

INS (E-Numbers) and Food Safety- An Awareness Program

Dr. C.S. Dash

Associate Professor, Department of Commerce,
 Aryabhata College, University of Delhi
 E-mail: csdash@gmail.com

Abstract—Most of the FMCG products today are manufactured with a large number of food additives with a purpose of preserving, colouring, emulsifying and taste enhancing agents which cause serious damages to human health. For example, Tartrazine (E-102) which is used in cakes, sodium benzoate (E-211) used in sauces and potassium sorbate (E-202) used in chocolates cause hyper activity, asthma and cancer. The rate at which these diseases are growing in our societies is alarming. With an intention of making the people aware of this fact and making them consciously avoid products using such chemicals to constructively contribute to a better state of affair and policy making. The project initially makes a survey of 100 people selected among the students between the age of 18 to 20 years from Delhi coming from neighboring states like UP, Haryana, J&K and others. A random sampling with explorative methodology was used and responses were collected through a goggle form. The results of his study showed that though 87 % of them were aware about the situation, 66% of them felt completely avoiding these products is not possible as some of these products have already entered in their daily life. However, each of them has shunned some or other products which contain such chemicals. It is suggested that more of such programs be made to enhance the awareness and policy measures be taken to ban at least those chemicals which are not approved)

Keywords: e-numbers; food safety; preservatives; emulsifiers; INS.

I. INTRODUCTION

While purchasing packed food items for our family we find a lot of precautions, warnings and safety instructions on packed food items. But we ordinarily neglect or unconsciously ignore them except for instructions like the date of manufacture, date of expiry, use before such and such date as safety measure to see that the product we purchase is not stale. Some of the technical information's are also printed on the package such as "contains permitted class-II preservatives "or contains" permitted colouring agent INS-133" etc. which is completely outside our purview as common man. If you make small survey on internet you will come to know that there are hundreds of food colours, preservatives & emulsifying agents which are carcinogenic (causing Cancer), Hyperactive (causing blood pressure, attention, tension and headache) and Asthma^[1]. After going through literature, a list of some 11 products (6 products shown here) containing such element,

were selected for a survey to be conducted on this subject. They are given below in Figure- 1.

PRODUCTS	E-NUMBER PRESENT	E-NUMBER OF DANGEROUS FOOD ADDITIVE	SIDE EFFECTS		
			(H) FOR HYPER ACTIVITY	(A) FOR ASTHMA	(C) FOR CANCER
1. Fruity-CAKES-	E-102,330,412, 420,422,435, 466,472d,472e,450(i),471,477,500(i)	E-102(tartrazine)	H	A	C
		E-435 (polysorbate 60)	-	A	-
		E-466, (Sodium carboxy methyl)	-	-	C
2. CARAMEL LOW-	E-442,471, 476,202	E-202(Potassium sorbet)	H	A	-
3. SHILK-CHACOLATE	E-838(Ethyl Vanillin),	Nil (replaced Cadbury-Caramel)	-	-	-
4. CHEWING GUMS	E-133(Brilliant blue)	E-133(Brilliant blue)	H	A	C
5. - AMLA JUICE	Sodium Benzoate(E-211),	(E-211), Sodium Benzoate	H	A	C
6. ALOVERA JUICE	Sorbitol(E-420,211,-300,202)	(E-211), Sodium Benzoate	H	A	C
		(E-202) (Potassium sorbet)	H	A	-

Figure 1: Products & their content E- Numbers

II. OBJECTIVES OF THE PROJECT

A. Assessing people behaviour

Assessing Peoples' Behaviour towards health and environmental hazards (particularly in Dangerous food additives, preservatives, & coloring agents leading to health issues over shadowing life in urban and rural village communities in India. *Presently covering Delhi.*

B. Sensitising them

Sensitizing them to the Dangers Of these health and environmental hazards (Hyper Activity, Asthma & Cancer) through awareness companion. *Presently covering Delhi.*

III. REVIEW OF RESEARCH

Since study covers subject which are of national issues very few data might be available at local level in Delhi however data on national & international may be available. Few instances are given below-

