An overview on Food Poisoning in Bangladesh

(This report presented in partial fulfillment of the requirements for the degree of Bachelor of Pharmacy)

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APPROVAL

This Project, **An overview on Food poisoning in Bangladesh** submitted by Md. Bokhtiar Uddin Mondol to the Department of Pharmacy, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy and approved as to it style and contents.

BOARD OF EXAMINERS

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DECLARATION

I hereby declare that, this project report is done by me under the supervision of Md. Arifur Rahman, Assistant Professor and Head, Department of Pharmacy, Daffodil International University, impartial fulfillment of the requirements for the degree of Bachelor of Pharmacy. I am declaring that this Project is my original work. I also declare that neither this project nor any part thereof has been submitted elsewhere for the award of Bachelor or any degree.

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At first I would like to thank the almighty Allah for giving me the opportunity and capability to complete this research. Then I would like to thank my parents for all the sacrifices that they have made on our behalf.

Then, I would like to take the opportunity to express my appreciation to our honorable supervisor, Muhammad Arifur Rahman, Assistant Professor & Head of the Department of Pharmacy, Daffodil International University for his proper guidelines and suggestions to complete the research. I wish to convey my thanks and heartiest regard to him for providing important data and extended cooperation.

It is also great pleasure for me to offer my indebtedness to all my respected teacher of Department of Pharmacy, Daffodil International University for extending their helping hands and affectionate attitude whenever I needed.

I would like extend my thanks to the office staff of Department of Pharmacy, Daffodil International University. My special heartfelt thanks extend to all of my classmates and friends for their supportive help.

Cordial thanks to my parents and to all well-wishers for their wholehearted inspiration and open-ended support throughout the period of the project of the research work.

DEDICATION

I would like to dedicate my work to My parents. (Md. Bashir Uddin & Mst. Sultana begum)

ABSTRACT

The number of food poisoning notifications rose steadily worldwide since the inception of E. coli (O157:H7) outbreak in the 1980s to date. This may be partly attributed to improved surveillance, increased global trade and travel, changes in modern food production, the impact of modern lifestyles, changes in food consumption, and the emergence of new pathogens. Approximately, 30 million people in Bangladesh are suffering from foodborne illnesses each year. Diarrheal diseases are the most common food poisoning cases in Bangladesh and in some cases, these can cause death. The diseases are caused by either toxin from the microbe or by the human body's reactions to the microbe. The traditional processing methods that are used in the preparation, inappropriate holding temperature, and poor personal hygiene of food handlers are some of the main causes of contamination of street foods.

A substance added to a food-item to reduce its quality in order to increase its quantity is called as an adulterant. This act of addition of the adulterant in food-items is known as food adulteration. In Bangladesh, most of the foodstuffs, be they manufactured or processed, are unsafe for consumption or adulterated to varying degrees. This problem persists at every level of the food chain from preparation to consumption. Food manufacturers, processors, restaurants, fast food outlets and so forth are all involved in one way or another in this corrupt practice of adulteration. Foods are adulterated by using various harmful chemicals and toxic artificial colors, on the one hand, and rotten perishables turned to poisonous foods are stored, sold and served to consumers in an unhygienic atmosphere, on the other. The unhygienic and unsafe treatment of food is seriously impacting public health by causing numerous chronic and non-chronic diseases. Despite different reasons for the unsafe treatment and adulteration of foodstuffs in Bangladesh, this study will concentrate on the regulatory failures to combat the current food safety problems persisting in Bangladesh. The major reason for the intentional addition of these adulterants is for increasing the profit margin on the expense of the health of the public or consumer. Food adulteration has become a new problem in the country. Some adulterants enter via agricultural steps, as they are not cleaned well. These are visible adulterants like stones, leaves, soil, sand and dust to name a few. The consumer can clean them and this makes it less harmful. Other

adulterants that are intentionally added are invisible or they are made invisible by astutely camouflaging with the color or texture. They are generally harmful for the health and most of them lead to serious health problems like cancer. However, there are hardly any food items from fish to meat, vegetables to milk,biscuits to juice that are not adulterated in one way or another. The hotels and restaurants are also serving these poisonous and unhealthy menus. Different reports show that adulterated foods are causing serious diseases including diarrhea and dysentery round the year. And adulterant reduces the quality of the food and this weakens the health of the one who consumes them, thereby increasing the cost for healthcare. Regular intake of an adulterated food can lead to many health problems. From curable to incurable disorders and diseases can ruin one's lifestyle and life as well. Recently, the government and general public have been much worried about this issue. Food adulteration increases the burden of health in the society.

