			
Tetragynon	50	2.9	48.00	96.00	95.47	0.92	0.97	6.30	102.43	102.43	101.85	1.00	0.98
		2.85	47.20	94.40				6.20	100.70	100.70			
		2.9	48.00	96.00				6.30	102.43	102.43			
MonoStep	30	1.8	28.90	96.33	95.44	1.54	1.61	5.60	90.30	100.33	101.68	1.26	1.24
		1.8	28.90	96.33				5.68	91.69	101.87			
		1.75	28.10	93.67				5.73	92.55	102.84			
Yasmin	30	1.75	28.10	93.67	92.67	0.88	0.95	5.64	90.99	101.10	100.20	1.56	1.55
		1.72	27.60	92.00				5.64	90.99	101.10			
		1.73	27.70	92.33				5.50	88.57	98.41			
ETE 25µg	25	1.54	24.40	97.60	96.93	1.89	1.95	6.20	100.70	100.70	99.54	1.00	1.01
		1.5	23.70	94.80				6.10	98.97	98.97			
		1.55	24.60	98.40				6.10	98.97	98.97			

1 tablet was dissolved in 10 mL methanol, thus the concentration would be 3 µg mL^{-1} for Minisiston, MonoStep and Yasmin, 5 µg mL^{-1} for Tetragynon, and 2.5 µg mL^{-1} for ETE 25 µg.

Sample solutions of Minisiston, MonoStep and Yasmin were dissolved to give 90 ng mL^{-1} of those solutions.
Sample slutions of Yasmin and Tetragynon were dissolved to give 100 ng mL^{-1} of those solutons.

[a] value is obtained from y=0.5763x + 0.1032

[b] value is obtained from y=0.0577x + 0.3897

Appendix 4 Determination of LEV in pharmaceutical preparations

		Standard method						Coupled with CMC					
Sample	Certified content (µg/tablet)	Peak height (cm)	Found (µg/tablet)	Recovery (%)	Average (%)	sd	RSD (%)	Peak height (cm)	Found (µg/tablet)	Recovery (%)	Average (%)	sd	RSD (%)
Minisiston	125	9.60	113.01	90.41	92.27	2.36	2.55	5.20	134.58	107.67	107.11	2.80	2.61
		10.00	118.18	94.54				5.20	134.58	107.67			
		9.80	115.59	92.48				5.30	137.36	109.89			
		9.50	111.72	89.37				5.00	129.03	103.22			
		10.00	118.18	94.54									
Tetragynon	250	7.90	227.62	91.05	90.27	1.47	1.63	5.10	263.61	105.44	103.22	1.81	1.76
		8.00	230.85	92.34				5.00	258.06	103.22			
		7.80	224.39	89.75				4.90	252.50	101.00			
		7.70	221.16	88.46				5.00	258.06	103.22			
		7.80	224.39	89.75									
MonoStep	125	5.30	114.91	91.93	90.69	2.77	3.06	5.40	140.14	112.11	107.67	9.69	9.00
		5.30	114.91	91.93				4.70	120.69	96.56			
		5.00	107.16	85.73				5.50	142.92	114.33			
		5.30	114.91	91.93									
		5.30	114.91	91.93									

1 tablet was dissolved in methanol and diluted so that
Minisiston 6.25 µg mL^{-1}
Tetragynon 5.00 µg mL^{-1}
MonoStep 3.125 µg mL^{-1}
[a] value is obtained from y=1.548x + 0.853

1 tablet was dissolved in methanol and diluted so that
Minisiston, Tetragynon, and MonoStep 50 ng mL^{-1}
[a] value is obtained from y=0.090x + 0.355