A. Incidence of Diseases Caused By Food Additives: -

Basically 3 important diseases are identified to have been caused by use of food additives, such as Hyper activity, Asthma, and Cancer.

i. Hyper activity or ad/hd (attention deficit hyper activity disorder)

Probably the first reliable description of ADHD (Attention Deficit Hyperactivity Disorder) or in short also called ADD (Attention Deficit Disorder), comes from England in early 20th century. It mildly affects up to 10% of children, being severely disadvantaged. Majority of parents ask for help when child starts going to school. Boys are affected six times more than the girls. One of the earlier studies in Indian setting carried out in Bangalore reported 9% of children attending child guidance clinics suffered from ADHD. It was found to be present in 5% of children attending the Child Guidance Clinic at our center between 1994 to 1996. Many workers' believe that around 60-70%, of ADD children will, carry some of their behavior with them into adulthood and many innovators, entrepreneurs and high-profile people like Churchill & Einstein etc. suffered from ADD during childhood. The positive aspect of their suffering was their channelling property all their ADD energies, drive and single mindedness to achieve greatness. Approximately 50% or more children with this disorder often suffer from other specific learning disabilities like dyslexia, language disorder or a weakness with mathematics. Lot of titles have been used for this disorder in the past, such as, Minimal Brain Damage/Minimal Brain Dysfunction, Hyperkinetic child syndrome etc.

ii. ASTHMA

The Global Strategy for Asthma Management and Prevention Guidelines define Asthma as a chronic inflammatory disorder

of the airways associated with increased airway hyper-responsiveness, recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, particularly at night/early morning'. Airway inflammation produces airflow limitation through acute broncho-constriction, chronic mucus plug formation and airway wall swelling or remodeling (Masoli et al. 2004).

There are two general categories for classifying Asthma: extrinsic and intrinsic depending upon the types of stimuli that trigger attacks^[iii].

Extrinsic Asthma: is caused by a type of immune system response to inhaled allergens such as pollen, animal dander or dust mite particles.

Intrinsic Asthma: is caused by inhalation of chemicals such as cigarette smoke or cleaning agents, taking aspirin, a chest infection, stress, laughter, exercise, cold air, food preservatives or a myriad of other factors. Natural History of Asthma Onset of Asthma can occur at any age but children and young adults are the commonly affected age groups and 5-10% cent of children with mild 'Asthma go on to develop severe Asthma later in life^[iii]. Although Asthma cannot be cured', clinical episodes can largely be prevented and controlled by proper management. Allergic rhinitis and skin allergy may coexist with or precede the onset of Asthma (www.iaatld.org). Environmental exposures during the early years and airway obstruction that develop during this time, in conjunction with genetic susceptibility, are important factors in the development of persistent Asthma in childhood.

In India, an estimated that 57,000 deaths were attributed to Asthma in 2004 (WHO 2004) and it was seen as one of the leading causes of morbidity and mortality in rural India (Smith 2000).

Though effective screening, evaluation, and management strategies for Asthma are well established in high-income countries, these strategies have not been fully implemented in India as evidence had previously suggested that Asthma is not to be treated independently but fitted into the general spectrum of respiratory diseases (Krishnakumar 2003). Furthermore, even though medicines that treat Asthma effectively are available at affordable costs, they rarely reach more than one per cent of those who would benefit from it (Krishnakumar 2003).

World Health Organisation (WHO) estimates 300 million people suffer from Asthma, 255,000 people died of Asthma in 2005 (WHO 2004) and over 80% of Asthma deaths are reported from low and lower-middle income countries (Braman 2006). Asthma creates a substantial burden on individuals and families as it is more often under-diagnosed and under-treated. (Rabe et al. 2000; Adachi et al. 2002; Lai et al. 2003)

THE LEVEL OF PREVALENCE BOTH NATIONAL AND INTERNATIONAL IS GIVEN BELOW

In India, an estimated that 57,000 deaths were attributed to Asthma in 2004 (WHO 2004) Global Burden of Asthma Approximately 300 million people worldwide currently have Asthma, with estimates suggesting that Asthma prevalence increases globally by 50% every decade (Masoli et al. 2004).^[iv]With the projected increase in the proportion of the world's urban population from 45% to 59% in 2025, there is likely to be a marked increase, estimated that there may be an additional 100 million persons with Asthma by 2025 (Masoli et al. 2004)^[v]

iii. CANCER

Cancer is one of the leading causes of deaths in India, which has nearly three million patients suffering from the disease.