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Chapter 1: Introduction

1.1. Overview:

Adulteration of food with toxic chemicals harmful to health has reached an epidemic proportion in Bangladesh. The newspapers have dubbed it as the 'silent killer'. It is very difficult to find a sector of food industry which is free of adulteration. From raw vegetable and fruits to milk and milk products to fish, meat and processed food–every food item is contaminated. Almost every day in the newspapers, newer and newer methods of adulterating newer and newer types of foods are reported. Carbide, formalin, textile colors, artificial sweeteners, DDT, urea etc. are used rampantly for this purpose. Contamination of foods with toxic chemicals pose a serious threat to public health, especially in a country like Bangladesh where due to poor health literacy, level of awareness is very low. Immediate effect of ingestion of such foods may be severe forms of diarrhea (food poisoning), threatening life. In the long run, these chemicals in food adversely affect vital organs such as the liver and kidney resulting in organ failure and/or cancer and thus, untimely loss of life. There is no database in the country for these, but the recent surge in liver and kidney failure patients in the hospitals is indicative of the deteriorating situation.

Ironically, people from all walks of life is aware of the hazards of taking foods adulterated with toxic chemicals, but this knowledge is not translated into practice. In a recent study, it has been found that though people are aware about the health several explanations are made for this paradox; absence or unavailability of non-adulterated food, failure of the regulatory agency to test and screen out adulterated food, adulterated foods are attractive in appearance and costs less, cultural factors and food habits etc. There is no paucity of laws and regulations to contain adulteration of food in Bangladesh such as Bangladesh Standard Testing Institute (BSTI) Ordinance of 1985, and the Pure Food Ordinance of 2005. Under the purview of these rules come the following offences: fake licenses, poor quality of food, substandard infrastructure and lack of maintaining hygiene, food adulteration, food impurity, incorrect information on food packages, selling products whose date have expired etc. However, the problem lies in its sustained and appropriate implementation by credible authority. Occasionally, the regulatory authorities will be suddenly in an active mode, and conduct mobile courts to penalize

sellers/producers for selling contaminated products/foods. Then, there will be a lull for a few days and after few weeks, business becomes as usual.

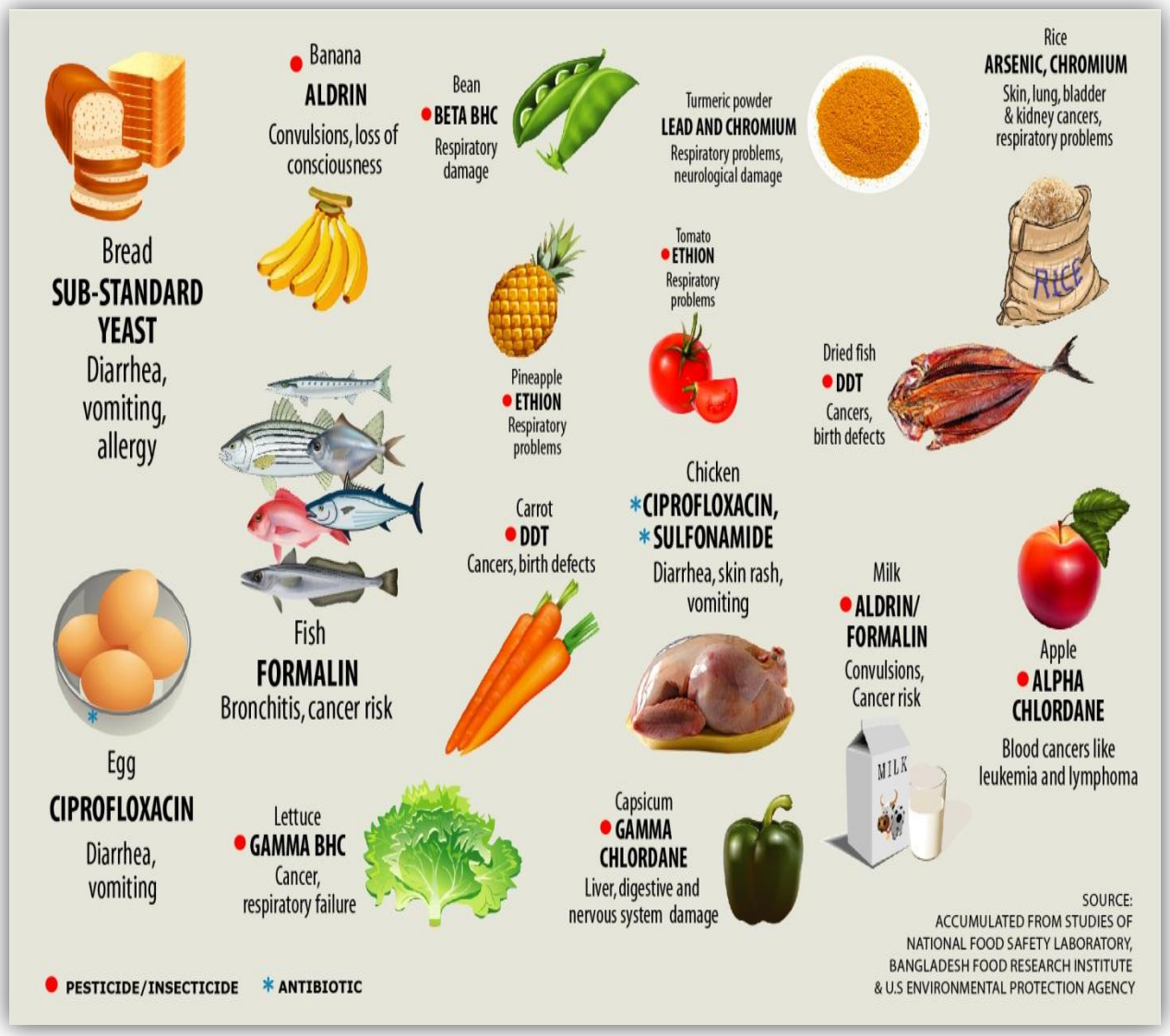
1.2. Some factors for food poisoning:

1.2. A. Microbiological factor:

The battle against foodborne diseases is facing new challenges due to the globalization of the food market, climate change, and changing patterns of human consumption as fresh and convenient foods are currently preferred. As food is biological in nature, it is capable of supporting the growth of microorganisms and foodborne diseases result from the ingestion of contaminated foods and food products. More than 250 different types of viruses, bacteria, parasites, toxins, metals, and prions are associated with foodborne diseases in humans. Although viruses are more responsible for more than 50% of all foodborne illnesses; generally hospitalizations and deaths associated with foodborne infections are due to bacterial agents. The infections range from mild gastroenteritis to life-threatening neurologic, hepatic, and renal syndromes caused by either toxin from the disease-causing microbe or by the human body's reaction to the microbe itself. Foodborne bacterial agents are the leading cause of severe and fatal foodborne illnesses. Of the many thousands different bacterial species, more than 90% of food-poisoning illnesses are caused by species of Staphylococcus, Salmonella, Clostridium, Campylobacter, Listeria, Vibrio, Bacillus, and Enteropathogenic *Escherichia coli*. However, no such databases are available for Bangladesh as well as other developing countries. Therefore, from October 2012 to the present, our laboratory conducted a series of experiments to assess the microbial quality of street foods of Bangladesh. More than 100 street foods samples of 20 kinds including singara, jhal-muri, chatpati, chetoipitha, chola/bengal gram, jilapi, jar drinking water, pickles, amra, tehari, vegetable rolls, sugarcane juice, raw cucumber slices, milk, other juices, beverages, and bread were analyzed for major foodborne pathogens including, Salmonella spp, Escherichia coli O157, O111, O26, and other E.coli,other coliforms, Listeria spp., and Staphylococcus spp.

1.2. B. Chemical factor:

Nonfood grade chemical additives, such as colorants and preservatives, and contaminants, such as pesticide residues, have also been found in street foods. A chemical analysis of street foods in Bogor found unpermitted coloring agents such as textile dyes and also pesticide residues. Proper use of salt, spices, nitrates, and sugar is an important means of preventing food spoilage, but the drive to keep prices low may lead to the purchase of cheap ingredients containing unpermitted chemical additives from unauthorized suppliers. Chemicals such as colorants may also be added to mask the poor quality of cheap materials.



Chapter 2: Food Poisoning

2.1. Definition:

Food poisoning is a general term for a wide variety of diseases that are caused by ingesting food or beverages that contain toxins or are contaminated with harmful microorganisms, such as bacteria, viruses or parasites. Food poisoning is also known as food-borne illness. Every year 48 million Americans suffer from food-borne illnesses. On the other hand, Disorder of digestive system caused from eating food (usually meat) contaminated with certain microorganism (that contain or produce toxins) or poisonous chemicals such as lead and mercury, or that is inherently harmful such as blow fish and poisonous berries and fungi. Its symptoms include abdominal pain, nausea, running diarrhea, and vomiting. Some types of food poisoning (such as botulism) can be fatal. Food poisoning typically causes irritation and inflammation of the gastrointestinal tract that resolves within a few days. Food poisoning can be severe and lead to serious complications in some cases. Food poisoning can often be prevented by Taking simple hygiene and food preparation precautions.

