

CHAPTER III



RESULTS

The absorbance of standard saccharin solution (2 mg/100 ml) was determined. The mean value of five measurements was 0.51. The percentage of recovery was worked out by adding standard saccharin solution having concentration from 1-5 mg/100 ml. The results ranged from 94.9-102.0 per cent, the mean value was 98.5 per cent, and standard deviation was 2.2. The absorbance and percentage of recovery were shown in Table 4, and Table 5 respectively.

Table 4

Mean absorbance of 2 mg/100 ml standard saccharin solution

No.	Absorbance		
	A235	A244	A235-A244
1	0.72	0.21	0.51
2	0.73	0.22	0.51
3	0.74	0.23	0.51
4	0.76	0.25	0.51
5	0.74	0.22	0.52
Mean value of net absorbance (A235-A244)			= 0.51

Table 5

The percentage recovery of added saccharin

mg Saccharin added per 100 ml	Absorbance			mg Sacch. detected	Percentage recovery	Average
	A235	A244	A235- A244			
1	0.40	0.14	0.26	1.02	102.0	99.0
	0.41	0.16	0.25	0.98	98.0	
	0.40	0.15	0.25	0.98	98.0	
	0.39	0.14	0.25	0.98	98.0	
2	0.69	0.18	0.51	2.00	100.0	97.5
	0.69	0.19	0.50	1.96	98.0	
	0.72	0.23	0.49	1.92	96.0	
	0.70	0.21	0.49	1.92	96.0	
3	1.02	0.24	0.78	3.06	102.0	101.0
	1.02	0.24	0.78	3.06	102.0	
	1.02	0.25	0.77	3.02	100.7	
	1.01	0.25	0.76	2.98	99.3	
4	1.32	0.30	1.02	4.00	100.0	98.8
	1.33	0.30	1.03	4.03	101.0	
	1.28	0.29	0.99	3.88	97.0	
	1.26	0.27	0.99	3.88	97.0	
5	1.57	0.34	1.23	4.82	96.5	96.3
	1.56	0.33	1.23	4.82	96.5	
	1.58	0.34	1.24	4.86	97.3	
	1.56	0.35	1.21	4.75	94.9	
Mean value						98.5
Standard deviation						2.2

The samples, collected from several locations, classified in three types :

1. Concentrate syrups
2. Carbonated beverages
3. Dilute soft drinks (ready for consumption)

1. Concentrate syrups : seventy-eight samples of this type were detected for saccharin. Saccharin was found in forty-eight samples which were further determined for the saccharin contents. The saccharin contents varied from 0.016 to 0.053 per cent. The mean value was 0.039 per cent. The details of results of detection and quantitative determination were shown in Table 6, and Table 7 respectively.

Table 6

Detection of saccharin in concentrate syrups

Sample No.	a. Organoleptic test	b. Fluorescent test	c. Ferric Chloride test
1	-		
2	-		
3	-		
4	-		
5	-		
6	-		
7	-		



Table 6 (Continued)

Sample No.	a. Organoleptic test	b. Fluorescent test	c. Ferric Chloride test
8	-		
9	-		
10	-		
11	+	+	+
12	+	+	+
13	+	+	+
14	+	+	+
15	+	+	+
16	+	+	+
17	+	+	+
18	+	+	+
19	+	+	+
20	+	+	+
21	+	+	+
22	+	+	+
23	+	+	+
24	+	+	+
25	+	+	+
26	+	+	+
27	-		
28	+	+	+

Table 6 (Continued)

Sample No.	a. Organoleptic test	b. Fluorescent test	c. Ferric Chloride test
29	+	+	+
30	+	+	+
31	+	+	+
32	-		
33	-		
34	+	+	+
35	-		
36	+	+	+
37	+	+	+
38	+	+	+
39	+	+	+
40	+	+	+
41	+	+	+
42	+	+	+
43	-		
44	+	+	+
45	+	+	+
46	+	+	+
47	+	+	+
48	-		
49	+	+	+

Table 6 (Continued)

Sample No.	a. Organoleptic test	b. Fluorescent test	c. Ferric Chloride test
50	+	+	+
51	+	+	+
52	-		
53	-		
54	+	+	+
55	+	+	+
56	-		
57	-		
58	-		
59	+	+	+
60	+	+	+
61	+	+	+
62	+	+	+
63	+	+	+
64	+	+	+
65	+	+	+
66	+	+	+
67	+	+	+
68	-		
69	+	+	+
70	+	+	+

Table 6 (Continued)

Sample No.	a. Organoleptic test	b. Fluorescent test	c. Ferric Chloride test
71	-		
72	-		
73	-		
74	-		
75	-		
76	-		
77	-		
78	-		

- a. - residue gave no sweet taste
 + residue gave sweet taste
- b. + residue gave green fluorescence when condensed
 with resorcinol in sulfuric acid.
- c. + residue gave violet color when converted to
 salicylic acid and tested with ferric chloride
 T.S.