Annually, nearly 500,000 people die of cancer in India. The WHO estimated this number to rise to 700,000 by 2015. *With a million new cases being reported every year, cancer seems to be tightening its grip on India. Experts say the incidence of the killer disease is expected to rise five-fold by 2025.*^[vi] According to medical professionals, lung and oral cancers were the most common among men while cervix and breast cancer were striking more and more women. In India, the requirement is 1 cancer care unit per 100,000 populations, which is a far cry from the current scenario".

In India, a skewed doctor-to-patient ratio only worsens the situation. The health ministry is working towards a target doctor-patient ratio of 1:1,000 by 2021, which at present is 1:2,000. Doctors say the causes of such a high incidence of cancer may be both internal like genetic, hormonal and poor immune conditions as well as external and environmental like food habits, industrialization, over growth of population and lifestyle.

IV. STATUS OF E- NUMBER/INS NO. OF FOOD ADDITIVES

The international status of prevalence diseases due to use of food additives have already presented in previous section (point no 7(C) with national status. Hence, national status of certification of the food additives will be discussed here internationally.

Status of E numbers are codes for substances that can be used as food additives for use within the European Union and Switzerland.^[vii]The "E" stands for "Europe". They are commonly found on food labels throughout the European Union. Safety assessment and approval are the responsibility of the European Food Safety Authority.

Having a single unified list for food additives was first agreed upon in 1962 with food coloring. In 1964, the directives for preservatives were added, 1970 for antioxidants and 1974 for the emulsifiers, stabilizers, thickeners and gelling agents.

The numbering scheme for food additives follows that of the International Numbering System (INS) as determined by the *Codex Alimentarius* committee, though only a subset of the INS additives are approved for use in the European Union as food additives. E numbers are also encountered on food labelling in other jurisdictions, including the Cooperation Council for the Arab States of the Gulf, Australia, parts of Canada (such as Quebec), South Africa, New York City, New Zealand and Israel. They are increasingly, though still rarely, found on North American packaging, especially in Canada (Canada wide outside Quebec and the Maritimes) on imported European products.

Colloquial use

In some European countries, "E number" is sometimes used informally as a pejorative term for artificial food additives, and products may promote themselves as "free of E numbers". This is incorrect, because many components of natural foods have E numbers (and the number simply is a synonym for the chemical component), e.g. vitamin C(E300) and lycopene (E160d).

Full list(food additive groupings)^[viii]

- E100–E199 (colours)
- E200–E299 (preservatives)
- E300–E399 (antioxidants, acidity regulators)
- E400–E499 (thickeners, stabilizers, emulsifiers)
- E500–E599 (acidity regulators, anti-caking agents)
- E600–E699 (flavour enhancers)
- E700–E799 (antibiotics)
- E900–E999 (glazing agents and sweeteners)
- E1000–E1599 (additional chemicals)

A comparative study of EU. vs. US based on approvals^[ix]

Here a comparative study of the some of the dangerous food additives is given in terms of E-numbers as approved by EU & US. The last column of the table shows the food additive approved by US & UK both, in some cases the process IS NOT-approval in either US or UK)

INTERPRETATION.: -

- I. It can be observed that use of E-102 is approved in EU while E-104 is undergoing a voluntary phasing out in UK