Common Pathogens Causing Food Poisoning	
Pathogen	**Common Host(s)**
Campylobacter	Poultry
E.coli 0157:H7	Undercooked, contaminated ground beef
Listeria	Found in a variety of raw foods, such as uncooked meats and vegetables, and in processed foods that become contaminated after processing
Salmonella	Poultry, eggs, meat, and milk
Shigella	This bacteria is transmitted through direct contact with an infected person or from food or water that become contaminated by an infected person
Vibrio	Contaminated seafood

2.2. Symptoms of food poisoning:

Symptoms of food poisoning vary depending on the specific type of food poisoning, the amount of infectious microorganisms or toxins ingested your age, medical history, and other factors. Classic symptoms of food poisoning affect the stomach and intestines and include abdominal cramps, diarrhea, and vomiting. Symptoms of food poisoning and its complications can also affect other organs including the liver, skin, joints, and kidneys, and other body systems, such as the nervous system and respiratory system. Mild cases of certain types of food poisoning may not cause noticeable symptoms.

- Symptoms of food poisoning can include:-

- Dilated pupils, redness of the whites of the eyes, or blurred vision.
- Dizziness.
- Fever and chills.
- Headache.
- Multiple bouts of diarrhea that may be bloody.
- Muscle weakness.
- Nausea and vomiting.
- Severe abdominal pain and cramps.
- Skin symptoms, such as a rash, lesion or abscess.
- Symptoms that might indicate a serious or life-threatening condition.

In some cases, food poisoning can result in serious or life-threatening complications, such as severe dehydration, meningitis, sepsis, stillbirth and miscarriage. Seek immediate medical care if you, or someone you are with, have any of these symptoms:-

- Change in alertness or level of consciousness.
- Lethargy or unresponsiveness.
- Not urinating or urinating small amounts of tea-colored urine.
- Seizure.
- Severe difficulty breathing or severe shortness of breath.

- Severe weakness or paralysis.
- Unusual abdominal pain or vaginal bleeding during pregnancy.

2.3. Cause of food poisoning:

Many types of food poisoning are spread through food or beverages that have been contaminated with human or animal feces that contain infectious bacteria, viruses or parasites. Any food can become contaminated with infectious microorganisms that cause food poisoning if it is handled by an infected person with unwashed hands or if it comes in contact with contaminated soil or water.

- Foods that can be contaminated with infectious microorganisms include:-
  - Home-canned food.
  - Honey.
  - Ice cubes made from contaminated water.
  - Raw vegetables and fruits.
  - Undercooked eggs, chicken and poultry.
  - Undercooked or raw food that comes from animals, such as seafood, meat and dairy products.
  - Unpasteurized apple cider and dairy products such as milk.
  - Water and other beverages.
  - Other sources of food poisoning and ingestion of toxins.
- Other sources of microorganisms that can cause food poisoning or related diseases include:-
  - Animals that are infected with Campylobacter jejuni bacteria or other infectious microorganisms.
  - Feces of a person with food poisoning.
  - Food contaminated with the feces of pets or reptiles with salmonellosis.
  - Soil contaminated with infectious microorganisms.
  - Toxic or poisonous mushrooms.

2.4. Risk factors for food poisoning:-

Food poisoning can occur in any age group or population, but a number of factors increase the risk of developing the disease. Not all people with risk factors will get food poisoning. Risk factors for food poisoning and related diseases include:-

- Advanced age.
- Consumption of expired food.
- Consumption of leftovers that have been stored for more than two to three days.
- Consumption of raw or undercooked eggs or meats.
- Contact with a person or animal who has an infection with microorganisms that cause food poisoning.
- Exposure to pet feces, handling reptiles, or touching raw foods or foods contaminated with microorganisms that cause food poisoning.
- Pregnancy.
- Swimming in pools, lakes, reservoirs, and other bodies of water that are contaminated with infectious microorganisms that cause food poisoning.
- Travel to developing countries with untreated water or unpasteurized foods.
- Weakened immune system due to such conditions as HIV/AIDS, diabetes, kidney disease, cancer or cancer treatment, and steroid treatment.

2.5. Complications of food poisoning:-

Complications of food poisoning and related diseases, such as wound botulism, can be serious, even life-threatening in some cases. People most at risk of serious or life-threatening complications include:

- Children.
- Infants.
- Older adults.

