RISK ASSESSMENT

Reliance on Databases:

Identifying existing risks

RISK BASED ORGANIZATIONAL STRUCTURE

FOOD AND AGRICULTURE
ORGANIZATION
OF THE UNITED NATIONS

WORLD
HEALTH
ORGANIZATION
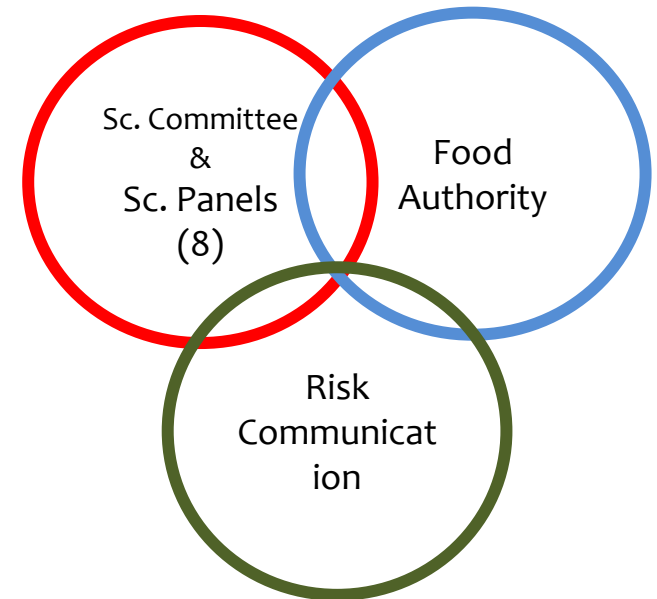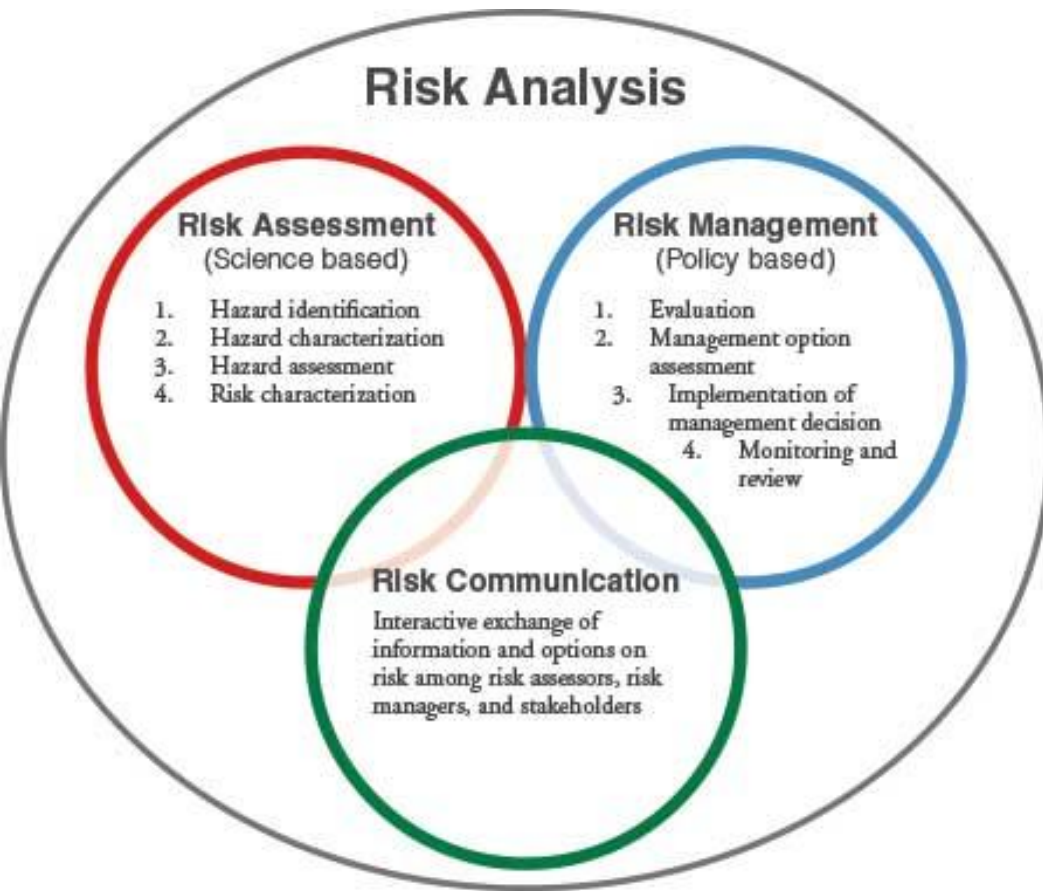
Traditional Food Safety System

- Reactive approach
- Main responsibility with government
- No structured risk analysis
- Relies on end product inspection and testing

Level of risk reduction: not always satisfactory

Modern Food Safety System

- Preventive approach
- Shared responsibility
- Addresses farm-to-table continuum
- Science based
- Use of structured risk analysis
- Establishes priorities
- Integrated food control
- Relies on process control

Level of risk reduction: improved

Managing Risks

CONTROL RISK - FACTORY
PROCESS STDS (SELF CONTROL)

FOOD SAFETY MANAGEMENT SYSTEM

- SAFETY OBJECTIVE
- RISK PROFILE
- PERFORMANCE
- MEASUREMENT
- HACCP
- GHP-GMP-GLP

- TRACEABILITY
- RECALL PLAN
- CERTIFICATION
- 3P AUDIT
- SELF AUDIT
- INSPECTIONS

INHERENT RISK - MARKET
STANDARDS

GENERAL

- Labeling
- Food Additive
- Pesticide
- Contaminant
- Antibiotics
- Other . . . .
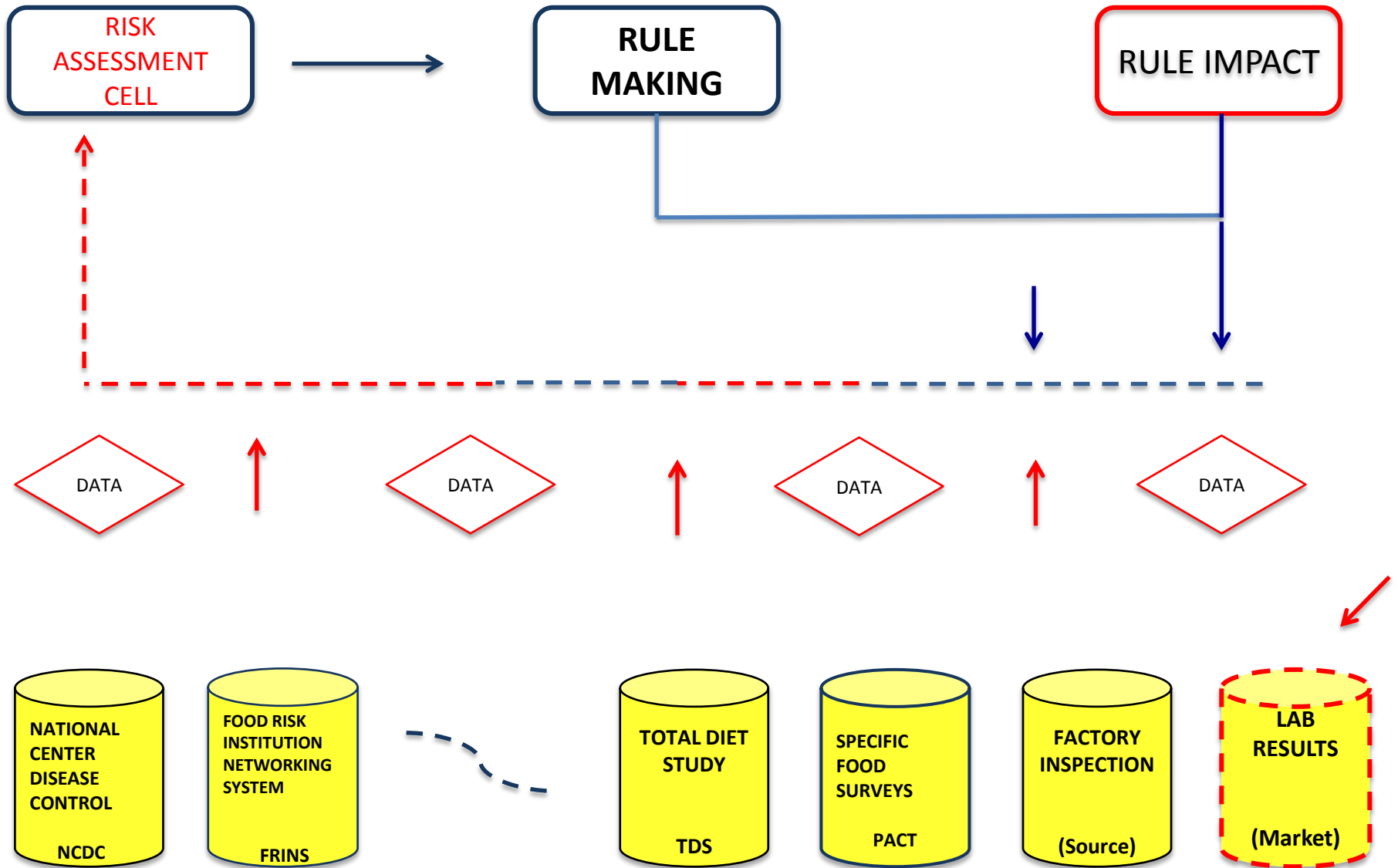
PRODUCT

