CHAPTER-V

SUMMARY

Food safety has emerged as an important global issue with international trade and public health implications. In response to the increasing number of food borne illnesses, governments all over the world are intensifying their efforts to improve food safety. The World Health Assembly adopted a resolution (WHA 53.15) in which, the World Health Organization (WHO) was asked “to give greater emphasis on food safety...with the goal of developing suitable, integrated foodsafety systems for the reduction in health risk along the entire food chain, from primary producer to the consumers”.

It is undoubtedly a social evil which can be regarded as the outcome of an interaction between a number of social, economic, technical and human behavioural factors. It is a manifestation of a sick society and can be regarded as a crime similar to other crimes like theft, burglary or murder. Like any other crime, food adulteration is expected to continue in our society as long as the existing factors which generate crime will continue.

What is food adulteration? We have noticed the color of water excessively yellowish while washing the pulses than is expected of it. White stone powder is mixed in salt, chalk powder is also mixed in it. Fine pieces of soap bars are mixed in hing. Generally the pure ghee is adulterated with the vanaspati. Malachite green named chemical is used enormously in green vegetables like green chillies. Haldi powder is mixed up with metanil yellow. Vegetables look excessively reddish than desirable after the chilli powder is dropped into it while cooking. It happens due to the mixing up of rhodamine named chemical and the brick powder is also mixed up into it.
It is common in almost all developing countries. And it's ugly face is come out in the form of it’s harmful effects as stomach disorder giddiness and joint pain, diarrhea, liver disorder, dropsy, gastrointestinal problems, respiratory distress, oedema, cardiac arrest, glaucoma carcinogenic effects, paralysis etc. In a developing country which is at the lowest rung of the development ladder, food adulteration consists of relatively simple measures

It is felt that there is an urgent need for an impartial scientific study to determine the prevalence of food adulteration at household level in the country. Such study should not be undertaken by an interested party, the consumers or the law enforcers, but should be undertaken by a research institution in a properly designed and controlled manner. The National Institute of Health and Family Welfare and the Indian Council of Medical Research are ideally suited to undertake such a study in various parts of India in order to find out the extent of food adulteration, the types of foods which are commonly adulterated, the types of adulteration adopted, the common adulterants used, the health hazards of such type of adulteration and lastly, to explore as far as possible the motives for such adulteration.

In other words, such a study will generate for the first time data on the basis of which one can develop an "anatomy of food adulteration" and possibly, get an idea of the "profiles of the food adulterators" and the reasons for such adulteration. The results of such a study will be an eye opener for the consumers, law enforcers and also for those who are brooding for decades as to the reasons of food adulteration and how to prevent this menace.

This study will be conducted to make people aware about adulteration and its ill effects on health from their daily meal item, either, in cereals, pulses, fruits and vegetables or in milk and milk products and spices. Therefore, it is a need to make them aware with simple and easiest methods of detection of adulteration at household level with low cost value. Because most of the
people are well aware with adulteration and its ill effects but due to their busy life, less time availability and costly methods of adulteration detection techniques was done by laboratories only. People ignore this one of the major health problem causing element at community level.

**Objectives**

7. To know the existing knowledge of consumer toward food laws, food safety, consumer behavior, health hazard at study area.

8. To elicit and classified adulteration in food stuffs used at household preparation in day to day life as per five food groups.

9. To give demonstration and detection of adulteration of selected food stuffs with using low cost method.

10. To examine food quality by using sensory evaluation techniques and detection kits.

11. To evaluate domestic methods for adulterated foods by using learning kits in the study area.

12. To study correlated factors with adulteration and its impact on health hazard as well as consumer behavior in the study area.

The study was conducted in 3 parts at Lucknow district. Each part included period of study time, sample size, selected study subject and sampling methodology. A pilot study on 40 sample size was conducted to find out the percentage of food adulteration rate in various food stuffs consumed at household level. The study is explain under 3 parts which was collective approach of above following heads.

**Result**
5.1 Background profile of respondents

- Majority of consumers were aged 35-44 years (n=179; 59.7%), There were 4 (1.3%) consumers who were aged between 15 and 24 years.
- Except for 2 (0.7%) consumers, all the consumers were literate. Majority of consumers were graduate or above (n=210; 70%).
- Majority of consumers were non-working (n=240; 80%). Only 60 (20%) were working.
- Maximum number (n=227; 75.7%) were housewives.
- Maximum number of consumers (n=135; 45%) were from upper middle income group and 4 (1.3%) from upper income group.
- Majority of consumers were vegetarian (n=153; 51%) and only and 9 (3%) were occasional vegetarian.
- Majority of consumers were Hindus (n=222; 74%) and only and 6 (2%) Sikhs.
- Majority were from general category (n=154; 51.3%).
- Most of the consumers dwelled in pakka houses (n=279; 93%).
- Majority (n=169; 56.3%) had their own house.
- Green vegetables, Salad, coffee and fruit use were the most common food items consumed on daily basis while Fast food was the item which was reported to be consumed occasionally by majority of consumers.
- A total of 201 (67%) consumers used to watch television regularly whereas a total of 209 (67.7%) consumers used to read newspaper regularly.

Phase-I Preliminary Study

5.2 Consumer’s knowledge assessment towards food adulteration
Before intervention majority of consumers had low scores on consumer rights, consumer protection, consumer laws, food safety and food marks.

Whereas high scores were reported only for 2 items consumer rights and food marks by 3 (1%) and 9 (3%) consumers respectively.