Appendix 5 Reproducibility of the methods

A. LEV

	STANDARD METHOD			COUPLED WITH CMC		
	Spike with 4.12 µg mL^{-1}			Spike with 72.1 ng mL^{-1}		
	Peak height (cm)	LEV found (µg mL^{-1}) [a]	Recovery (%)	Peak height (cm)	LEV found (ng L^{-1}) [b]	Recovery (%)
	7.0	3.97	96.38	6.6	69.39	96.24
	6.9	3.91	94.81	6.7	70.50	97.78
	6.9	3.91	94.81	6.5	68.28	94.70
	7.1	4.04	97.95	6.7	70.50	97.78
	7.1	4.04	97.95	6.6	69.39	96.24
	7.2	4.10	99.52	6.5	68.28	94.70
	7.4	4.23	102.65	6.6	69.39	96.24
	7.1	4.04	97.95	6.6	69.39	96.24
	7.3	4.16	101.09	6.6	69.39	96.24
	7.3	4.16	101.09	6.6	69.39	96.24
	7.1	4.04	97.95			
	7.4	4.23	102.65			
	6.9	3.91	94.81			
	7.3	4.16	101.09			
	6.8	3.84	93.25			
	6.9	3.91	94.81			
	6.8	3.84	93.25			
	7.2	4.10	99.52			
	6.9	3.91	94.81			
	7.0	3.97	96.38			
Average		4.02	97.64		69.39	96.24
sd		0.13	3.04		0.74	1.03
%RSD		3.11	3.11		1.07	1.07

[a] value is obtained from y=1.548x + 0.853
[b] value is obtained from y=0.090x + 0.355

B. ETE

	STANDARD METHOD					
	Spike with 10 µg mL^{-1} (215 nm)			Spike with 10 µg mL^{-1} (280 nm)		
	Peak height (cm)	ETE found (µg mL^{-1}) [a]	Recovery (%)	Peak height (cm)	ETE found (ng mL^{-1}) [b]	Recovery (%)
	5.85	9.97	99.72	1.60	10.00	100.00
	5.90	10.06	100.59	1.60	10.00	100.00
	5.80	9.89	98.85	1.60	10.00	100.00
	6.10	10.41	104.06	1.55	9.67	96.73
	6.10	10.41	104.06	1.60	10.00	100.00
	6.35	10.84	108.39	1.50	9.35	93.45
	6.20	10.58	105.79	1.55	9.67	96.73
	6.05	10.32	103.19	1.55	9.67	96.73
	6.10	10.41	104.06	1.50	9.35	93.45
	6.10	10.41	104.06	1.55	9.67	96.73
Average	6.06	10.33	103.28	1.56	9.74	97.38
std	0.17	0.29	2.88	0.04	0.26	2.58
RSD	2.74	2.78	2.78	2.53	2.65	2.65

	COUPLED WITH CMC		
	Spike with 60 ng mL^{-1}		
	Peak height (cm)	ETE found (ng mL^{-1}) [c]	Recovery (%)
	4.00	62.57	104.28
	3.80	59.10	98.51
	4.00	62.57	104.28
	4.00	62.57	104.28
	4.00	62.57	104.28
Average	3.96	61.88	103.13
std	0.09	1.55	2.58
RSD	2.26	2.51	2.51

[a] value is obtained from y=1.5763x + 0.1032
[b] value is obtained from y=1.527x + 0.073
[c] value is obtained from y=0.0577x + 0.3897

Appendix 6 Effect of PAN concentration on the analytical signal of metal-PAN complexes

A. Zinc

	PAN concentration (M)				
	2.10^{-4}	4.10^{-4}	6.10^{-4}	8.10^{-4}	10.10^{-4}
Absorbance	0.0494	0.0698	0.0885	0.1027	0.1071
	0.0339	0.0699	0.0910	0.1038	0.1115
	0.0451	0.0799	0.0978	0.1148	0.1165
Average	0.0428	0.0732	0.0924	0.1071	0.1117
sd	0.0080	0.0058	0.0048	0.0067	0.0047
%RSD	18.70	7.93	5.21	6.25	4.21

Experimental conditions:
- pH : 4
- Preconcentration time : 1 minute
- Sample flow rate : 0.825 mL min^{-1}
- Eluent flow rate : 0.951 mL min^{-1}
- Reaction coil length : 120 cm
- Zn(II) concentration : 0.5 µg mL^{-1}

B. Copper

	PAN concentration (M)				
	2.10^{-4}	4.10^{-4}	6.10^{-4}	8.10^{-4}	10.10^{-4}
	0.1263	0.1462	0.1175	0.1163	0.1113
	0.1283	0.1496	0.1157	0.1157	0.1045
Absorbance	0.1307	0.1391	0.1204	0.1124	0.1066
	0.1205	0.1295	0.1228	0.1165	0.1177
	0.1383	0.1314	0.119	0.1231	0.1098
Average	0.1288	0.1370	0.11924	0.1168	0.1099
sd	0.0065	0.0088	0.0027	0.0039	0.0051
%RSD	5.05	6.45	2.28	3.33	4.61