- Ingredient
- Product
- Category

FSSAI - 16. 3b
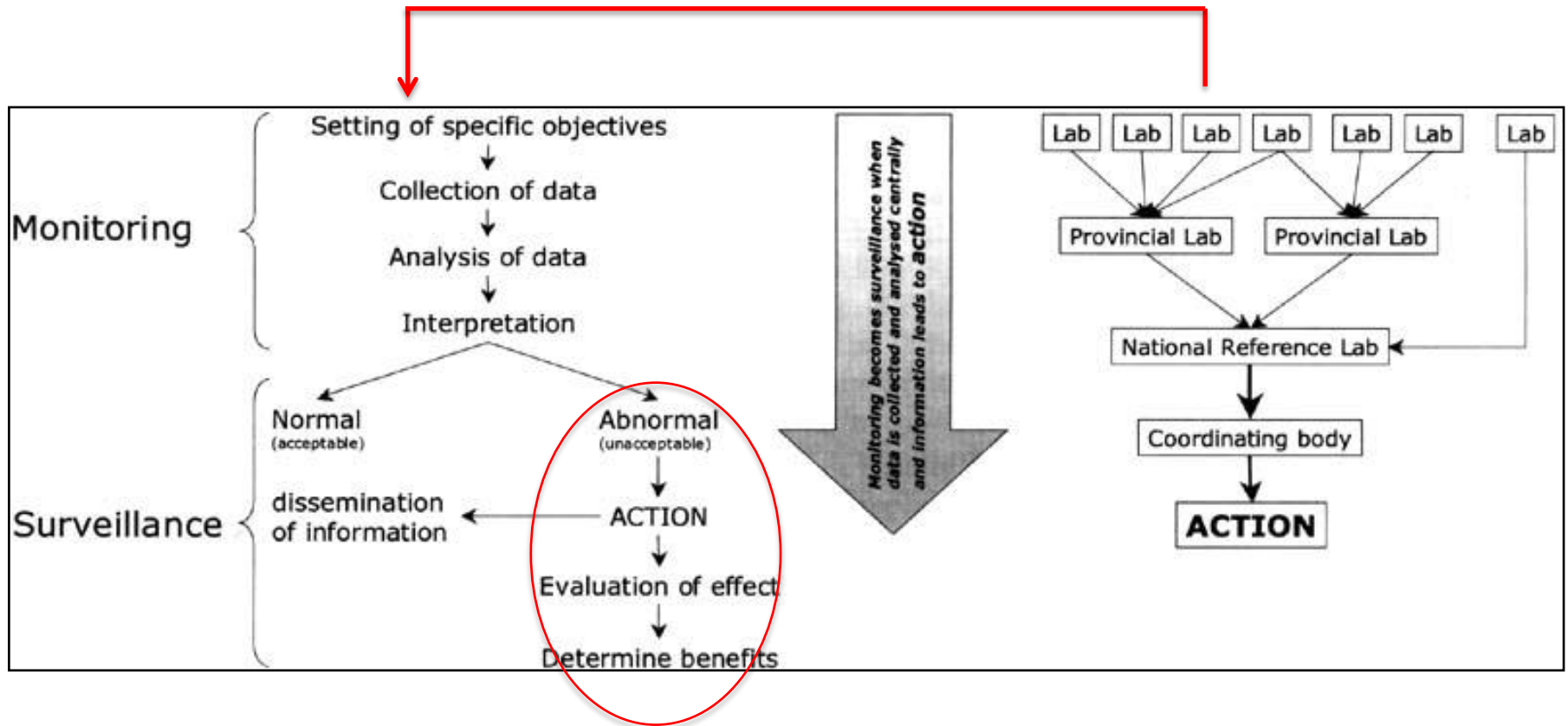
SURVEILLANCE   MONITORING   &   EVALUATION

Support Systems for Risk Assessment

1. MONITORING & CONTROL & SURVEILLANCE

- ❖ Enforcement - directed - result based - consumer benefit measured
- ❖ Preventive (Safety) - trend rising (e.g. color additives)
- ❖ Emerging risk -

GNCT database Analysis

❖ Pre-requisite learning

❖ Conceptualizing -

  ❖ Risk based data base for FSSAI

Analyst Test Reports

S. No	Data requested from	No. of reports received	Time period
1.	Delhi (GNCT)	online	August 2011
2	Maharashtra	114	January-March, 2016
3	TamilNadu	50	January-March, 2016
4	Gujarat	18	January-March, 2015 and 2016
5	Karnataka	Not Received	
6	CFL, Kolkata		

GNCT - Data base

1. **Good Data base - perhaps one of its kind in the country**
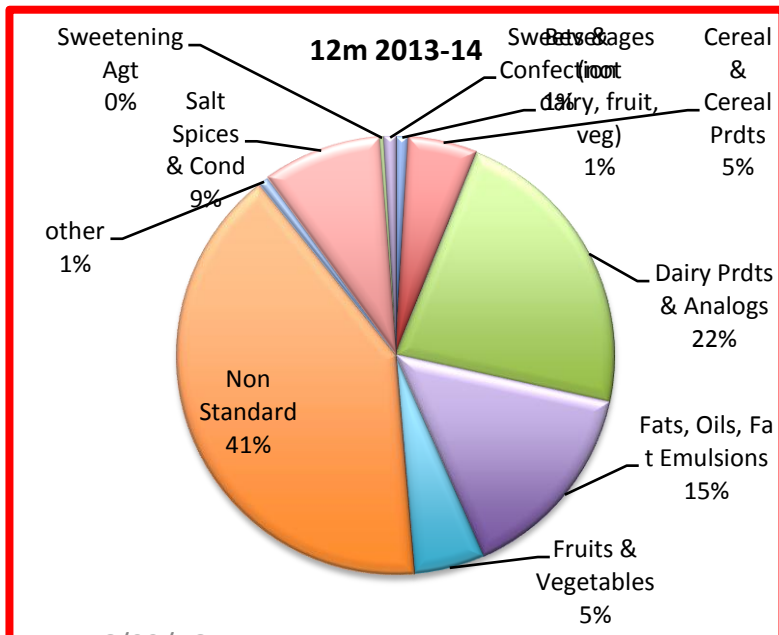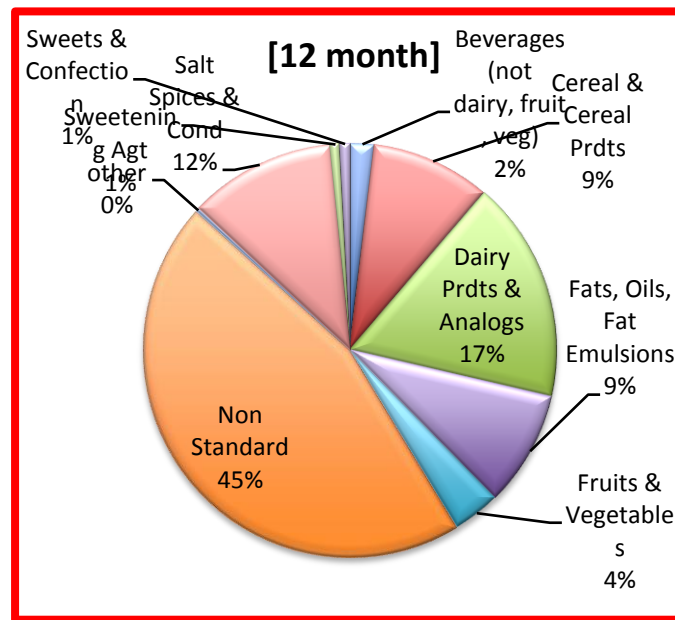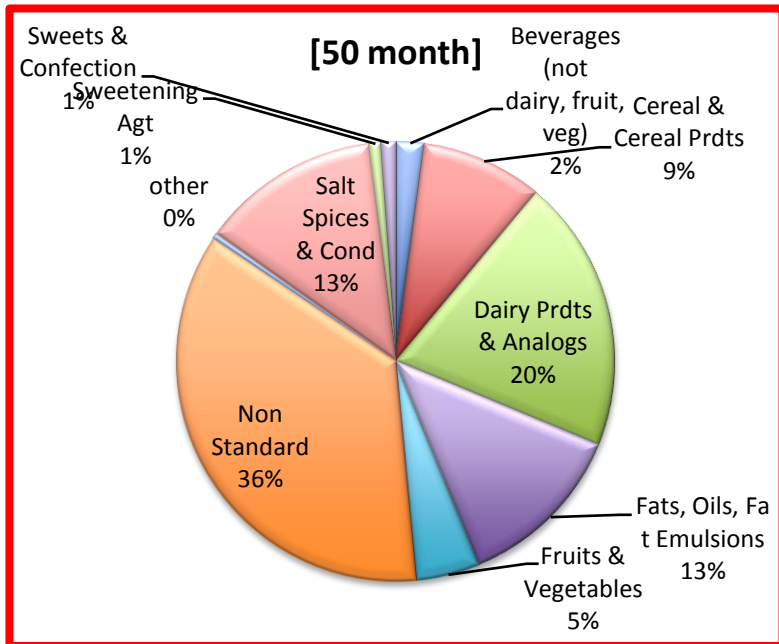
   – Gives a wealth of information

2. **Overview of All Tests done**

   – 2011 - 2016 (50months)

   – 2015 (12 months)

3. **Data mining of 2015 -**

   – Most frequent failure (GMSUV)

   – Which food sector/products failing

   – What parameter is it failing

   – Why is it failing ???