Additive Number	Name of Food Additive	Safe	Hypersensitivity	Asthma	Cancer	Compiled by Author
102 & E102	Tartrazine (food color)	H	A	C		Approved in the EU. ^[9] Approved in the US. ^[10]
104 & E104	Quinoline Yellow (food color)	H	A	C		Approved in the EU. ^[9] Undergoing a voluntary phase-out in the UK.
110 & E110	Sunset Yellow (Yellow food color #6)	H	A	C		Approved in the EU. ^[9] Banned in Norway. ^[12] Products in the EU require warnings and its use is being phased out. Approved in the US. ^[10]
120 & E120	Carmines, Cochineal (food color)	H	A	-		Approved in the EU. ^[9] Approved in the US. ^[10]
925 & E925	Chlorine (Agent used in Bleaching Flour, Bread Enhancer and Stabiliser)	-	-	-	C	
926	Chlorine Dioxide (Bleaching Flour and Preservative Agent)	-	-	-	C	
928 & E928	Benzoyl Peroxide (Bleaching Flour and Bread enhancer Agent)	-	A	-		
950 & E950	Potassium Acesulphame (Sweetener)	-	-	-	C	Approved in the EU.[9]
951	Aspartame (Sweetener)	H	A	-		Approved in the EU.[9]
952 & E952	Cyclamate and Cyclamic Acid (Sweeteners)	-	-	-	C	Approved in the EU.[9]
954 & E954	Saccharine (Sweetener)	-	-	-	C	Approved in the EU.[9]

Figure 2: Approval status of e- numbers

- II. While E-110 is approved in EU, it is banned in Norway and products in EU needs a warning in the package and approved in US.
- III. E-925, E-926 and E-928 are not approved at all in any country.
- IV. E-950, E-952 & E-954 are approved in EU only but not approved on US & UK.
- V. What we observe in this comparison is that use of food additive is an administrative decision in different countries depending on what the politics or administrator thinks good for their nation and not based on technical consideration or decision. Thus there can be a control over their use in particular countries according to the national will.

V. RESEARCH METHODOLOGY

The project initially makes a survey 100 people selected among the students between the age of 18 to 20 years from Delhi coming from neighboring states like UP, Haryana, J&K and others. A random sampling with explorative methodology was used and responses were collected through a google form.

VI. RESULT OF THE STUDY:

1. Awareness among the Total Population-

The study showed overall awareness as high as 87%, only 11% were not sure of it.

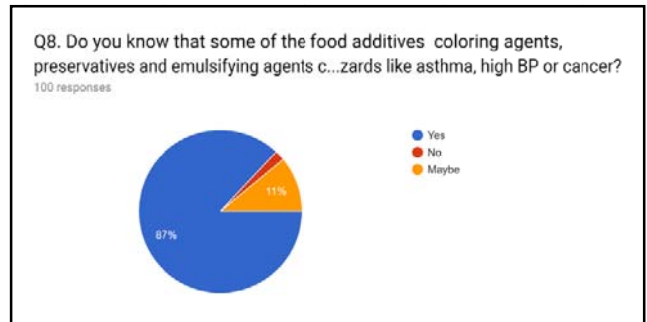


Figure 3: Over all response

II. State wise background/status: -

On the basis of background states, distribution of highest awareness was among delhitis more than those of UP, Haryana and others. Haryana was thesecond state to have high awareness, mostly due to its closest vicinity to Delhi’s culture.

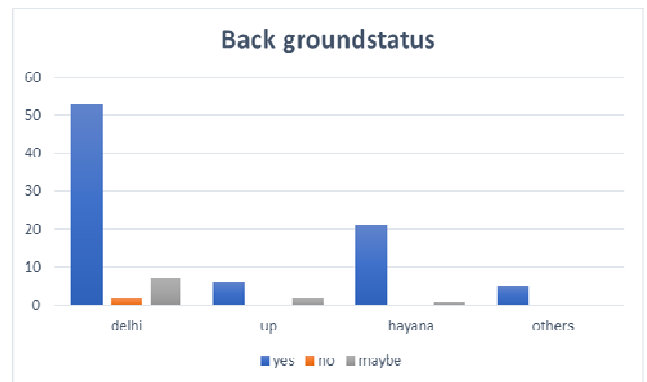


Figure 4: State back ground of disease

III. PREVALENCE OF DISEASES: -

Hyper activity/attention deficiency was highest (61%). if migraine, seizure, thyroid included it will cross 65%. Asthma, cancer accounting for only 3% to 4% (see fihure-5)