Experimental conditions:
- pH : 4
- Preconcentration time : 1 minute
- Sample flow rate : 0.825 mL min^{-1}
- Eluent flow rate : 0.951 mL min^{-1}
- Reaction coil length : 120 cm
- Cu(II) concentration : 0.8 µg mL^{-1}

Appendix 7 Effect of the preconcentration time on the analytical signal of the metal-PAN complexes

A. Zinc

	Preconcentration time (min)					
	0.25	0.5	0.75	1	1.5	2
Absorbance	0.0593	0.1303	0.1774	0.2074	0.3284	0.4042
	0.0522	0.1206	0.1459	0.2126	0.3016	0.4085
	0.0598	0.1212	0.1670	0.1984	0.3104	
	0.0532	0.1216	0.1499	0.2180		
	0.0570	0.1223	0.1534	0.2060		
Average	0.0563	0.1232	0.1587	0.2085	0.3135	0.4064
sd	0.0035	0.0040	0.0131	0.0074	0.0137	0.0030
%RSD	6.16	3.26	8.26	3.53	4.36	0.75

Experimental conditions:
- pH : 6
- Sample flow rate : 0.825 mL min^{-1}
- Eluent flow rate : 0.951 mL min^{-1}
- PAN concentration : 8.10^{-4} M
- Reaction coil length : 150 cm
- Zn(II) concentration : 0.5 µg mL^{-1}

B. Copper

	Preconcentration time (min)				
	0.5	0.75	1	1.5	2
Absorbance	0.0516	0.0814	0.1207	0.1713	0.2170
	0.0555	0.0914	0.1192	0.1746	0.2472
	0.0567	0.0873	0.1273	0.1828	0.2341
	0.0617	0.0791	0.1230	0.1755	0.2404
	0.0650	0.0820	0.1153	0.1751	0.2186
Average	0.0581	0.0842	0.1211	0.1759	0.2315
sd	0.01	0.01	0.00	0.00	0.01
%RSD	9.09	5.94	3.68	2.40	5.75

Experimental conditions:
- pH : 4
- Sample flow rate : 0.825 mL min^{-1}
- Eluent flow rate : 0.951 mL min^{-1}
- PAN concentration : 4.10^{-4} M
- Reaction coil length : 120 cm
- Cu(II) concentration : 0.8 µg mL^{-1}

Theoretical enrichment factor

	Preconcentration time (min)					
	0.25	0.5	0.75	1	1.5	2
Sample volume	0.20625	0.4125	0.61875	0.825	1.2375	1.65
Buffer volume	0.20625	0.4125	0.61875	0.825	1.2375	1.65
Reagent volume	0.045	0.09	0.135	0.18	0.27	0.36
Total volume (V_t)	0.4575	0.915	1.3725	1.83	2.745	3.66
Enrichment factor	1.27	2.54	3.8125	5.083	7.625	10.166

Sample flow rate : 0.825 mL min^{-1}
Buffer flow rate : 0.825 mL min^{-1}
Reagent flow rate : 0.18 mL min^{-1}
End volume of eluent (estimated)(V_o): 0.36 mL

Theoretical enrichment factor is defined as V_t/V_o

Appendix 8 Effect of sample flow rate on the analytical signal of the metal-PAN complexes

A. Zinc

	Sample flow rate (mL min^{-1})			
	0.625	0.825	1.025	1.225
Absorbance	0.0796	0.1743	0.2079	0.1943
	0.0750	0.1693	0.1792	0.2235
	0.0784	0.1860	0.1812	0.2240
	0.0859	0.1609	0.2233	0.2213
	0.1183	0.1731	0.2015	0.2323
Mean	0.0874	0.1727	0.1986	0.2191
sd	0.0177	0.0091	0.0186	0.0145
%RSD	20.24	5.26	9.37	6.60

Experimental conditions:
- pH : 6
- Preconcentration time : 1 minute
- Eluent flow rate : 0.951 mL min^{-1}
- PAN concentration : 8.10^{-4} M
- Reaction coil length : 120 cm
- Zn(II) concentration : 0.5 µg mL^{-1}

