

Lessons on Food Safety

P. Madarasinghe

Challenge before us

Hundreds of thousands of deaths have occurred in the past due to contamination of food and pollution of water resources' and this continue to happen even today. Despite the fact that the world has achieved great advances in modern technology, a notable increase is seen in the prevalence of diseases associated with food and water, and this situation is equally applicable to both developed and developing countries. This is supported by the World Health Organization reports which reveal that 1.8 million deaths have occurred throughout the world in 2005 alone. The majority of these deaths have been reported from developing countries, and infants and children are the most vulnerable to these diseases.

The pattern of prevalence of diseases in a country depends on the life style, food practices, health of the living environment etc. of the people, and fluctuations in the incidence of microbiological, chemical and physical factors. Today ensuring food hygiene encounters many challenges, the resolution of which have become increasingly complicated.

Weaning from natural foods

In the past there was plenty of fresh food and fruit for consumption available through the generosity of nature. However, with the increase in population, the yields of such foods became inadequate to meet the demands of the growing population. As a consequence it became necessary to increase the yields through adoption of various methodologies to satisfy requirements, and as a result the simple food style that had been developed until then had to be translated into a complex one. Accordingly artificial foods grown with chemical manure, insecticides, growth hormones, modern machinery and equipment, and manufactured using additives, colouring essence and chemical preservatives, packed in attractive containers began to flood the market instead of fresh food.

In the context of the existing life styles, these foods have become part and parcel of their day to day life, and the



responsibility to supply food requirements to millions of people around the world has gradually shifted from nature's traditional generosity to the hands of cultivators, manufacturers and supply institutions. Although rules and regulations have been formulated to ensure the safety and quality of foods under this gigantic food supply process, it has become evident that there are hazardous effects which have already come into existence and may continue to exist in the future along with the increasingly complex food supply process.

The "Minamata" Tragedy and its after effects

The 'Minamata' incidence in Japan brings to our memory the danger and complexity involved in a food supply process.

In 1950 the people living in 'Minamata', Japan had an interesting experience. They observed that the animals displayed an abnormal behaviour. The cats were seen jumping around unnaturally and died after struggling for sometime. The crows that were flying high in the sky too fell, while the fish in the sea died and were washed ashore.

In the meantime, a 5-year girl suddenly fell ill. Then she became dumb and unconscious and was finally hospitalized. Later her sister too went through the same

ordeal. Subsequently a survey was carried out by the authorities concerned that showed that a large number of people had suffered same symptoms.

Consequently, the Disease Control Committee of 'Minamata', took immediate action to prevent the spread of the disease, and isolated the persons with above symptoms. They also disinfected houses. However, most of the people living in the area left their houses on hearing about the illness, and wherever they went they were discriminated and ill-treated.

The number of patients increased by thousands and an Investigation Group from the Kumamotor University initiated a special investigation on the occurrence and the spread of this disease.

Studies on the affected people revealed that they had developed symptoms of loss of voice, numbness in hands and feet, loss of hearing and eyesight, difficulty to swallow, and leading finally to total disability. In the end they became unconscious and die as a result of the effects of the disease.

The investigations of the Committee revealed that most of the people affected were fishermen, who consumed mostly fish with their meals. This observation led them to believe that the disease was due to a food poison.

In the post-mortem examination of body parts of the dead animals, as well as studies on water samples and of geological structures had shown that the disease was due to metal toxicity and that the poison had entered the body of the fish through water, and the animals and people who consumed these fish had contracted the disease.

Source of pollution and magnitude of the disaster

The Committee which carried out the inspection found no difficulty in identifying the source of water contamination. It was confirmed that the toxicity was due to the discharge of the chemical methyl mercury

into the 'Minamata' lagoon by the Chisso Corporation, which is an industrial centre manufacturing acetylene, acetaldehyde, acetic acid and vinyl chloride in the Minamata Province.

The most important observation was that methyl mercury at a later stage had a serious effect on children of this area causing neurological diseases. The parents of these children did not have the symptoms of this disease and the children too had never taken these poisonous fish

for their meals. Normally the transfer of chemicals in mother's blood to the foetus is prevented by the placenta. However, methyl mercury behaves differently in expectant mothers, in that the toxic chemical passes through the placenta and cause serious effects reflecting the characteristic Minamata symptoms.

The disease that spread so rapidly accounted for about 2200 patients in Minamata within a few years. Of these 1984 patients had died and compensation had been paid by the Chisso Industries for more than 10,000 affected people. The unfortunate aspect of this situation is that the majority of the patients suffering from these diseases are infants and children.

Should Sri Lanka risk being another 'Minamata'?

There is evidence that calamities associate with toxic chemicals are on the increase in our country, although not of the magnitude of the Minamata disaster. This has been revealed from a study of statistics on the imports of insecticides to our country within the last several years as evident from the data summarized below.

A total of 6,704.49 MT of insecticides have been imported in the year 2005 to be used or sprayed on a land area of 25,262 sq. miles. These chemicals are deposited on crops and water bodies, and are gradually absorbed into our food. There are serious adverse effects due to absorption of these chemicals into our system. Although death may not be the end result it may lead to various complicated disease conditions, such as serious

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liver dysfunction, kidney infections or malignant diseases associated with the stomach.

