CHAPTER VII

Laboratory Results.

CHAPTER - 7

LABORATORY RESULTS

7.1 Parametric Values :

The present chapter intends to analyse the laboratory results obtained by both department and us. The department uses the following parameters for detecting the adulteration in groundnut oil :

1)	Butyro Refractometer reading (B.R.)at 40°C	54.0 to 57.1
2)	The saponification value	188 to 196
3)	Iodine value	85 to 99
4)	Unsaponifiable matter	not more than 1.0 percent
5)	Acid value	not more than 6.0 percent
6)	Bellier test (Turbidity Temperature Acetic acid method)	39°C to 41°C

Besides these above tests the following general tests are also carried out which are of less significance, viz. appearance, Rancidity and test for mineral oils. Out of the three tests in the latter two tests sample seldom fails, as if these tests are positive than the oil becomes unfit for human consumption as well bad in odour taste and while frying gives bad odour. Hence dealer is unable to sell such oil to costumers.

There are also some specific tests for certain oils which if reported positive shows the presence of specific oil (adulterant) in a given oil.

These are as below :

1)	Halphen's test	This is a test for the presence of Ref. cottonseed oil.
2)	Boudain's test	This is a test for detecting presence of til oil.
3)	Test for castor oil (By TLC method)	This is a specific test for the presence of castor oil (Thin TLC layer chromatography)

The variations in the parametric values laid down by the PFA Act are allowed between minimum and maximum limits.

Between 1989 to 1991 the department samples of rapeseed oil, groundnut oil, soyabeen oil had been tested in the laboratories. Among these samples groundnut oil samples are concerned they had usually failed to come up with the standard of (1) B.R. reading, (2) Iodine value and (3) Bellier test. Only few samples have failed in acid value and saponi fication value. Only one sample of groundnut oil in 1992 has failed on account of castor oil being present.

7.2 Result of Our Samples :

The samples of groundnut oil drawn and tested by us correspond to different time periods. In the first instance the samples spread over the period between 23 January to

February 1992, out of the seven samples drawn and tested only four samples did not conform to the standards of PFA act. One has failed in Bellier's test, second has failed in specific castor oil test, which is positive, third has failed in B.R. reading and Bellier's test and fourth only in castor oil test. Remaining 15 samples have conformed to the standard laid by the PFA act. It is surprising to note that about 75 percent of the samples drawn by us conformed to the standards, though they are of doubtful validity. This might have been happened due to laboratory defects or lack of recently advanced laboratory equipment used for testing the edible oils. Again it is just possible that some of them might have been due to the personal error of laboratory technicians/assistants.

When 75% of the samples satisfied the food standard of PFA, we experimented by mixing 20% of substitute edible oils in groundnut oil and tested in the laboratory which conformed to the minimum standards of PFA act, e.g. when 20% castor oil is mixed with groundnut oil then the mixture itself come to the standards of groundnut oil. Similarly, when 20% soyabeen oil is mixed with groundnut oil then this mixture also comes up to the standards of the groundnut oil. Again the mixtures of groundnut oil with rapeseed and sunflower at the ratio of 80:20 conformed to the standards of groundnut oil, therefore, the mixtures at these ratios normally go undetected. Besides the other adulterants which

are likely to be used go undetected unless specific tests are conducted. When these mixtures come up to the standards of PFA act, we made an arithmetic exercises to prove how these samples conformed to the standards, though adulterated By taking the mean values of every parameters we come to know that these mixtures satisfy the standard of PFA that means, the values of different parameters lied between the minimum and maximum range. Details of calculation that we have made are described somewhere in the preceding chapter. For the detailed results of our calculations please refer Table No.7.2.

Again we experimented with the different edible oil mixtures at the ratio of 50:50 viz. groundnut oil plus refined cotton seed oil, soyabeen oil plus groundnut oil, sunflower oil with soyabeen oil and soyabeen oil with refined cotton seed oil. Among these four samples only one mixture of soyabeen with sunflower oil gets through the test normally applied to sunflower oil. Other mixtures do not conform to the standards when groundnut oil and soyabeen oil are mixed at equal ratio and when tested as a groundnut oil also failed. The last one the soyabeen oil with refined cotton seed oil has also failed to satisfy the standards prescribed for soyabeen oil. Hence there is large room for a mixture of sunflower with soyabeen oil at the said ratio to be sold in the market.