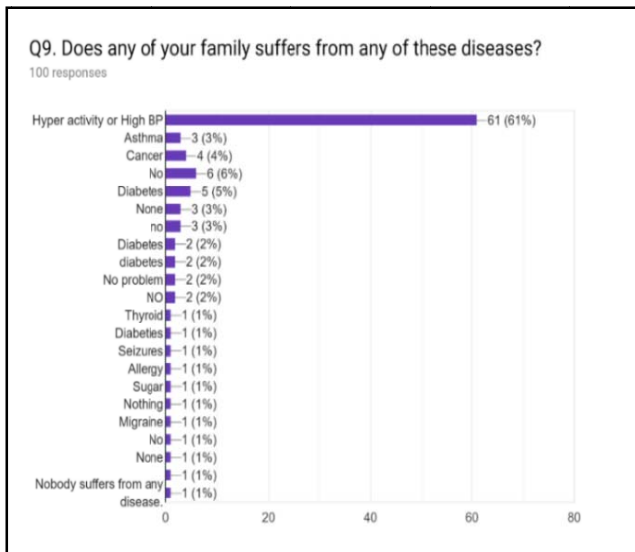


Figure 5: Prevalence of Diseases

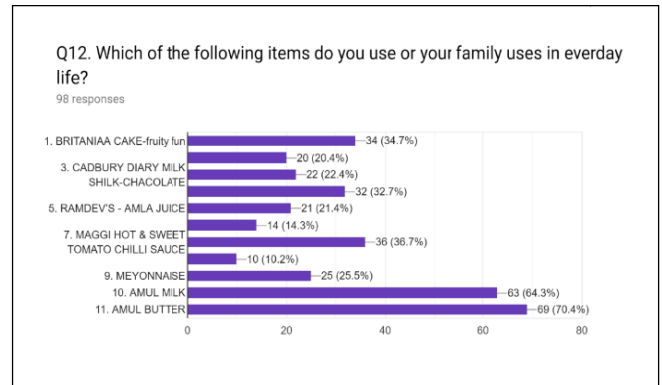


Figure 7: Use of FMCG with harmful chemicals

VII. POST SURVEY (AWARENESS) LEADING TO AVOIDANCE OF DANGEROUS FOOD ADDITIVES.

Awareness has increased from 87% to 91% after going through the survey in avoiding products with harmful chemicals.

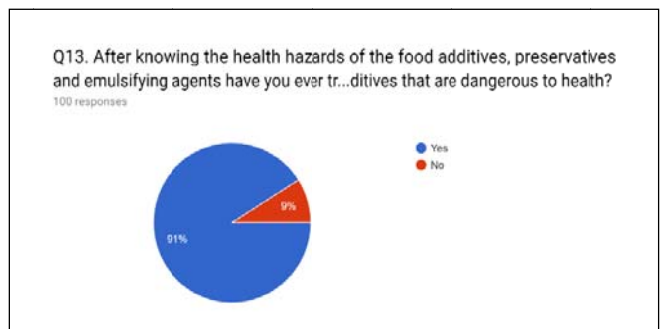


Figure 8: Post survey rejection behaviour

III. POSSIBILITY OF AVOIDING THE FOOD ADDITIVE: -

Impossibility of discarding a product that has entered into daily life is also very high(66%). Only 16% people are able to discard products with harmful chemicals.

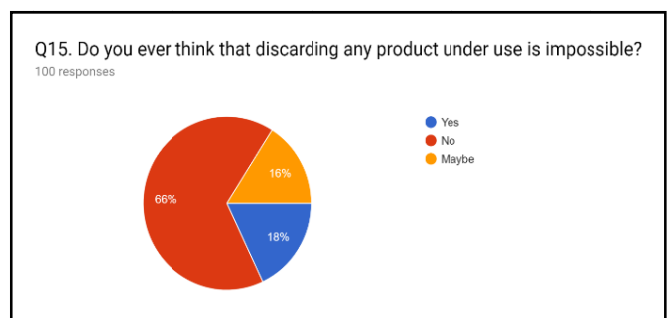


Figure 9: Impossibility of rejection

IV. DISEASES SHOWING INHERITANCE: -

Incidence of heredity on hyper activity, asthma, and cancer was 52%,9.6% & 8.5% respectively