Table 7

Determination of saccharin by UV. Spectrophotometer.

Only those samples which gave positive test from detection procedure were determined.

No.	Sample No.	ml. of original sample used	Absorbance			% Saccharin found	
			A235	A244	A235-A244	% saccharin	average
1	11A	10	1.71	0.52	1.19	0.047	0.047
	11B	10	1.70	0.52	1.18	0.046	
2	12A	10	0.89	0.36	0.53	0.021	0.021
	12B	10	0.86	0.34	0.52	0.020	
3	13A	10	1.30	0.36	0.94	0.037	0.037
	13B	10	1.23	0.32	0.91	0.036	
4	14A	10	1.50	0.41	1.09	0.043	0.044
	14B	10	1.54	0.44	1.10	0.044	
5	15A	10	0.70	0.31	0.39	0.015	0.016
	15B	10	0.72	0.32	0.40	0.016	
6	16A	10	1.69	0.50	1.19	0.047	0.047
	16B	10	1.70	0.53	1.17	0.046	
7	17A	10	1.30	0.40	0.90	0.035	0.036
	17B	10	1.33	0.41	0.92	0.036	
8	18A	10	1.29	0.50	0.79	0.031	0.031
	18B	10	1.36	0.56	0.80	0.031	
9	19A	10	1.70	0.56	1.14	0.044	0.044
	19B	10	1.68	0.58	1.10	0.043	

Table 7 (Continued)

No.	Sample No.	ml. of original sample used	Absorbance			% Saccharin found	
			A235	A244	A235-A244	% saccharin	average
10	20A	10	1.60	0.69	0.91	0.036	0.035
	20B	10	1.52	0.66	0.86	0.034	
11	21A	10	1.85	0.52	1.33	0.052	0.053
	21B	10	1.87	0.53	1.34	0.053	
12	22A	10	1.50	0.41	1.09	0.043	0.044
	22B	10	1.57	0.44	1.13	0.044	
13	23A	10	1.56	0.40	1.16	0.045	0.047
	23B	10	1.68	0.45	1.23	0.048	
14	24A	10	1.30	0.68	0.62	0.024	0.024
	24B	10	1.26	0.65	0.61	0.024	
15	25A	10	1.47	0.62	0.85	0.033	0.033
	25B	10	1.45	0.63	0.82	0.032	
16	26A	10	1.69	0.76	0.93	0.036	0.036
	26B	10	1.70	0.79	0.91	0.036	
17	28A	10	1.50	0.46	1.04	0.041	0.041
	28B	10	1.52	0.49	1.03	0.040	
18	29A	10	1.70	0.70	1.00	0.039	0.040
	29B	10	1.80	0.78	1.02	0.040	
19	30A	10	1.18	0.36	0.82	0.032	0.033
	30B	10	1.20	0.37	0.83	0.033	

Table 7 (Continued)

No.	Sample No.	ml. of original sample used	Absorbance			% Saccharin found	
			A235	A244	A235-A244	% saccharin	average
20	31A	10	1.80	0.48	1.32	0.052	0.053
	31B	10	1.80	0.46	1.34	0.053	
21	34A	10	1.70	0.50	1.20	0.047	0.047
	34B	10	1.69	0.48	1.21	0.047	
22	36A	10	1.38	0.38	1.00	0.039	0.039
	36B	10	1.36	0.38	0.98	0.038	
23	37A	10	1.50	0.46	1.04	0.041	0.041
	37B	10	1.48	0.46	1.02	0.040	
24	38A	10	1.64	0.47	1.17	0.046	0.046
	38B	10	1.52	0.38	1.14	0.045	
25	39A	10	1.66	0.58	1.08	0.042	0.043
	39B	10	1.58	0.48	1.10	0.043	
26	40A	10	1.44	0.39	1.05	0.041	0.042
	40B	10	1.46	0.40	1.06	0.042	
27	41A	10	1.28	0.36	0.92	0.036	0.035
	41B	10	1.14	0.27	0.87	0.034	
28	42A	10	1.72	0.51	1.21	0.047	0.047
	42B	10	1.74	0.54	1.20	0.047	
29	44A	10	1.19	0.36	0.83	0.033	0.033
	44B	10	1.20	0.38	0.82	0.032	