Table VII-1 : Samples of Groundnut Oil drawn for testing in the laboratory

Date and year	Name of oil	Parameters to which the samples did not conform
11th July 1989	Rapeseed oil	Iodene value 110.87 Bellier test Turbidity temperature Acetic Acid Met. 290°C
15th July 1989	Groundnut oil	B.R. reading at 40°C 59.4 Iodene value 103.22 Bellierd Test 30°C.
18th Sept. 1989	,,	B.R. reading 58.0 Iodene 110.25 Bellierd test 37.5°C
7th Nov. 1989	,,	Acid value 7.6
,,	,,	Acid value 8.14
16th Feb. 1990	,,	B.R. reading 59.8 Iodene 110.25 Bellierd Test 32.5°C
16th May 1990	,,	Iodene value 101.67 Bellierd Test 33.0°C
11th June 1990	Soyabeen oil	B.R. Reading 58.3 Saponification value 186.35 Iodene value 105.75
10th Oct. 1990	Groundnut oil	B.R. reading 58.5 Iodene value 106.88 Belliard Test 30°C
13th Sept. 1991	Coconut oil	B.R.reading 40.5°C Saponification value 249.12 Iodene value 14.22 Polenskey value 7.1
9th Jan. 1992	Groundnut oil	B.R.R. 61.1 Iodene value 114.02 Bellierd Test 20.0°C
23rd Jan. 1992	,,	B.R. reading 58.5 Iodene value 102.57 Bellierd Test 34.0°C
24th Jan. 1992	,,	Caster oil +ve
13th March 1992	,,	B.R. reading 59.0 Iodene value 105.85 Belliard Test 37.5°C
March 92	,,	B.R. Reading 60.6 Iodene value 102.65 Bellierd Test 34.5°C
13th April 1992	Palm oil	B.R.reading at 50°C 47.5
18th Sept. 1992	Groundnut oil	Appearance not clear and it contains suspended matter Belliard Test 41.5°C.

Table VII-2 : Chart showing the values of the parameters used for testing the edible oils in the laboratories.

Oils	Parameters			Remarks
	B. R.	Saponification reading	Iodene reading	
Groundnut oil	54 to 57.1	188 to 196	85 to 99	
Castor oil	66 to 72	177 to 185	82 to 90	Pass
Mixtures of 10 kg. G.N. and 2 kg. castoroil	57.2	191	91	
Groundnut oil	54 to 57.1	188 to 196	85 to 99	
Linseed	69.5 to 74.3	188 to 195	Not less than 170	Fails
Mixture of 10 kg. G.N. and 2 kg. linseed	57.8	108.7	105	
Groundnut oil	54 to 57.1	188 to 196	85 to 99	
Soyabeen oil	58.5 to 68.0	189 to 195	120 to 140	Pass
10 kg. of G.N. and 2 kg of Soyabeen	56.3	191.1	97.5	
Groundnut oil	54 to 57.1	188 to 196	85 to 99	
Sunflower	57.1 to 82.9	181 to 194	100 to 145	Pass
10 kg of G.N. and 2 kg of sunflower	55.7	191.0	97.0	
Groundnut oil	54 to 57.1	188 to 196	85 to 99	
Rapesee oil	58.0 to 60.5	168 to 177	96 to 110	Pass
10 kg. of G.N. and 2 kg of Rapeseed	56.0	188.5	93.8	

Table VII-3 : Chart showing the results of laboratory tests of edible oil mixtures at the ratio of 50:50 .

Edible oils & mixtures	Parameters							Test for			
	Butyro Refracto-meter at 40°C	Saponi-fication value	Iodine value	Unsaponi-fiable matter	Acid value	Belliers Turbidity test	Pollen value	Hal-phen	Baud win	Caster oil	Mineral oils
1) Refined cotton-seed oil	55.6 to 60.2	190 to 198	98 to 112	not more than 1.4%	not more than 0.50%	19.0°C to 21.0°C					
Mixture of refined cottonseed oil 50% + G.N.oil 50%	58.5	191.16	108.31	0.44	0.5000	fails 28°C	-	Posi-tive	Nega-tive	Nega-tive	Nega-tive
2) Groundnut oil	54-57.1	188 to 196	85 to 99	not more than 1.0%	not more than 6.0%	39°C to 41°C					
Mixture of Soyabeen oil 50% G.N. oil 50%	59.5	196.38	107.03	0.56	0.4448	32.5°C		Slight positive	Nega-tive	Nega-tive	Nega-tive
3) Sunflower oil	57.1 to 82.9	181 to 194	100 to 145	not more than 1.5%	not more than 6.0	-					
Mixture of soyabeen oil 50% sunflower oil 50%	60.8	192.30	120.45	0.62	0.8896	-	-	,,	,,	,,	,,
4) Soyabeen oil	58.5 to 68.0	189 to 195	120 to 141	not more than 1.5%	not more than 2.50%						
Mixture of soyabeen oil 50% cottonseed oil 50%	58.4	196.98	126.09	0.66	1.668	-	-	strong up positive	,,	,,	,,
5) Groundnut oil	54 to 57.1	188 to 196	85 to 99	not more than 1.0%	not more than 6.0	39°C to 41°C		Nega-tive	,,	,,	,,
	54.8	191.60	89.36	0.72	1.2232	42.5°C		Negative	,,	,,	,,