B. Copper

	Sample flow rate (mL min^{-1})			
	0.625	0.825	0.1025	0.1225
Absorbance	0.0741	0.1207	0.1462	0.1802
	0.0651	0.1107	0.1635	0.1687
	0.0777	0.1273	0.1498	0.1888
	0.0822	0.123	0.1584	0.1758
	0.0818	0.1153	0.1518	0.1795
Average	0.0763	0.1211	0.1539	0.1786
sd	0.0070	0.0065	0.0069	0.0073
%RSD	9.20	5.38	4.51	4.09

Experimental conditions:
- pH : 4
- Preconcentration time : 1 minute
- Eluent flow rate : 0.951 mL min^{-1}
- PAN concentration : 4.10^{-4} M
- Reaction coil length : 120 cm
- Cu(II) concentration : 0.8 µg mL^{-1}

Appendix 9 Effect of eluent flow rate on the analytical signal of the metal-PAN complexes

A. Zinc

	Eluent flow rate (mL min^{-1})						
	0.4	0.525	0.671	0.811	0.951	1.0951	1.231
Absorbance	0.2101	0.2016	0.1587	0.1861	0.1534	0.1529	0.1587
	0.2172	0.1745	0.1845	0.1583	0.1694	0.1599	0.1530
	0.1923	0.1987	0.1883	0.1652	0.1680	0.1558	0.1576
Average	0.2065	0.1916	0.1772	0.1699	0.1636	0.1562	0.1564
sd	0.0128	0.0149	0.0161	0.0145	0.0089	0.0035	0.0030
%RSD	6.21	7.77	9.09	8.52	5.42	2.25	1.93
Read time(s)	450	415	350	270	240	200	200

Experimental conditions:
- pH : 6
- Preconcentration time : 1 minute
- Sample flow rate : 0.825 mL min^{-1}
- PAN concentration : 8.10^{-4} M
- Reaction coil length : 120 cm
- Zn(II) concentration : 0.5 µg mL^{-1}

B. Copper

	Eluent flow rate (mL min^{-1})				
	0.671	0.811	0.951	1.0951	1.231
Absorbance	0.1419	0.1294	0.1207	0.1135	0.1027
	0.138	0.1305	0.1107	0.1174	0.1147
	0.143	0.1241	0.1273	0.1047	0.1085
	0.1175	0.1219	0.123	0.1046	0.1037
	0.1329	0.1305	0.1153	0.1085	0.1033
Average	0.1347	0.1272	0.1211	0.1087	0.1065
sd	0.0104	0.0040	0.0065	0.0056	0.0051
%RSD	7.71	3.15	5.38	5.16	4.78
Read time (s)	600	480	240	180	120

Experimental conditions:
- pH : 4
- Preconcentration time : 1 minute
- Sample flow rate : 0.825 mL min^{-1}
- PAN concentration : 4.10^{-4} M
- Reaction coil length : 120 cm
- Cu(II) concentration : 0.8 µg mL^{-1}

Appendix 10 Effect of reaction coil length on the analytical signal of the metal-PAN complexes

A. Zinc

	Reaction coil length (cm)					
	30	60	90	120	150	180
	0.0383	0.0451	0.0718	0.1085	0.1247	0.1123
Absorbance	0.0460	0.0470	0.0710	0.1046	0.1257	0.1185
	0.0402	0.0460	0.0737	0.1107	0.1332	0.1241
Average	0.0415	0.0460	0.0722	0.1079	0.1279	0.1183
sd	0.0040	0.0010	0.0014	0.0031	0.0046	0.0059
%RSD	9.67	2.06	1.92	2.86	3.63	4.99

Experimental conditions:
- pH : 6
- Preconcentration time : 1 minute
- Sample flow rate : 0.825 mL min^{-1}
- Eluent flow rate : 0.951 mL min^{-1}
- PAN concentration : 8.10^{-4} M
- Zn(II) concentration : 0.5 µg mL^{-1}

B. Copper

	Reaction coil length (cm)				
	30	60	90	120	150
	0.1296	0.1291	0.1229	0.1207	0.1037
	0.1102	0.1145	0.1300	0.1107	0.1145
Absorbance	0.1215	0.1299	0.1340	0.1273	0.1216
	0.1248	0.1233	0.1337	0.1230	0.1100
	0.1200	0.1105	0.1288	0.1153	0.1166
Average	0.1213	0.1214	0.1299	0.1211	0.1133
sd	0.0072	0.0087	0.0045	0.0065	0.0068
%RSD	5.92	7.15	3.47	5.38	5.99