Table 7 (Continued)

No.	Sample No.	ml. of original sample used	Absorbance			% Saccharin found	
			A235	A244	A235-A244	% saccharin	average
30	45A	10	1.48	0.48	1.00	0.039	0.039
	45B	10	1.48	0.48	1.00	0.039	
31	46A	10	1.52	0.54	0.98	0.038	0.039
	46B	10	1.52	0.52	1.00	0.039	
32	47A	10	1.68	0.64	1.04	0.041	0.041
	47B	10	1.65	0.60	1.05	0.041	
33	49A	10	1.39	0.42	0.97	0.038	0.039
	49B	10	1.32	0.33	0.99	0.039	
34	50A	10	1.58	0.42	1.16	0.045	0.045
	50B	10	1.59	0.44	1.15	0.045	
35	51A	10	1.42	0.48	0.94	0.037	0.038
	51B	10	1.42	0.46	0.96	0.038	
36	54A	10	1.60	0.60	1.00	0.039	0.040
	54B	10	1.62	0.60	1.02	0.040	
37	55A	10	1.27	0.44	0.83	0.033	0.033
	55B	10	1.24	0.42	0.82	0.032	
38	59A	10	1.87	0.77	1.10	0.043	0.043
	59B	10	1.75	0.66	1.09	0.043	
39	60A	10	1.65	0.57	1.08	0.042	0.043
	60B	10	1.67	0.57	1.10	0.043	

Table 7 (Continued)

No.	Sample No.	ml. of original sample used	Absorbance			% Saccharin found	
			A235	A244	A235-A244	% saccharin	average
40	61A	10	1.87	0.63	1.24	0.049	0.049
	61B	10	1.88	0.62	1.26	0.049	
41	62A	10	1.07	0.30	0.77	0.030	0.029
	62B	10	0.94	0.24	0.70	0.027	
42	63A	10	1.08	0.40	0.68	0.027	0.027
	63B	10	1.06	0.40	0.66	0.026	
43	64A	10	1.25	0.40	0.85	0.033	0.034
	64B	10	1.27	0.40	0.87	0.034	
44	65A	10	1.76	0.50	1.26	0.049	0.050
	65B	10	1.76	0.49	1.27	0.050	
45	66A	10	1.62	0.42	1.20	0.047	0.048
	66B	10	1.70	0.48	1.22	0.048	
46	67A	10	1.44	0.74	0.70	0.027	0.027
	67B	10	1.50	0.82	0.68	0.027	
47	69A	10	1.83	0.74	1.09	0.043	0.043
	69B	10	1.74	0.68	1.06	0.042	
48	70A	10	0.80	0.25	0.55	0.022	0.022
	70B	10	0.84	0.27	0.57	0.022	

Saccharin found were between 0.016 to 0.053 per cent

Mean value was 0.039 per cent

2. Carbonated beverages : four from seventeen samples of this type were found to contain saccharin. The quantities of saccharin were between 0.005 to 0.008 per cent. The mean value was 0.007 per cent. The details of detection and determination were shown in Table 8, and Table 9 respectively.

Table 8

Detection of saccharin in carbonated beverages

Sample No.	a. Organoleptic test	b. Fluorescent test	c. Ferric Chloride test
1	+	+	+
2	+	+	+
3	+	+	+
4	+	+	+
5	-		
6	-		
7	-		
8	-		
9	-		
10	-		
11	-		
12	-		
13	-		
14	-		
15	-		
16	-		
17	-		

Table 9

Determination of saccharin in carbonated beverages, in those samples which gave positive test from detection procedure.

No.	Sample No.	ml. of original sample used	Absorbance			% Saccharin found	
			A235	A244	A235-A244	% saccharin	average
1	1A	50	1.26	0.46	0.80	0.006	0.006
	1B	50	1.18	0.40	0.78	0.006	
2	2A	50	1.44	0.56	0.88	0.007	0.007
	2B	50	1.44	0.58	0.86	0.007	
3	3A	50	1.84	0.84	1.00	0.008	0.008
	3B	50	1.86	0.84	1.02	0.008	
4	4A	50	1.09	0.42	0.67	0.005	0.005
	4B	50	1.05	0.40	0.65	0.005	

Saccharin found varied from 0.005 to 0.008 per cent

Mean value was 0.007 per cent

3. Dilute soft drinks (ready for consumption) : among the fifty-six samples collected from several locations, twenty-one samples were found to contain saccharin. In some sample the added color, fat and protein, interfered in the ethereal extract, forming viscous emulsion which was difficult to separate the layers in the process of extraction with organic solvents. These problems could be avoided by adding 5 per cent neutral lead acetate solution in the process of preparing the sample. The percentage of saccharin in this type of beverages were 0.003 to 0.011. The mean value was 0.007 per cent. The results of detection and determination were shown in Table 10, and Table 11 respectively.