[50 month]

Sweets & Confection 1%
Sweetening Agt 1%
other 0%
Beverages (not dairy, fruit, veg) 2%
Cereal & Cereal Prdts 9%
Salt Spices & Cond 13%
Dairy Prdts & Analogs 20%
Non Standard 36%
Fats, Oils, Fat Emulsions 13%
Fruits & Vegetables 5%

[12 month]

Sweets & Confection 1%
Sweetening Agt 1%
other 0%
Salt Spices & Cond 12%
Beverages (not dairy, fruit veg) 2%
Cereal & Cereal Prdts 9%
Dairy Prdts & Analogs 17%
Non Standard 45%
Fats, Oils, Fat Emulsions 9%
Fruits & Vegetables 4%

12m 2013-14

Sweetening Agt 0%
Salt Spices & Cond 9%
other 1%
Sweets & Confection 1%
Beverages (not dairy, fruit, veg) 1%
Cereal & Cereal Prdts 5%
Dairy Prdts & Analogs 22%
Non Standard 41%
Fats, Oils, Fat Emulsions 15%
Fruits & Vegetables 5%

Inspection & Analysis

❖ **Reflects similarity** - *routine*
  - ❖ 36-45% Non Standard Foods *(always highest)*
  - ❖ 17-22% Milk & Milk Products
  - ❖ 9-13% Spices
  - ❖ 9-13% Oils
  - ❖ 4-5% Fruits & Vegetables

16/03/16

50 Month (2011-16)

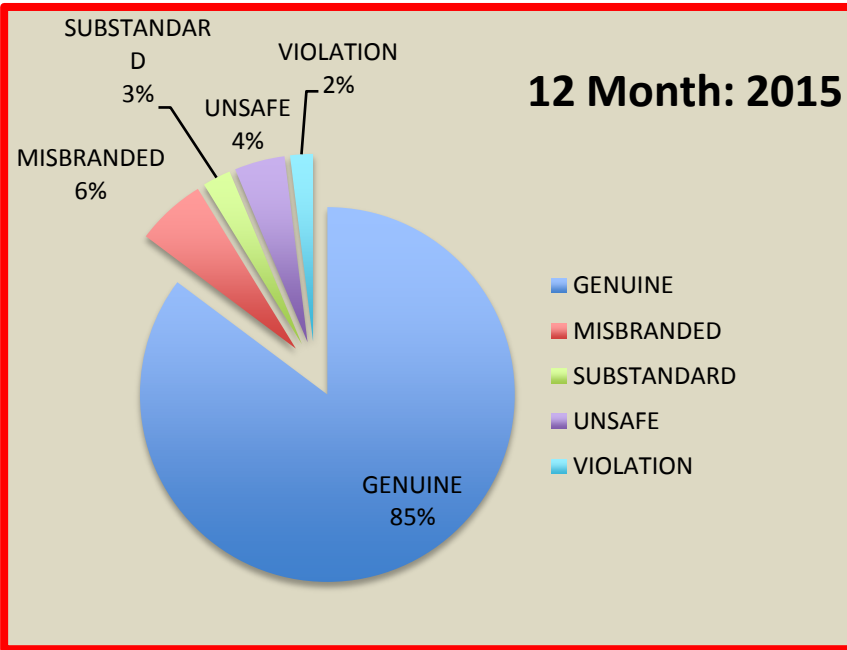| Sl No.	Food Category	Total No. Of Sample Taken	Result Declared	Result Awaited	Genuine	Misbranded	Substandard	Unsafe	Violation
1	Beverages (Other than Dairy and Fruits & Vegetable based)	155	155	0	147	4	1	3	0
2	Cereal and Cereal Products	665	665	0	600	34	11	19	1
3	Dairy Products and Analogues	1491	1491	0	1349	10	130	2	0
4	Fats, Oils and Fat Emulsions	930	929	1	898	12	17	1	1
5	Fish and Fish Products	2	2	0	2	0	0	0	0
6	Fruits and Vegetable Products	347	347	0	316	14	10	6	1
7	Irradiation of Food	3	3	0	3	0	0	0	0
8	Meat and Meat Products	3	3	0	3	0	0	0	0
9	Non Standard	2658	2658	0	2227	129	27	216	59
10	Other Food Products and Ingredients	34	34	0	25	5	1	3	0
11	Salt, Spices,Condiments and related Products	976	976	0	928	20	15	12	1
12	Sweetening Agents Including Honey	65	65	0	55	4	1	5	0
13	Sweets and Confectionery	78	78	0	61	9	2	2	4
	GRAND TOTAL	7407	7406	1	6614	241	215	269	67

12 Month: 2015

Sl No.	Food Category	Total No. Of Sample Taken	Result Declared	Result Awaited	Genuine	Misbranded	Substandard	Unsafe	Violation
1	Beverages (Other than Dairy and Fruits & Vegetable based)	32	32	0	30	2	0	0	0
2	Cereal and Cereal Products	157	157	0	133	15	2	7	0
3	Dairy Products and Analogues	291	291	0	271	1	19	0	0
4	Fats, Oils and Fat Emulsions	151	150	1	139	4	6	0	1
5	Fruits and Vegetable Products	62	62	0	58	0	1	2	1
6	Irradiation of Food	1	1	0	1	0	0	0	0
7	Meat and Meat Products	2	2	0	2	0	0	0	0
8	Non Standard	760	760	0	601	65	6	57	31
9	Other Food Products and Ingredients	7	7	0	3	2	1	1	0
10	Salt, Spices,Condiments and related Products	192	192	0	174	10	5	3	0
11	Sweetening Agents Including Honey	12	12	0	8	1	0	3	0
12	Sweets and Confectionery	13	13	0	11	1	1	0	0
	GRAND TOTAL	1680	1679	1	1431	101	41	73	31

16/03/16

FROM 1/4/2013 TO 31/3/2014

Sl No.	Food Category	Total No. Of Sample Taken	Result Declared	Result Awaited	Genuine	Misbranded	Substandard	Unsafe	Violation
1	Beverages (Other than Dairy and Fruits & Vegetable based)	11	11	0	9	0	0	2	0
2	Cereal and Cereal Products	61	61	0	57	2	0	1	1
3	Dairy Products and Analogues	266	266	0	240	1	25	0	0
4	Fats, Oils and Fat Emulsions	178	178	0	170	2	6	0	0
5	Fruits and Vegetable Products	62	62	0	55	1	3	3	0
6	Non Standard	483	483	0	421	13	4	41	4
7	Other Food Products and Ingredients	9	9	0	7	2	0	0	0
8	Salt, Spices,Condiments and related Products	104	104	0	103	0	0	1	0
9	Sweetening Agents Including Honey	4	4	0	2	2	0	0	0
10	Sweets and Confectionery	10	10	0	6	2	0	1	1
	GRAND TOTAL	1188	1188	0	1070	25	38	49	6

FROM 1/1/2015 TO 31/12/2015

| Sl No.	Food Category	Total No. Of Sample Taken	Result Declared	Result Awaited	Genuine	Misbranded	Substandard	Unsafe	Violation
1	Beverages (Other than Dairy and Fruits & Vegetable based)	32	32	0	30	2	0	0	0
2	Cereal and Cereal Products	157	157	0	133	15	2	7	0
3	Dairy Products and Analogues	291	291	0	271	1	19	0	0
4	Fats, Oils and Fat Emulsions	151	150	1	139	4	6	0	1
5	Fruits and Vegetable Products	62	62	0	58	0	1	2	1
6	Irradiation of Food	1	1	0	1	0	0	0	0
7	Meat and Meat Products	2	2	0	2	0	0	0	0
8	Non Standard	760	760	0	601	65	6	57	31
9	Other Food Products and Ingredients	7	7	0	3	2	1	1	0
10	Salt, Spices,Condiments and related Products	192	192	0	174	10	5	3	0
11	Sweetening Agents Including Honey	12	12	0	8	1	0	3	0
12	Sweets and Confectionery	13	13	0	11	1	1	0	0
	GRAND TOTAL	1680	1679	1	1431	101	41	73	33

2013-14   (12 months)

2015   (12 months)

In 2015

- ❖ NSF 45% of total samples
- ❖ NSF 64% up in 2015

18/03/16
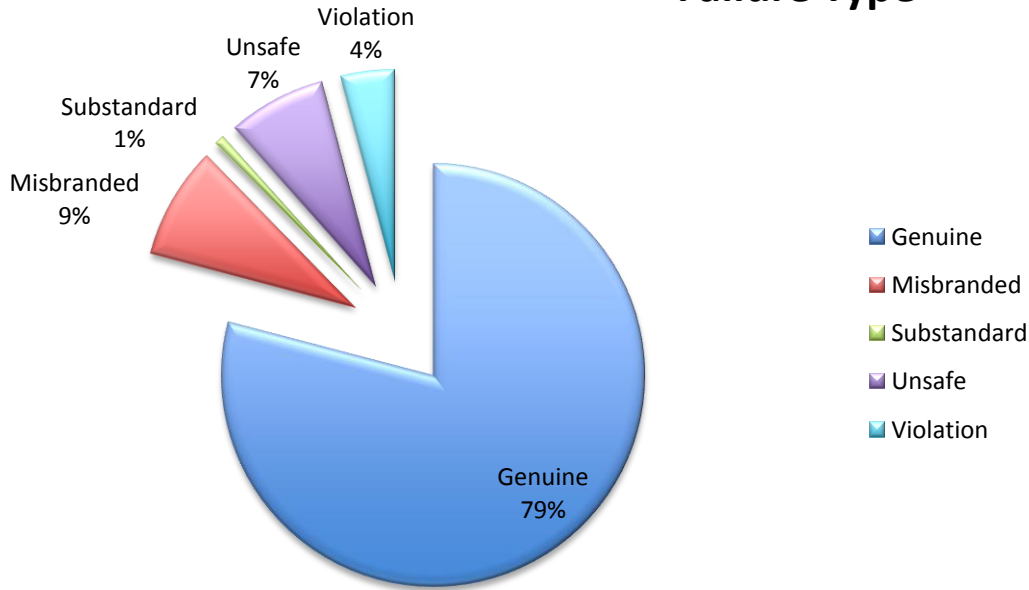
NON STANDARD	12M
FAILURE TYPE	No
Genuine	601
Misbranded	65
Substandard	6
Unsafe	**57**
Violation	31