Experimental conditions:
- pH : 4
- Preconcentration time : 1 minute
- Sample flow rate : 0.825 mL min^{-1}
- Eluent flow rate : 0.951 mL min^{-1}
- PAN concentration : 4.10^{-4} M
- Cu(II) concentration : 0.8 µg mL^{-1}

Appendix 11 Standard curve

A. Zinc

	Zn(II) concentration (μg mL^{-1})						
	0.05	0.1	0.2	0.3	0.4	0.5	0.6
Absorbance	0.0241	0.0449	0.0844	0.1190	0.1622	0.1985	0.2020
	0.0274	0.0421	0.0873	0.1302	0.1497	0.1864	0.2136
	0.0288	0.0421	0.0800	0.1133	0.1623	0.1855	0.2190
	0.0252	0.0524	0.0758	0.1366	0.1524	0.1902	0.2241
	0.0217	0.0469	0.0718	0.1245	0.1546	0.1911	
Average	0.0254	0.0457	0.0799	0.1247	0.1562	0.1903	0.2147

B. Copper

	Cu(II) concentration (μg mL^{-1})									
	0.05	0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Absorbance	0.0116	0.0192	0.0286	0.0323	0.0477	0.0609	0.0733	0.0858	0.1076	0.1200
	0.0105	0.0183	0.0295	0.0325	0.0477	0.0608	0.0825	0.0846	0.1065	0.1100
	0.0192	0.0169	0.0282	0.0343	0.0460	0.0618	0.0793	0.0832	0.1055	0.1270
	0.0122	0.0214	0.0298	0.0335	0.0500	0.0658	0.0783	0.0842	0.1089	0.1230
	0.0117	0.0183	0.0270	0.0358	0.0490	0.0640	0.0751	0.0844	0.1029	0.1150
Average	0.0130	0.0188	0.0286	0.0337	0.0481	0.0627	0.0777	0.0844	0.1063	0.1190

Appendix 12 Determination of method accuracy

A. Zinc

Zn(II) spiked ($\mu g\ mL^{-1}$)	Absorbance	Found[a] ($\mu g\ mL^{-1}$)	Recovery (%)	Average (%)
0.1	0.0460	0.098	98.0	98.8
	0.0457	0.097	97.0	
	0.0475	0.102	102.0	
	0.0460	0.098	98.0	
	0.0464	0.099	99.0	
0.3	0.1156	0.296	98.7	99.5
	0.1167	0.299	99.7	
	0.1167	0.299	99.7	
	0.1174	0.301	100.3	
	0.1160	0.297	99.0	
0.5	0.1877	0.501	100.2	100.3
	0.1888	0.504	100.8	
	0.1866	0.498	99.6	
	0.1870	0.499	99.8	
	0.1895	0.506	101.2	

[a] Value was calculated based on the equation y=0.3515x + 0.0116

B. Copper

Cu(II) spiked ($\mu g\ mL^{-1}$)	Absorbance	Found[b] ($\mu g\ mL^{-1}$)	Recovery (%)	Average (%)
0.1	0.0198	0.101	101.0	101.2
	0.0202	0.104	104.0	
	0.0193	0.098	98.0	
	0.0193	0.098	98.0	
	0.0203	0.105	105.0	
0.4	0.0622	0.402	100.5	99.6
	0.0617	0.398	99.5	
	0.0614	0.396	99.0	
	0.0618	0.399	99.8	
	0.0615	0.397	99.3	
0.7	0.1048	0.704	100.6	100.6
	0.1054	0.708	101.1	
	0.1041	0.699	99.9	
	0.1057	0.710	101.4	
	0.1044	0.701	100.1	