Table 10

Detection of saccharin in dilute soft drinks

Sample No.	a. Organoleptic test	b. Fluorescent test	c. Ferric Chloride test
1	-		
2	+	+	+
3	-		
4	-		
5	-		
6	-		
7	-		
8	-		
9	-		

Table 10 (Continued)

Sample No.	a. Organoleptic test	b. Fluorescent test	c. Ferric Chloride test
10	-		
11	-		
12	-		
13	-		
14	-		
15	-		
16	-		
17	+	+	+
18	-		
19	-		
20	-		
21	+	+	+
22	+	+	+
23	+	+	+
24	+	+	+
25	+	+	+
26	+	+	+
27	+	+	+
28	-		
29	-		
30	+	+	+
31	+	+	+

Table 10 (Continued)

Sample No.	a. Organoleptic test	b. Fluorescent test	c. Ferric Chloride test
32	+	+	+
33	-		
34	+	+	+
35	+	+	+
36	-		
37	+	+	+
38	+	+	+
39	-		
40	-		
41	+	+	+
42	+	+	+
43	+	+	+
44	+	+	+
45	-		
46	-		
47	-		
48	-		
49	+	+	+
50	+	+	+
51	-		
52	-		
53	-		
54	-		
55	-		
56	-		

Table 11

Determination of saccharin in dilute soft drinks

No.	Sample No.	ml. of original sample used	Absorbance			% Saccharin found	
			A235	A244	A235-A244	% saccharin	average
1	2A	50	0.80	0.25	0.55	0.004	0.004
	2B	50	0.82	0.25	0.57	0.004	
2	17A	50	0.70	0.25	0.45	0.004	0.004
	17B	50	0.68	0.24	0.44	0.003	
3	21A	50	0.86	0.27	0.59	0.005	0.005
	21B	50	0.90	0.28	0.62	0.005	
4	22A	50	1.62	0.65	0.97	0.008	0.008
	22B	50	1.65	0.64	1.01	0.008	
5	23A	50	1.45	0.56	0.89	0.007	0.007
	23B	50	1.42	0.55	0.87	0.007	
6	24A	50	1.67	0.50	1.17	0.009	0.009
	24B	50	1.48	0.44	1.04	0.008	
7	25A	50	1.62	0.46	1.16	0.009	0.009
	25B	50	1.57	0.44	1.13	0.009	
8	26A	50	1.68	0.46	1.22	0.010	0.010
	26B	50	1.74	0.48	1.26	0.010	
9	27A	50	0.69	0.28	0.41	0.003	0.003
	27B	50	0.74	0.30	0.44	0.003	
10	31A	50	1.20	0.30	0.90	0.007	0.007
	31B	50	1.26	0.33	0.93	0.007	
11	32A	50	1.31	0.31	1.00	0.008	0.008
	32B	50	1.34	0.33	1.01	0.008	

Table 11 (Continued)

No.	Sample No.	ml. of original sample used	Absorbance			% Saccharin found	
			A235	A244	A235- A244	% saccharin	average
12	34A	50	1.20	0.30	0.90	0.007	0.007
	34B	50	1.18	0.29	0.89	0.007	
13	35A	50	1.55	0.38	1.17	0.009	0.009
	35B	50	1.57	0.37	1.20	0.009	
14	37A	100	0.64	0.20	0.44	0.003	0.004
	37B	100	0.68	0.21	0.47	0.004	
15	38A	50	0.80	0.27	0.53	0.004	0.005
	38B	50	0.85	0.25	0.60	0.005	
16	41A	50	1.64	0.41	1.23	0.010	0.010
	41B	50	1.73	0.44	1.29	0.010	
17	42A	50	1.74	0.42	1.32	0.010	0.010
	42B	50	1.83	0.45	1.38	0.011	
18	43A	50	1.16	0.34	0.82	0.006	0.007
	43B	50	1.20	0.33	0.87	0.007	
19	44A	100	1.27	0.30	0.97	0.004	0.004
	44B	100	1.20	0.28	0.92	0.004	
20	49A	100	1.37	0.34	1.03	0.004	0.004
	49B	100	1.42	0.36	1.06	0.004	
21	50A	100	1.60	0.50	1.10	0.004	0.005
	50B	100	1.72	0.55	1.17	0.005	

Saccharin found were between 0.003 to 0.011 per cent

Mean value was 0.007 per cent