UNSAFE: 2015
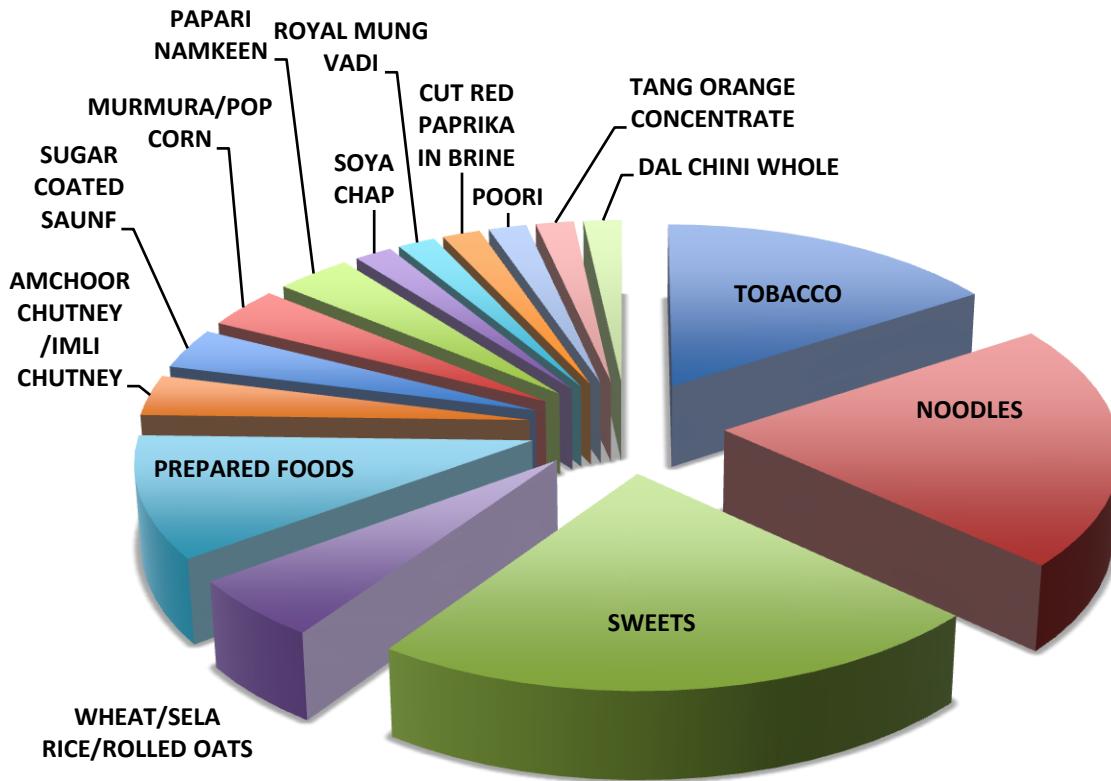
FOODS UNDER NON STANDARD	NO
TOBACCO	9
NOODLES	12
SWEETS	13
WHEAT/SELA RICE/ROLLED OATS	3
PREPARED FOODS	6
AMCHOOR CHUTNEY /IMLI CHUTNEY	2
SUGAR COATED SAUNF	2
MURMURA/POP CORN	2
PAPARI NAMKEEN	2
SOYA CHAP	1
ROYAL MUNG VADI	1
CUT RED PAPRIKA IN BRINE	1
POORI	1
TANG ORANGE CONCENTRATE	1
DAL CHINI WHOLE	1
TOTAL	57

Noodle
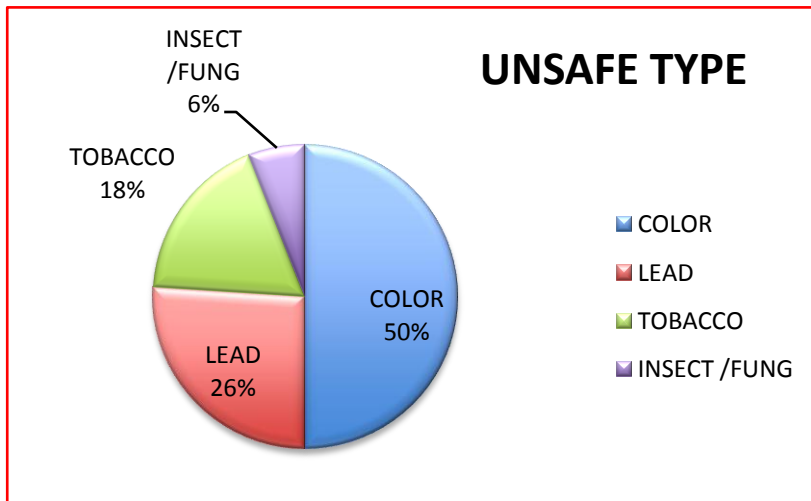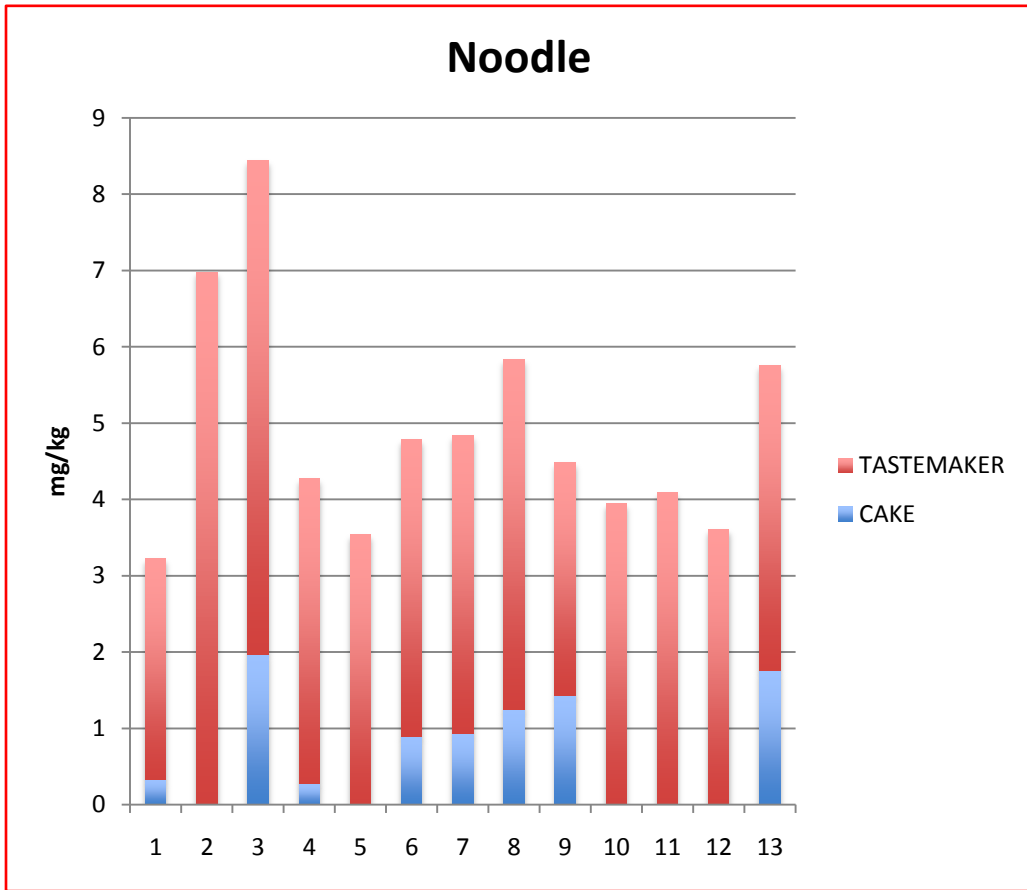
Sample	CAKE	TASTEMAKER
N31	0.33	2.9
N33	0	6.98
N35	1.97	6.48
N36	0.27	4
N37	0	3.54
N38	0.89	3.89
N39	0.93	3.91
N40	1.25	4.59
N41	1.43	3.05
N42	0	3.95
N43	0	4.09
N44	0	3.6
N45	1.76	4
AVG	0.68	4.2

1. "Tastemaker' tests higher for lead
2. Reasons - sources
3. Remedy - long term

1.	Maximum Limit	100 ppm
2.	Average	146 ppm

INDIAN SWEETS

	s4	S5	S6	S7	S8	S9	S10	S11	S14	S20	S21	S27	S52
SAMPLE	119	131	149	145	135	115	123	118	234	124	220	157	133

y-axis: mg/ke
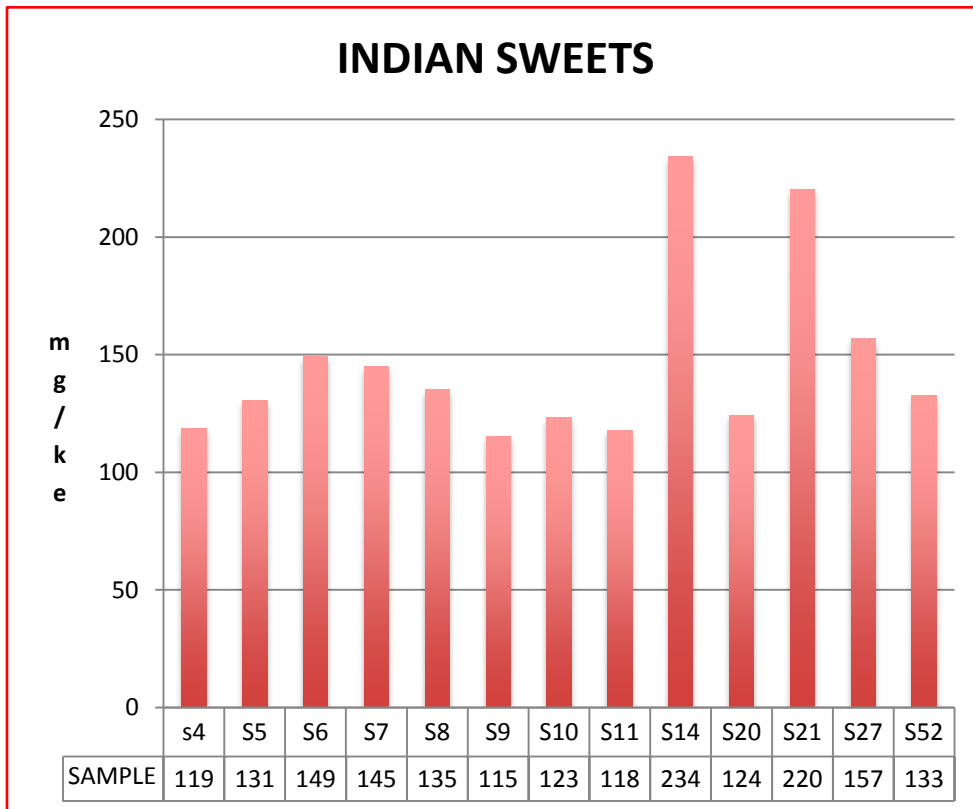
❖ **Exceeding ML -**

   o legal infringement

❖ **Exceeding ADI -**

   o determines safety

❖ **Reason for excess ?**

   o Insufficiency of limit?
   o Inability to test ?