Import of insecticides in the recent past (in metric tons)			
	2003	2004	2005
Insecticides	1684.4	1359.68	1921.81
Herbicides	2925.1	3273.74	3883.1
Fungicides	792.18	749.62	899.58

In addition to the absorption of certain chemicals to our system through the environment without our knowledge, a number of other different hazardous substances also enter into our system through artificial additives, anti-oxidatives and non-oxidatives.

The maximum levels of chemical additives that could be included in food have now been identified, while action has been taken to prohibit the use of dangerous chemicals.

For instance in terms of Food (sweeteners) Regulations 2003 under the Food Act No. 26 of 1980, artificial sweetners such as sorbitol, mannitol, lactitol, aspartame, sucralose and sacharin can be used to sweeten foods, but restrictions have been imposed on the limits for such additives. Also it has been made mandatory for manufactures to include the warning label in legible letters that read “Not recommended for children”, in respect of aspartame used as a sweetener, and the warning that “excessive use may cause purgative effects” in respect of chemicals such as sorbitol. However, the question is how far do consumers take an interest to read these warnings.

Microbiotics infections

It is important to stress that chemical hazards are not the only threats that consumers face when we discuss about the food safety. The microbiotic infections too cause several diseases.

It is significant that both developed and developing countries are often affected by these microbiotic infections. In United States of America alone the number

of people affected by diseases associate with food infections in a year exceeds 76 million, while the number of patients hospitalized is around 325,000. The number of deaths due to such infections stands at 50,000.

The spread of new diseases associated with microbiotic infections has even in developed countries become the focus of attention for food hygiene analysts. The prevalence of Mad Cow disease in Great Britain in 1996, and the disease condition of E-coli 0157:47 that prevailed in the same year are few such examples. Around 6000 school children had been affected by these disease conditions.

In the United States of America more than 400,000 people have been hospitalized due to parasites in the pipe-borne water. In Malaysia about 900,000 pigs were killed due to a disease condition that originated with Nipah virus of pigs. In 1998 all the livestock farms had to be closed in Hong Kong, and the birds killed to prevent the spread of bird fever epidemic among the people.

Ensuing food hygiene and safety

The diseases associated with food has become a serious threat to the people, their personal economy, and to the economy of the country as a whole. The control of this condition needs the support and contribution from 03 main sections i.e. the State sector, food manufacturing sector and the consumer sector.

The State has contributed by formulating necessary rules and regulations for promotion of food hygiene, creating a system for proper implementation of such rules and regulations, and by the establishment of a laboratory service for detection of food poisoning and adulterations.

The food manufacturers should contribute through the supply of quality hygienic food from their farms to the table in compliance with good manufacturing practices.

The consumers too should be made knowledgeable and vigilant in selecting their food without being misled. The consumers should have an understanding about the risk of becoming victims to microbiotic infections and chemical disasters, and take preventive measures in the selection and consumption of such food, rejecting the places where such food items are offered for sale.

P. Madarasinghe

*Assistant Director (Food Control)
Ministry of Healthcare & Nutrition*

What have you learnt? Scan your own memory!

1. True? False?

- (a) Post harvest losses in developed countries remain 10% or less while in developing countries the values are excessively high ranging from 20-40%.
- (b) Post harvest losses of a commodity can be reduced by adopting improved post harvest technologies alone.
- (c) Climacteric fruits (i.e. banana) should be harvested at properly matured unripe stage.
- (d) Vegetables such as okra, ma, beans, and luffa should be harvested at the mature stage.
- (e) Before marketting, insect damaged and disfigured fruits and vegetables must be discarded and the rest should be packed in rigid, ventilated, shallow containers.

2. True? False?

- (a) SLSI monitors the manufacture of SLS marked products continuously.
- (b) The premises where the water is bottled should also be registered.
- (c) In food standard formulation, Sri Lanka follows the standards adopted by European countries.
- (d) The common name should be mentioned clearly in one language.
- (e) The Chief Food Authority's (CFA) approval is necessary to import or manufacture any genetically modified organism.

3. True? False?

- (a) Cleaning and sorting are not included in preparatory operations employed in the food industry.
- (b) Osmotic dehydration is another way of removing water from food commodities.
- (c) Pickling is the process of preserving food by aerobic fermentation in brine (a

solution of salt in water) to produce lactic acid.

- (d) The pioneer of food canning was a french confectioner, Nicolas Appert.
- (e) Irradiated food is not radioactive.

4. True? False?

- (a) Food additives are substances added internationally to food stuffs to reform to certain technology functions.
- (b) Although 2000 artificial colours are available in the market, only about ten (10) colours are used as food colouring agents.
- (c) Preservatives are substances added to foods to promote the growth of bacteria, yeast and or moulds.
- (d) An antioxidant tends to prevent oxidation.
- (e) Flavours are not aromatic compounds.