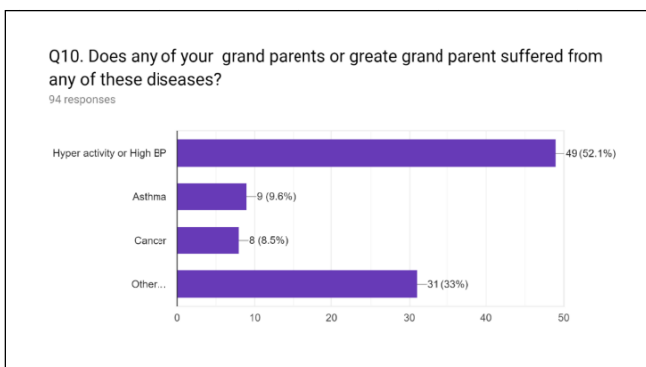


Figure 6: Diseases showing in heritage

6. FMCG- Used in Families-

Amul milk & butter are the largest group (63% & 69%) entering in to the daily consumption items followed by Maggi sauce(36%) Britannia cake(34%) and Cadbury milk chocolates(32%)

IX. FOOD SAFETY BEHAVIOUR

Study of safety behaviour showed that only 10% to 16% of population check the manufacturing date and expiry date before purchasing an item. Almost 83% check all details before purchase.



Figure 10: Food safety behaviour

X. POST AWARENESS LIST OF FOOD ITEMS/FOOD ADDITIVES REJECTED BY THE SUBJECTS OF STUDY

There is A large list of products (almost 86 items, see figure-11) with harmful chemicals that has been rejected by the mass after building consciousness.

4. Maggi
5. None
6. Coca cola, pepsi
7. Kurkure
8. Burger
9. Maggie
10. Junk food
11. Pepsi maggi
12. Ramdev Juice
13. caramel, Erythrosine and carmoisium
14. Mustard oil Chocolates Sweets Butter Certain spices
15. Using of room heaters
16. Gum ,food colouring sodium nitrite
17. Gum , food colour ,sodium nitrite
18. Gum,ice cream
19. Oily stuff Ghee Spicy food Items
20. Junk Food Causes Cancer Oil Causes Cancer, Hyper Activity Instead we have started Rice Bran Oil.
21. Alovera juice, chewing gum, Amla juice
22. Juices , pickles
23. Cold drink
24. Pickled food Bottled lemon juice
25. Junk food Aeriated Drinks chocolates Excessive sweets
26. Maggi, Tropicana juice
27. Maggi Fried food items Packed fruit juices
28. packaged juices, condoms
29. Chocolate,alovera juice etc
30. Aloverajuce,Dairy milk etc
31. Noodles
32. Maggi noodles
33. Sugar
34. Maggi , refined sugar , canned goods , soda and hydrogenated oils
35. refined sugars, canned goods, maggi and hydrogenated oils
36. Momos
37. Kurkure
38. Kurkure chips , Cold drinks
39. Maggie noodles Amul butter Kurkure
40. Popcorn, canned juice, refined sugar
41. Soft drinks ,ice -creams
42. Real juice, tropicana juice
43. Agino moto
44. Shell fish,meat,fish and packaged food can cause these types of problems.
45. aerated soft drinks maggi
46. Soft drink , chocolates , processed meat
47. 1 Oily food 2 Junk food 3 Cabbage
48. 1.Oily food 2.Junk food 3.Cabbage 4.Packed food
49. Plastic bottles , expired food items
50. Pepsi ,kurkure
51. maggi chewing gum
52. Frozen foods like frozen parathas, potato bites. Soft drinks, packed juices.
53. Pickles, sliced fruits, jams
54. Preservative Juices Chocolates
55. Beverages and snacks which uses food colouring in them and candies which uses red dye in their making process.
56. Tropicana Juice
57. Packed foods.
58. Canned food and carbonated beverages
59. Fruit Juices Dried Fruits
60. Excessive use of salt
61. COLD DRINKS MAGGI FAST FOODS
62. Cigarettes, Liquor
63. Ketchup, instant noodles, caffeine
64. Kurkure Pepsi Oily food
65. Kurkure, Maggi, Soft drinks
66. Coca cola
67. Pepse, coca cola
68. Coke and Pepsi
69. Maggi Pepsi
70. Cold drinks , Maggi
71. Maggi, Tetra Pack Juices, Some Softdrinks
72. Cigarette
73. Coke
74. TOMATO SAUCE, MEYONNAISE
75. Cold drink, maggi
76. flavored juices common food dyes
77. pepsimaggi
78. patanjali ghee. maggikurkure
79. Fast food , sugar product, oily dis etc
80. Sauces spices