❖ **Remedy ?**

What is the ' story '
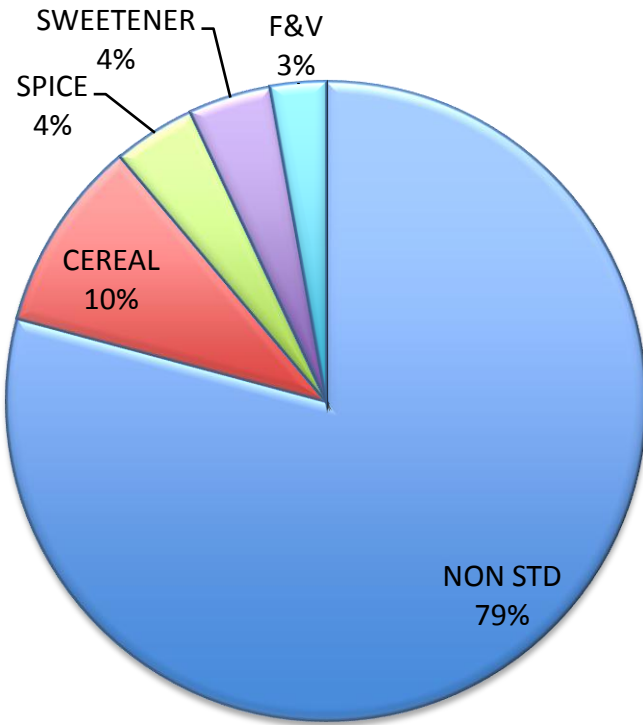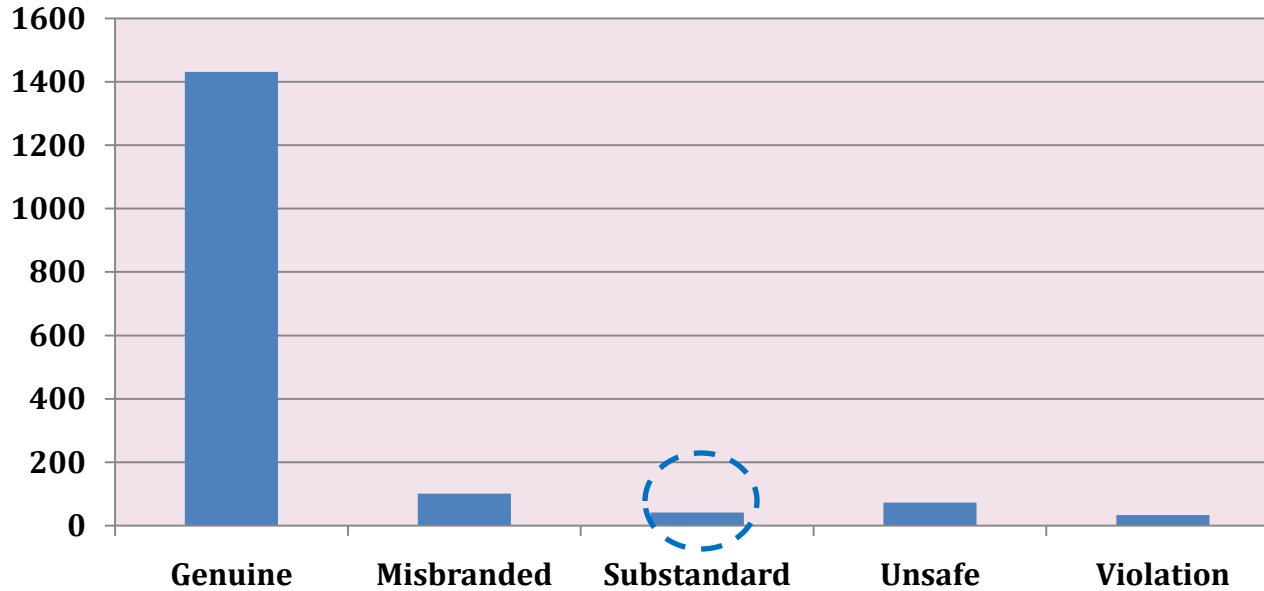
TOTAL UNSAFE 2015	
NON STD	57
CEREAL	7
SPICE	3
SWEETENER	3
F&V	2
TOTAL	72

UNSAFE FOODS 2015

SUB STANDARD

Sample Tested in 2015

Food Category	No. of sample tested
Genuine	1431
Misbranded	101
Substandard	41
Unsafe	73
Violation	33

"Sub-standard" an article of food shall be deemed to be sub-standard if it does not meet the specified standards but not so as to render the article of food unsafe
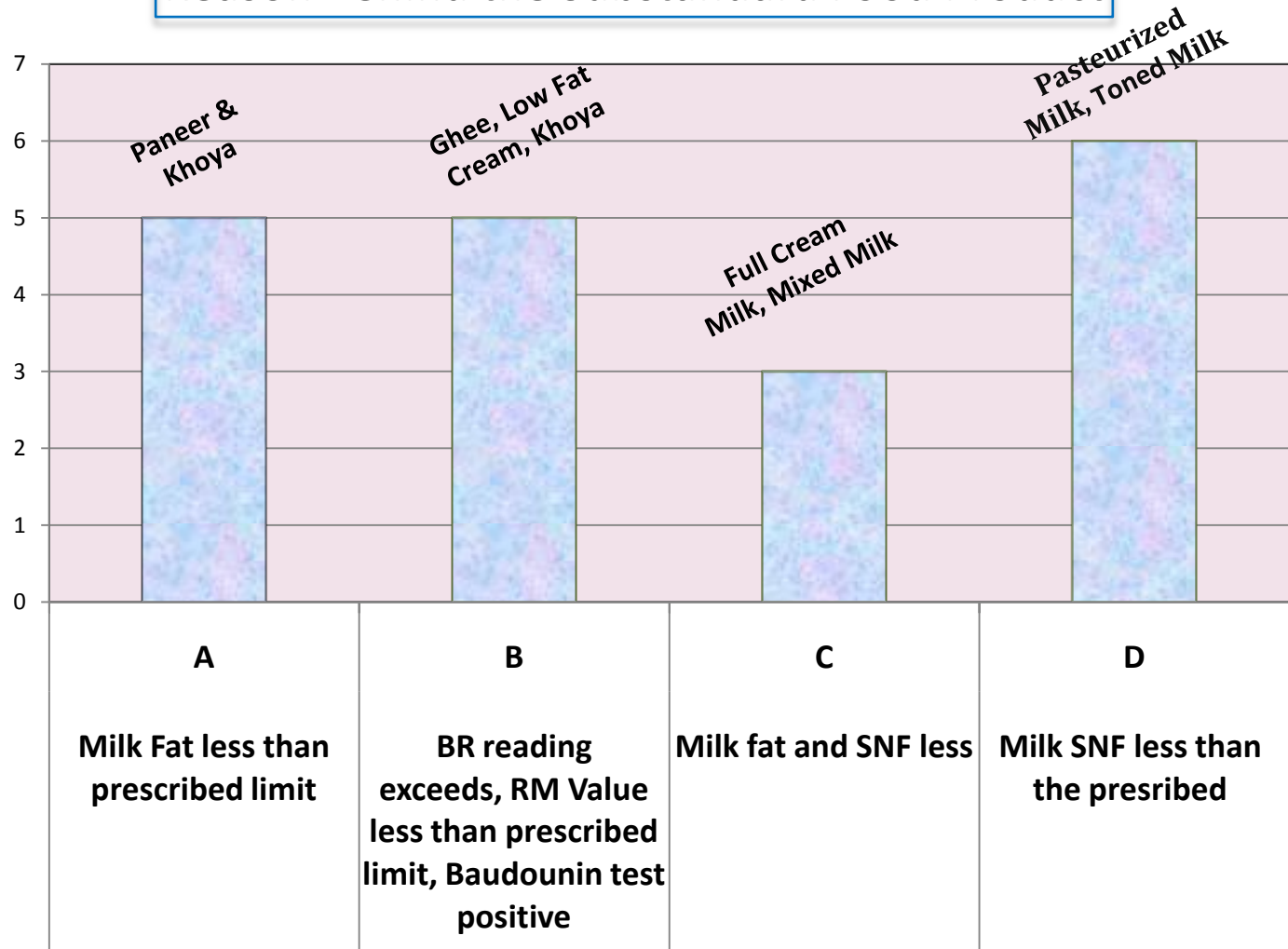
Analysis Report of Substandard Food Products
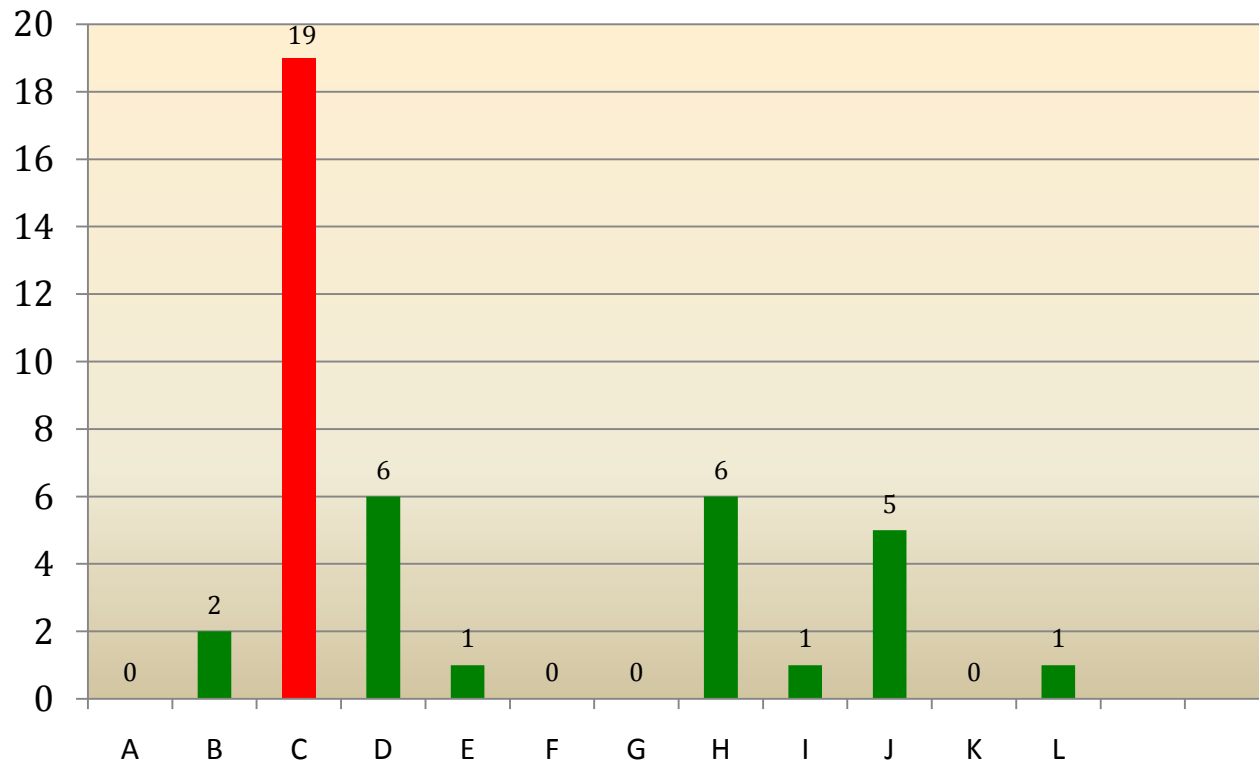
A-Beverages
B-Cereal and Cereal Products
C- Dairy Products and Analogues
D- Fats, Oils and Fat Emulsions
E-Irradiation Of Food
F- Meat and meat Products
G- Non Standard
H- Salt, Spices and Condiments
I- Sweetening agent
J- Sweets and Confectionery