[b] Value was calculated based on the equation y=0.1411x + 0.0055

Appendix 13 Determination of Zn and Cu in pharmaceutical preparations

Pharmaceuticals	Unit	Certified value[a]	After digestion (mg mL^{-1})	After dilution (mg mL^{-1})	Absorbance	Found (mg mL^{-1})	Recovery (%)	Average (%)	Found (see Unit)
Unizink® 50	mg/tablet	10	100	0.5	0.1870	0.486	97.3	97.4	9.74
					0.1869	0.486	97.2		
					0.1876	0.488	97.6		
Zineryt®	mg/g	68.59	68.59	0.343	0.1319	0.330	96.1	96.0	65.88
					0.1315	0.329	95.8		
					0.1320	0.330	96.2		
Zinkit® 3	mg/tablet	3	30	0.6	0.2228	0.588	98.1	97.8	2.93
					0.2221	0.586	97.7		
					0.2220	0.586	97.7		
Zinkit® 10	mg/tablet	10	100	0.5	0.1870	0.486	97.3	97.3	9.73
					0.1865	0.485	97.0		
					0.1876	0.488	97.6		
Zinkit® 20	mg/tablet	20	200	0.6	0.2226	0.588	98.0	97.9	19.58
					0.2228	0.588	98.1		
					0.2221	0.586	97.7		
Zincfrin®	mg/mL	2.5	25	0.5	0.1868	0.486	97.2	97.1	2.43
					0.1860	0.484	96.7		
					0.1870	0.486	97.3		
Zinkorotat 20	mg/tablet	3.2	32	0.32	0.1235	0.306	95.6	95.6	3.06
					0.1237	0.306	95.8		
					0.1234	0.306	95.5		
Zink-D-Longoral®	mg/tablet	6.54	65.4	0.327	0.1260	0.313	95.7	95.6	6.26
					0.1262	0.314	95.9		
					0.1256	0.312	95.4		

					0.1511	0.384	96.1		
Zinkoxid Salbe Law	mg/g	80	80	0.4	0.1514	0.385	96.3	96.3	77.08
					0.1519	0.387	96.7		
					0.2218	0.585	97.6		
Zinkoxid Emulsion Law	mg/g	200	200	0.6	0.2226	0.588	98.0	97.7	195.32
					0.2215	0.585	97.4		
					0.1790	0.464	96.6		
Zinkpaste Law	mg/g	160	160	0.48	0.1810	0.469	97.8	97.1	155.37
					0.1795	0.465	96.9		
					0.1515	0.385	96.4		
Zinksalbe Dialon®	mg/g	80	80	0.4	0.1520	0.387	96.7	96.8	77.44
					0.1528	0.389	97.3		
					0.0500	0.315	101.7		
Kupferorotat	mg/tablet	0.31[b]	3.1	0.31	0.0490	0.308	99.4	99.9	0.31
					0.0486	0.305	98.5		

[a] as Zn [b] as Cu

CURRICULUM VITAE

Full name	: Ganden Supriyanto
Place and date of birth	: Jombang Indonesian, December 28th, 1968
Parent	: Tomo and Ngatimah
Marital status	: Married
Wife	: Masrutji Handajani
Children	: Bagus Aryan Delftanto
	Nimas Sekar Ayu Citraningsukma
Nationality	: Indonesian

Education

School

1976-1982 : Elementary School
(SDN Dukuhmojo I Mojoagung, Indonesian)

1982-1985 : Junior School
(SMPN I Mojoagung, Indonesian)

1985-1988 : High School
(SMAN 2 Jombang, Indonesian)

University

1988-1992 : Undergraduate, Department of Chemistry, Faculty of Mathematic and Natural Sciences, Airlangga University, Surabaya Indonesian.

Thesis: Comparative study of potassium permanganate standardization using oxalic acid by heating and sodium lauryl sulfate addition

Degree: Sarjana Science (Drs.)

1995-1997 : Master Program, Department of Environmental Science and Technology, Institute of Infrastructural, Hydraulic, and Environmental Engineering Delft, The Netherlands

Thesis: Treatment of wastewater containing surfactant by using Rotating Biological Contactor (RBC)

Degree : Master of Science (M.Sc.)

Oct. 2000- Jan. 2005: Ph.D Program, Institute of Chemistry, Fachbereich Biologie, Chemie, und Pharmazie, Free University of Berlin

Occupation

Since 1993 : Junior Lecturer and Researcher, Department of Chemistry, Faculty of Mathematic and Natural Sciences, Airlangga University Surabaya, Indonesian

Erklärung

Hiermit erkläre ich an Eides statt, dass ich die vorliegende Arbeit selbständig und nur unter Verwendung der angegebenen Hilfsmittel angefertigt habe.

Ganden Supriyanto
Berlin 2005