81. Cooking oil, Polished pulses, expired foods, spicy sauces, etc.
82. Cig ratte
83. Not discarded for myself
84. Ice cream ,cold drink
85. Lot of things junk food and all
86. Canned products Red meat Energy drinks
87. 1. Artificial Sweeteners 2. High fructose corn syrup 3. Monosodium glutamate 4. Trans fat 5. Sodium sulfite 6. Sodium nitrate
88. Juices

Figure 11: List of rejected items

VII. SUGGESTIONS & RECOMMENDATION OFS

1. SURVEYS/PROGRAMS LIKE THE PRESENT ONE SHOULD BE CONDUCTED IN THE SOCIETY VERY FREQUENTLY TO BRING IN AWARENESS.
2. AFTER ASSESSMENT STEPS SHOULD BE TAKEN BY GOVT TO CONTROL THE DISEASE THROUGH HEALTH PROGRAMS BOTH IN RURAL AND URBAN AREAS.
3. POLICY FRAMEWORK BE MADE TO BAN THOSE FOOD ADDITIVES CAUSING CANCER, HD/AD SYNDROME OR ASTHMA ETC.
4. ALL FMCG PRODUCTS BE CHECKED FOR DANGEROUS FOOD ADDITIVES CAUSING CANCER, AD/HD SYNDROME OR ASTHMA ETC. AND EFFECTIVE CONTROL MECHANISMS TO BE CREATED TO BAN ITS USE AS IT HAPPENED IN CASE OF MAGI^[xi] AND BROWN BREAD^[xii].
5. FURTHER, JUST AS EVERY NATION FIXES THE STANDARD FOR ITS OWN. WHY CAN'T IT BE DONE IN INDIA? A CHECK ON THE PERMISSIBLE LIMIT IN EACH HARMFUL CHEMICALS BE MADE BEFORE ALLOWING IT'S ENTRY INTO MARKET.
6. IT IS ALSO SUGGESTED THAT IN THE FACE OF POOR STATESMANSHIP AND POOR ROLE OF OMBUDSMAN IN INDIA PERSUASIVE METHODS OF BANNING PRODUCTS OR STOPPING THE CONSUMPTIONS DANGEROUS FOOD ADDITIVES BE TAKEN UP IN THIS FIELD.

REFERENCES

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ⁱⁱ (www.buteyko.co.nz/asthma/facts)

ⁱⁱⁱ (www.iatld.org)

^{iv}WHO Global Burden of Disease, 2004-

^v ibid

^{vi}<http://timesofindia.indiatimes.com/life-style/health-fitness/health-news/Cancer-incidence-to-rise-five-fold-in-India-by-2025/articleshow/29823316.cms>

vii

http://en.wikipedia.org/wiki/E_number#E300.E2.80.93E399_.28antioxidants.2C_acidity_regulators.29

^{viii}https://en.wikipedia.org/wiki/E_number#E100.E2.80.93E199_.28colours.29

^{ix}ibid

^xmonosodium glutamate (MSG), a taste enhancer. The tests revealed that, while the permissible lead content is only 0.01 ppm, Maggi samples contained 17 ppm.as found by (Food Safety and Standards Authority of India (FSSAI)

^{xi}The government **banned** use of potassium bromate + as a food additive following a CSE study that found its presence in **bread** as causing cancer. "FSSAI has **banned** potassium bromate.