TOTAL 41

Reason Behind the Substandard Food Product

Reason Behind the Substandard Dairy and Dairy Product is SOLID NOT FAT

	Pasteurized Full Cream Milk	Standarized Milk	Toned Milk	Full Cream Milk	Full Cream Milk	Toned Milk	Mixed Milk	Mixed Milk	Pasteurized Full Cream Milk
Observation	8.59	8.16	8.24	8.64	8.6	8.24	7.14	8.21	8.76
Standard	9	8.5	8.5	9	9	8.5	8.5	8.5	9
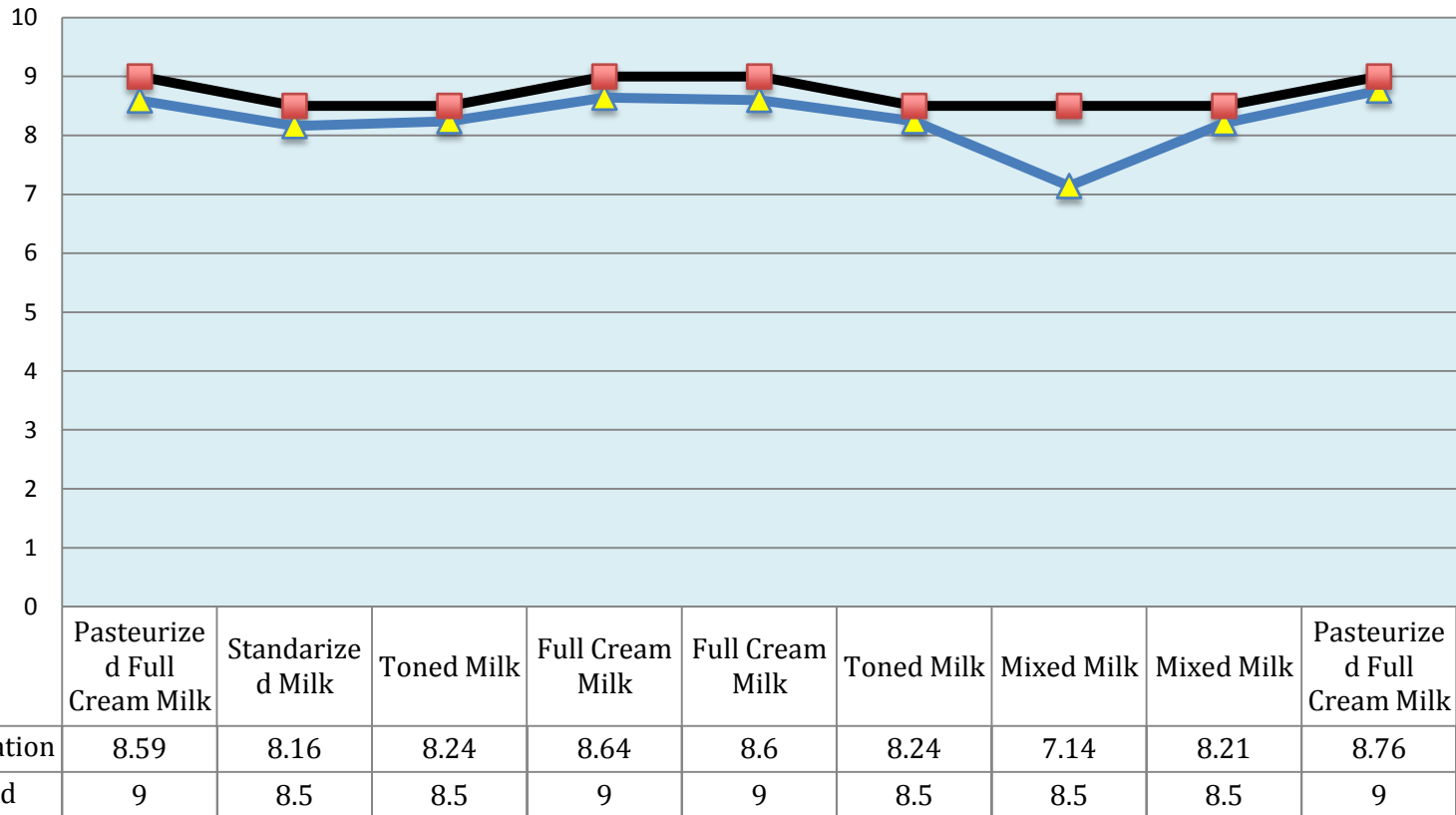
Data-based
Surveillance and monitoring

1. **Risk based inspections/analysis - food sector wise**

    ❖ Fish, meat, poultry - *low to nil*

    ❖ Fresh fruit, vegetables - pesticide residues, contaminants - *low to nil*

    ❖ Food grains, nuts - toxins - *low to nil*

2. **Failure reductions - intent and measure?**

    ❖ E.g. Indian Sweets - exceeding color limits

    ❖ Milk - Solids non fat (SNF)

    ❖ Review of standards/analytical reproducibility

3. **Targeted Enforcement Action**

    ❖ Directed V/s Routine actions

4. **Review Analyst decisions** -

    ❖ Quality of citing offences

    ❖ Role of FSO/DO - in safety and risk reduction (review)