5. True? False?

- (a) In 1950 the people living in 'Minamata', Japan observed that the animals displayed an abnormal behaviour.
- (b) Methyl mercury at a later stage had no effect on children of this area causing neurological diseases.
- (c) A total of 6,704.49 MT of insecticides have been imported in the year 2005 to be used or sprayed on a land area of 25,262 sq. miles (Sri Lanka).
- (d) Chemical hazards are the only threat that consumers face when we discuss about the food safety.
- (e) The diseases associated with food hasn't become a serious threat to the people.

Answers

- 1. (a) True (b) False (c) True (d) False (e) True
- 2. (a) True (b) True (c) False (d) False (e) True
- 3. (a) False (b) True (c) False (d) True (e) True
- 4. (a) True (b) True (c) False (d) True (e) False
- 5. (a) True (b) True (c) True (d) False (e) False

School Science Society Programme at the NSF

1. Introduction

School Science Society Programme (SSSP) has been established to register School Science Societies (SSS) with the NSF with an objective of fostering students to acquire knowledge on latest developments in various fields of science and technology, to make them aware of scientific knowledge in day to day activities and to improve their standard of living.

2. Registration of School Science Societies

School Science Societies can be registered with the NSF by completing a simple application form, which could be obtained from the Science Popularization Division at NSF or through the web www/nsf.ac.lk. Application forms will be sent free of charge to the Principal of the school on request. Registration fee will be Rs.100/=.

The registration has to be renewed annually and a sum of Rs.50/= should be paid on renewal. Renewal forms could be obtained from the Science Popularization Division at NSF or through the web.

Registration would be cancelled if any SSS uses the name of the NSF for its activities without prior approval from the National Science Foundation.

3. Benefits to the School Science Society

- 1) NSF will assist to organize various activities related to science and may provide funds required for the activity (up to Rs.10,000/- per programme per school), based on the proposal submitted. NSF will also assist the School Science Society by providing resource persons (leading Sri Lankan Scientists from Universities and Research Institutions).
- 2) A copy of Vidurava Science Magazine will be sent to all the registered School Science Societies.
- 3) Members of SSS can participate in periodic seminars, workshops, field trips and various activities including the World Science Day Programme organized/conducted by the NSF.

4. Activities of the School Science Societies

- ◆ Registered SSS should organize one main activity to celebrate the World Science Day Programme, which is held on 10 November each year, and at least five (05) programmes to identify and scientifically solve problems in their localities.
- ◆ A separate proposal for each activity (forms could be obtained from the NSF) including a breakdown of the budget should be submitted for consideration of possible funding.
- ◆ The first proposal should be sent within the first three months of registration. If not, it would be taken in to consideration at the renewal of the registration for the next year.
- ◆ Proposals would be selected for funding by the NSF Special Committee on Popularization of Science. The decision of the Committee will be final.
- ◆ Funds will be issued on reimbursement basis. However, in special circumstances 50% of the total budget may be released on the recommendation of the Committee.

5. For any information

Science Popularization Division, National Science Foundation
47/5, Maitland Place, Colombo 07.

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Guidelines for Contributors

1. Types of articles considered for publication

Articles written on the themes related to science and technology, which will help to enhance the scientific knowledge and their practical applications are accepted. Articles submitted will be reviewed and edited by the Editorial Committee. Submission of manuscripts in both languages in Sinhala/Tamil, and English will be appreciated. If the article is written in a particular language the Editorial Committee has the right to translate it to other languages (Sinhala/Tamil or English) as required.

2. Guide to preparation of manuscripts

Manuscript

Manuscripts of articles should be typewritten in double space on one side white A4 sheets. Adequate margins (4 cm) should be left with sufficient spacing at the top and bottom of each page. The typescript should be free of corrections and should be complete and in final form. It is preferable if the article could be sent together with the diskette on MS Word 98.

It is better if the illustrations/photographs/graphics too are included with the manuscript.

Length and style

Articles should be written to a given theme/topic related to science and science activities. They should be well focused, preferably organized, structured, and avoid the 'text book' style. Articles should be written clearly and concisely in simple language avoiding complex words as much as possible. The theme article (cover story) should not exceed 3000 words. Other articles should not exceed 2000 words.

Manuscript layout

- Title of the articles should be brief, and the author's name and affiliation should also be mentioned preferably along with a recent passport size photograph.

- Tables and figures should be on separate sheets and should be fully labeled and captioned.
- Graphs and other line drawings should be clearly drawn.
- Photographs must have good contrast and should be in black and white.
- Use names of chemical compounds and not their formulae be given in the text. Scientific (Botanical and Zoological) names should be correctly spelled and typed in italics or underlined. In case of Sinhala or Tamil articles, scientific/technical terms should be given in English within brackets. Mathematical applications, such as statistical analysis should be avoided as far as possible.
- Reference and footnotes should be numbered consecutively and given at the bottom of each page. Provide complete name of the text book.

i.e. Barras, R. (2003). (First Indian reprint).
Scientists Must Write.
Gopsons Papers Ltd., India.

Submission of Manuscripts

The original and two copies of the manuscript should be sent to the following address.

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Science Popularization Division
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E-mail: janak@nsf.ac.lk

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