**Level of awareness about adulteration in food stuffs**

- Majority of consumers had low awareness scores for adulteration in different food stuffs.
- There were only two food items *i.e.* cereals and milk for which high scores were reported by 7 (2.33%) and 1 (0.33%) consumers respectively.

**Frequency of adulteration found in food items**

- Majority of food items never had adulteration. The most frequent adulteration was that of dal-stone.

**Consumer awareness regarding harmful effects of adulteration**

- On evaluating the level of awareness regarding harmful effects of adulteration, majority of consumers were seen to be having low awareness about these.

**Consumer’s awareness about methods of adulteration detection**

- All the consumers reported use of only sensory methods for detection of adulteration.

**5.3 Classification of adulterations consumed at household level.**

- Majority of consumers had no knowledge about type of adulterants found in cereals and its products less than fifty percent consumers had knowledge only about stone in rice(141), dirt in flour (36), sand in flour (35) and chalk in flour (09) were found as adulterant in cereal and its products.
- More than fifty percent consumers had no knowledge about types of adulterant found in dals. Forty six per cent (138) consumers had knowledge about stone found in dal only.
fourteen per cent (42) consumers out of three hundred had knowledge about colour was found as adulterant in dal.

- Majority of consumers (>50%) had no knowledge about types of adulterants found in fruits and vegetables. Less than fifty per cent consumers had knowledge about colour in vegetables (122, 40.00%), calcium carbide in mango (117, 39.00), calcium carbide in banana (75, 25.00%) urea in vegetables (70, 23.30%) and wax in fruits (16, 05.00%) adulterant were found in fruits and vegetables out of 300 consumers.

- More than sixty per cent consumers had no knowledge about types of adulteration found in milk and its products. Consumers (119, 39.00%) had knowledge only about water in milk and only consumers (13, 04.30%) had knowledge about potato in khoa was used as adulterant in milk and its products.

- Majority of consumers (>70%) had no knowledge about types of adulterants found in spices. Less than twenty per cent consumers had knowledge only about papaya seed in black pepper (37, 12.30%), dirt in chilli powder (35, 11.60%), brick powder in chilli powder (25, 08.30%), grass in cumin seeds and chalk was found in salt as adulterant in spices out of 300 consumers.

**Frequency of Adulteration on Consumption pattern**

- Majority of food items never had adulteration. The most common adulteration was stones in rice and dal. None of the food items, except salt-chalk had frequency of adulteration more than weekly. The most frequent adulteration was that of dal-stone. Flour-chalk (n=291), khoa-potato (n=287) and fruit-wax (n=284) were the least adulterated food products.
Phase-II Interventional study

5.4 Interventional study through sensory techniques

- Before intervention majority of consumers had poor knowledge of sensory technique for T3 (127), T2 (83), T4 (64), and T1 (51) respectively. For the items T4 (78), T2(53), and T1 (46) consumers had off knowledge for cereal and its products respectively. But after intervention more than fifty per cent consumers had good knowledge of sensory technique for T3 (131), T2 (90), T1 (89) and T4 (89) respectively.

- Before intervention only seventy nine consumers had good knowledge for item T1 whereas consumers (70, and 01) had fair and poor knowledge for T1 respectively in milk whereas after intervention more than ninety five per cent (146) consumers had good knowledge of sensory technique for adulteration detection in T1.

- Before intervention majority of consumers had poor knowledge of sensory technique for T2 (83), T4 (64), T1 (51) and T3 (12) respectively whereas after intervention majority of consumers had good knowledge of sensory technique for T4 (144), T3 (136), T1 (88) and T2 (78) of adulteration detection in fruits and vegetables respectively.

Adulteration detection through detection kit

- Before intervention not any single consumer had knowledge about adulteration detection at household level through detection kit whereas after intervention more than ninety five per cent consumers had knowledge about adulteration detection through detection kit in cereal and its products for T2 (145) and T1 (144) items respectively.

- Before intervention no consumers had any knowledge about adulteration detection through detection kit in pulses and its products. After intervention more than eighty per
cent consumers (130, 129 and 126) had knowledge of adulteration detection in pulses and its products through detection kit at household level for all the three items T1, T3 and T2 respectively.

- Before intervention no consumers had knowledge about adulteration detection through detection kit at household level in milk and its products. Whereas in post intervention phase it was found that more than 90.00% consumers had knowledge of adulteration detection in T4 (143), T1 (141), T2 (138) and T3 (137) respectively.

- Before intervention consumers had no knowledge about adulteration detection in fats, oils, sugar and jiggery through detection kit. Whereas after intervention more than 85.00% consumers had found to be had knowledge of adulteration detection through detection kit for T1 (147), T2 (147), T5 (134), T4 (133) and T3 (130) respectively.

**Phase-III Post Study**

**KAP level regarding consumer education after intervention**

- After the intervention, majority of consumers had high scores for all the items. Maximum number of consumers with high score were observed for the item food marks (n=136; 90.7%).

- Minimum number of consumers with high scores were observed for the items consumer protection and consumer laws respectively (n=109; 72.7%).

**KAP level regarding awareness about adulteration after intervention**

- Majority of consumers had high level of awareness regarding adulteration and minimum for the item fruits (n=124; 82.67%).

**KAP level regarding awareness about harmful effects adulteration after intervention**
• Following intervention majority of consumers had good awareness of harmful effects of adulteration of food stuffs.

• Maximum number of consumers with high scores were observed for cereals and spices (n=131; 87.3%) while minimum number of consumers with high scores were observed for the item pulses (n=123; 82.0%).