Analyst Test Reports -

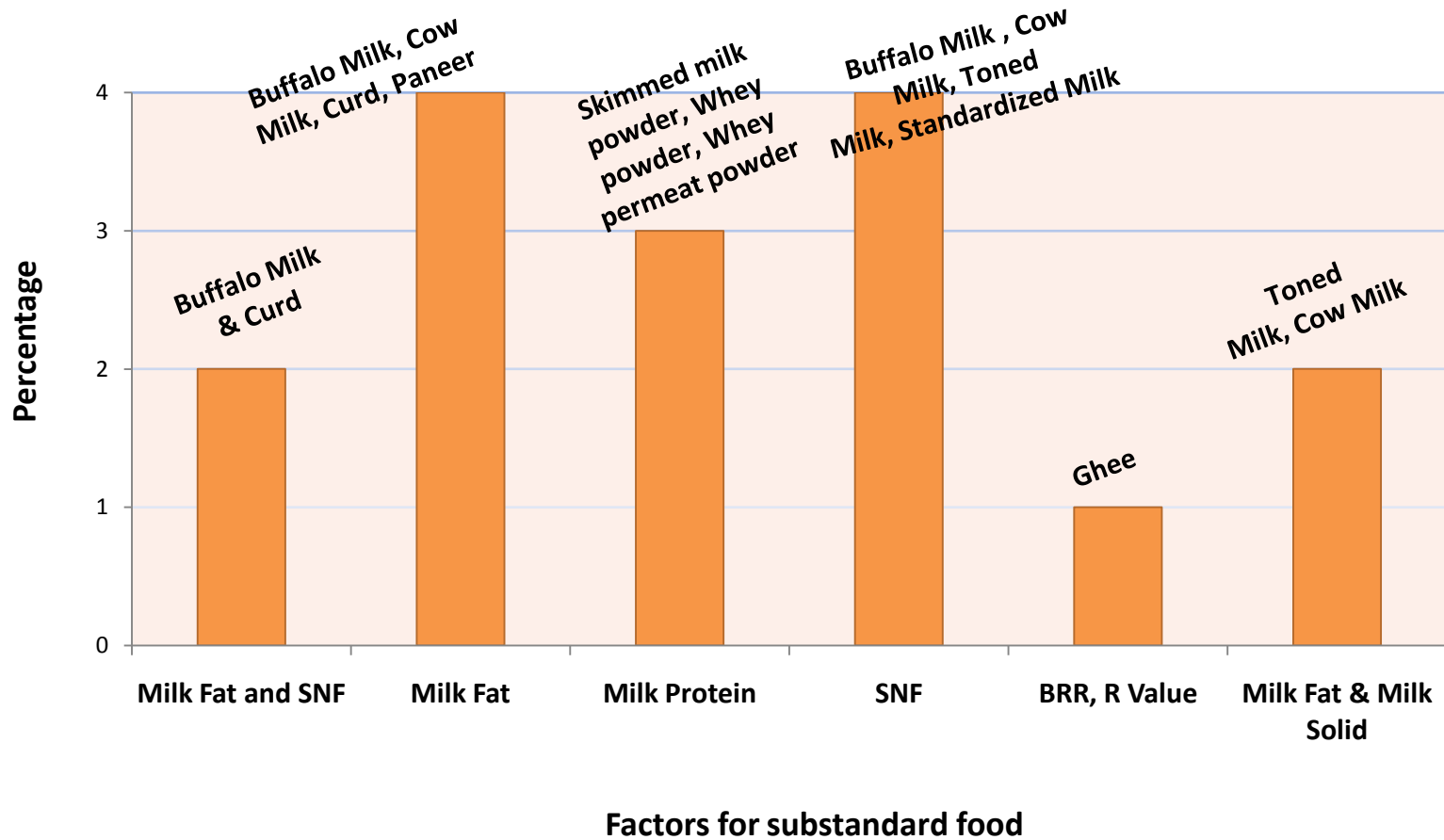| FDA	Total Reports	Non Conforming	Conforming
Maharashtra	114	64	50
Tamilnadu	50	42	8
Gujarat	18	18	0

1. Failures declared as "Non conforming"
2. Not grouped as: Misbranded, Substandard, Unsafe and Violation
3.

MAHARASHTRA

Food Category wise Sample Taken in January-March,2016

S. No	Food Category	Genuine	Misbranded	Substandard	Unsafe	Violation
1	Cereal & Cereal Products	8	2	0	0	0
2	Dairy Products & Analogues	21	1	**17**	0	5
3	Fats, Oils & Fat Emulsions	11	0	**11**	0	0
4	Non-Standard	1	5	2	**6**	6
5	Fruit & Vegetable Products	3	0	0	1	0
6	Salt, Spices, Condiments & Related Products	5	0	2	4	0
7	Beverages	1	2	0	1	1
8	Other Food Products and Ingredients	0	0	0	1	2
9	**Total**	**50**	**10**	**32**	**13**	**14**

Reason for substandard food in Dairy products and Analogues

Chart showing Percentage (y-axis, 0 to 4) vs Factors for substandard food (x-axis).

- **Milk Fat and SNF**: 2 — Buffalo Milk & Curd
- **Milk Fat**: 4 — Buffalo Milk, Cow Milk, Curd, Paneer
- **Milk Protein**: 3 — Skimmed milk powder, Whey powder, Whey permeat powder
- **SNF**: 4 — Buffalo Milk, Cow Milk, Toned Milk, Standardized Milk
- **BRR, R Value**: 1 — Ghee
- **Milk Fat & Milk Solid**: 2 — Toned Milk, Cow Milk

Reason For Unsafe Food

Chart showing Percentage (y-axis, 0–8) against Factors (x-axis). Bars:
- Synthetic Colour, Dye Content: 7
- Rice strach: 1
- Uric Acid: 1
- Mineral Oil: 1
- Fungal Growth, TPC: 2
- Extraneous Matter: 3
- Total acid and Volatile Acid: 1
- Artificial Sweetener: 1
- Insects, Rat Excreta: 2
- Magnesium Carbonate, Alkaloids: 4

2. GUJARAT

Food Category wise Sample Taken in January-March,2016

S. No	Food Category	Misbranded	Substandard	Unsafe
1	Cereal & Cereal Products	0	1	1
2	Dairy Products & Analogues	0	3	0
3	Fats, Oils & Fat Emulsions	0	7	0
4	Non-Standard	2	0	3
5	Beverages	1	0	0
6	Total	3	11	4

Analyst Report Data: PHL, Vadodara

S. No	Year	Month	Total No. of samples received	Total no. of samples analyzed	Total no. of samples passed	Total no. of samples failed
1	2015	January	112	112	112	00
2	2015	February	106	106	100	06
3	2015	March	94	94	89	05
TOTAL			312	312	301	11
4	2016	January	92	92	90	02
5	2016	February	96	96	90	06
6	2016	March (up to 29.03.2016)	50	47	46	01
TOTAL			238	235	226	09

Reason for Substandard Food Sample

(**Ghee**) BRR, RM Value
9%

(**Kulfi**) TSS, Milk Fat, BRR
9%

(**Paneer**), BRR
9%

(**Besan**)Foreign Starch
9%

(**Cottonseed Oil**)BRR, Iodine Value, BTT, AV
64% (7)
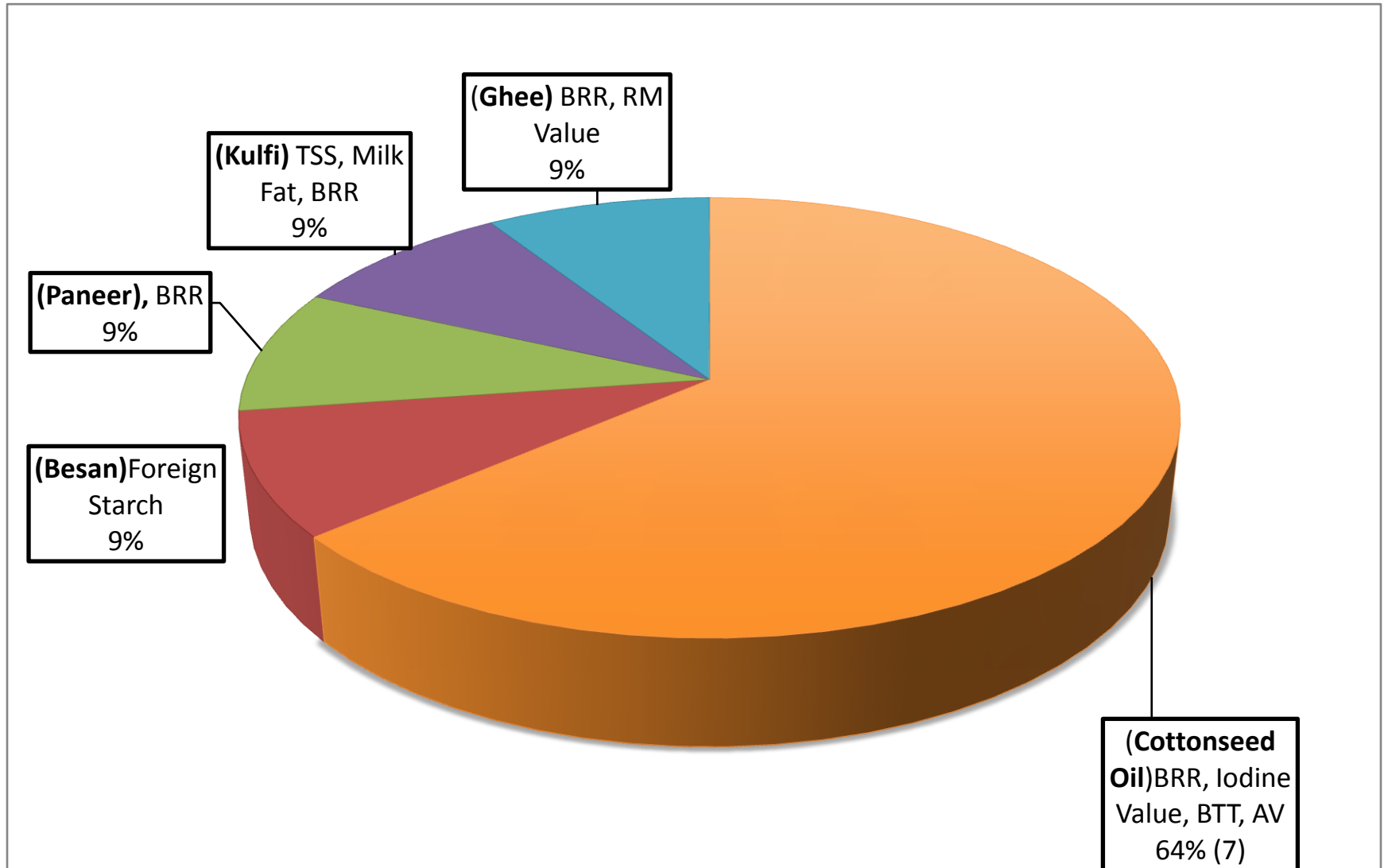
TAMILNADU

Food Category wise Sample Taken in January-March,2016

S. No	Food Category	Genuine	Misbranded	Substandard	Unsafe	Violation
1	Cereal & Cereal Products	5	0	0	1	3
2	Dairy Products & Analogues	0	1	8	1	0
3	Fats, Oils & Fat Emulsions	0	5	2	0	1
4	Non-Standard	0	2	1	6	3
5	Fruit & Vegetable Products	1	3	2	1	3
6	Salt, Spices, Condiments & Related Products	1	1	1	4	1
7	Beverages	1	1	1	1	1
8	Sweetening agent including Honey	0	1	1	2	0
9	Sweets & Confectionery	0	1	1	1	0
10	Total	8	15	17	17	12

Reason for Substandard Food for Dairy Products and Analogues
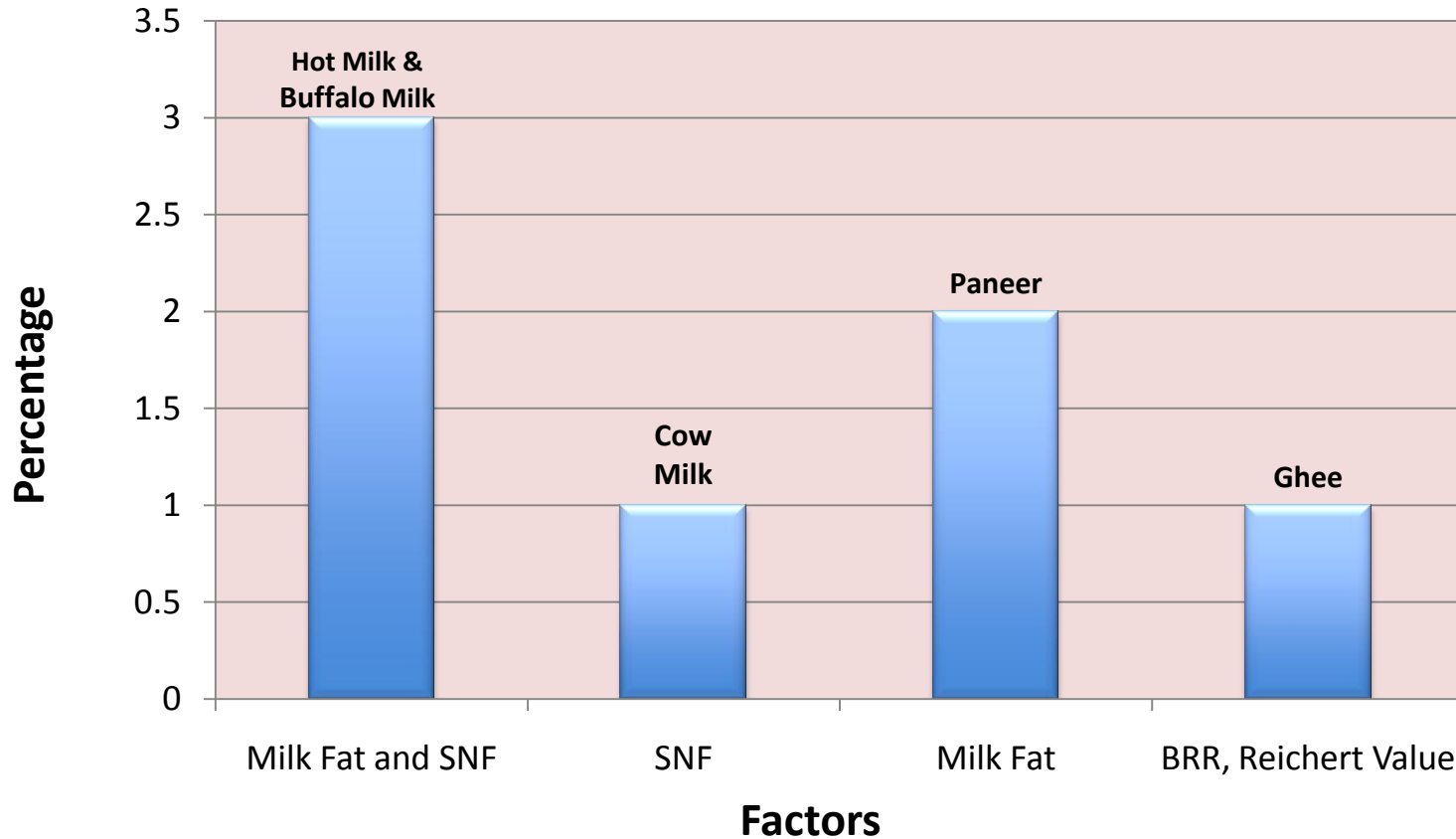
Unsafe Food Analysis

Reason for unsafe food
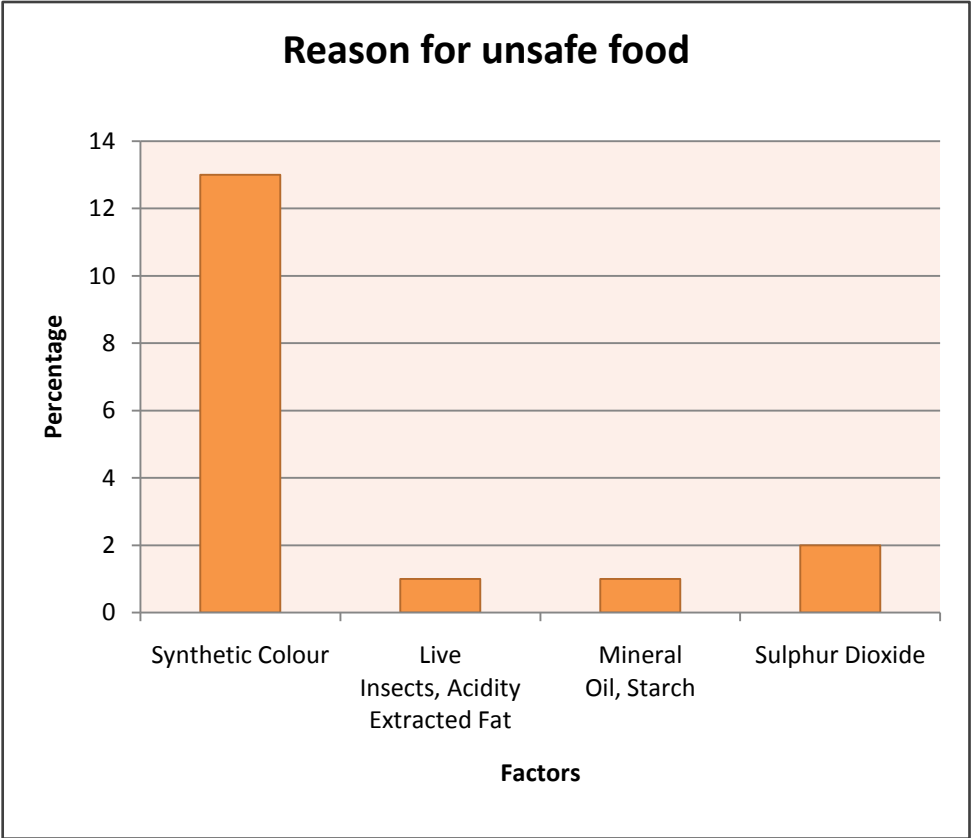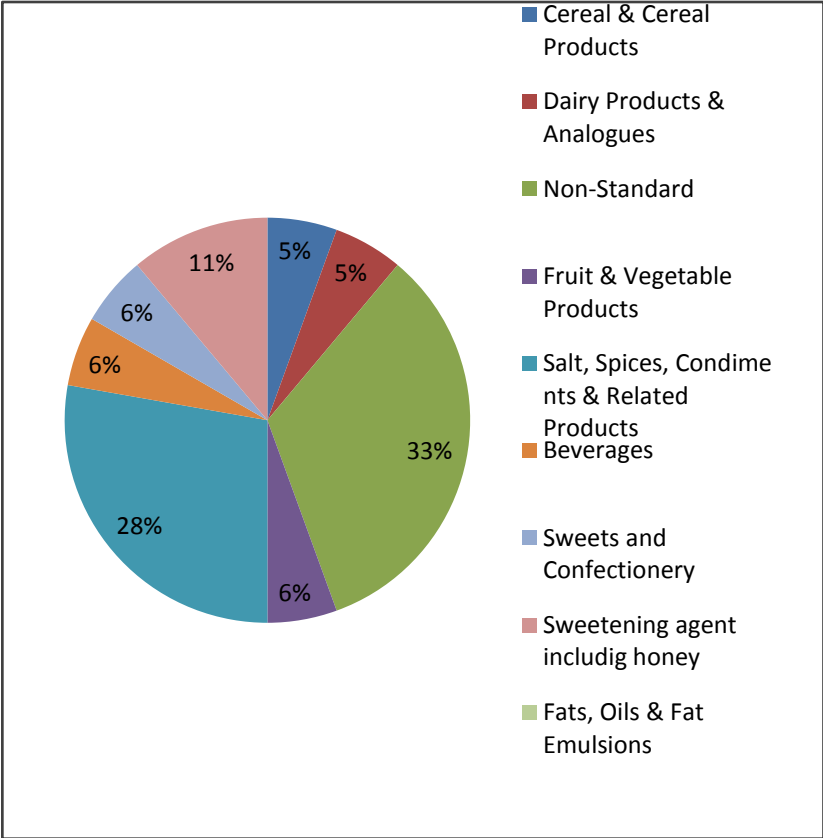
Moving Forward: 1. Monthly Analyst Test Reports (10th every month)

FOOD AND DRUG ADMINISTRATION _____ (Enter name of State/UT)

Address:

SUMMARY OF SAMPLES ANALYSED & RESULTS FOR:

_____ (Month) _____ (year)

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13	Sweets and Confectionery	78	78	0	61	9	2	2	4
	GRAND TOTAL	7407	7406	1	6614	241	215	269	67

Summary

- National database
  - Risk based test reports
  - Risk based inspection reports (FSMS)
- Categorize food failures (by risk)
  - Safety (microbiological, contaminants, residues etc.
  - Quality/Composition
  - Economic fraud
- Monitoring trends

- Enforcement Prioritization

Thank You

"Some bloke wants to know if we've carried out a thorough risk assessment?"