- People who have compromised immune systems due to such conditions as HIV/AIDS, diabetes, kidney disease, organ transplant, cancer or cancer treatment, and steroid treatment.
- Pregnant women.
- Complications of pregnancy, such as miscarriage and still birth.
- Electrolyte imbalance.
- Kidney and liver damage.
- Meningitis.
- Neurological and developmental problems in infants and young children.
- Paralysis.
- Reiter's syndrome and chronic arthritis.
- Sepsis.
- Severe dehydration due to the loss of fluids and electrolytes from diarrhea and vomiting.
- Shock.

2.6. Food poisoning is characterized by-

a. History of ingestion of common food.

b. Attack of many persons at the same time

c. Similarity of signs and symptoms in the majority of cases.

2.7. Investigation of food poisoning:-

- Secure complete list of people involved and their history: Interview the people with questionnaire.
- Laboratory investigation to detect bacteria.

- Animal experiments
- Blood for antibodies
- Environmental studies

2.8. Prevention and control of Food Poisoning:-

a. Food sanitation

- Meat inspection.
- Personal hygiene.
- Food handlers.
- Food handling techniques.
- Sanitary improvements.
- Health education.

(b) Refrigeration

- Food to be kept in correct temp.
- Never left in warm pantries.
- Cook and eat the same day.

(c) Food surveillance: Regular food surveillance should be carried out to ensure food safety.

Chapter 3: Types of Food Poisoning in Bangladesh

3.1. Non-bacterial:

- Caused by chemicals such as arsenic, certain plants and sea foods.
- In recent times by pesticides, mercury, cadmium, fertilizers.

3.2. Bacterial: Mainly 5 types-

(a) Salmonella food poisoning:-An extremely common form of food poisoning.

- **Five reasons for increase in recent years:-**

1. An increase in communal feeding

2. Increase in international trade in human food.

3. A higher incidence of salmonellosis in farm animals

4. Widespread use of house-hold detergents interfering with sewage treatment

5. Wide distribution of "prepared food".

- **Agent:-**Most common species causing outbreak are S. typhimurium, S. cholera and S. enteritidis.

➢ **Source:-**

Salmonellosis is primarily a disease of animals.

- Man gets infection from farm animals and poultry through contaminated meat, milk, and milk products, sausages, custards, egg and egg products.
- Rats and mice contaminate foods by their feces.
- Temporary human carriers cause spread of the disease

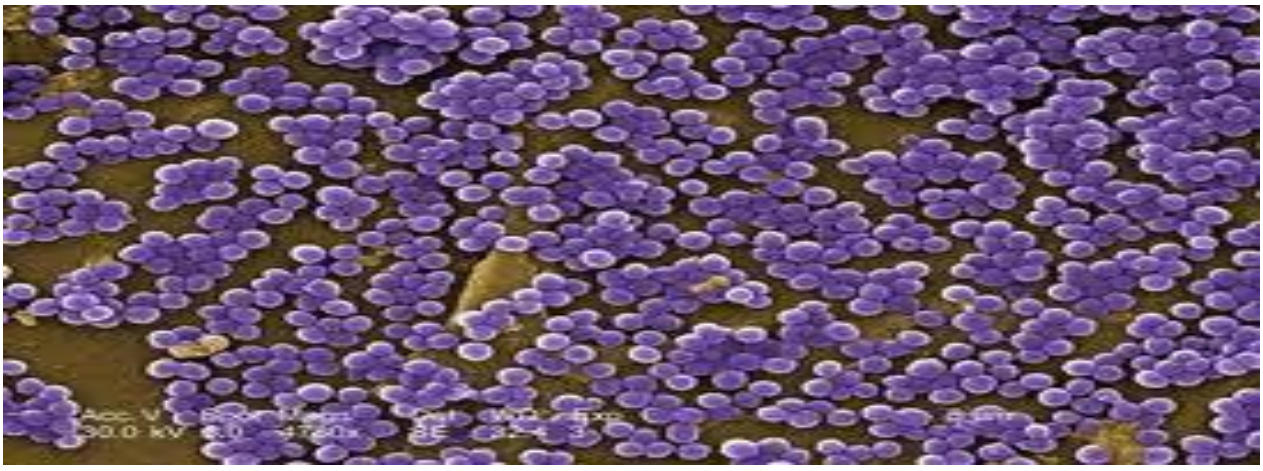
➢ **Incubation period:-**

12 to 24 hours commonly

➢ **Mechanism of food poisoning:-**

- The causative organisms, on ingestion, multiply in the intestine and give rise to acute enteritis and colitis.
- The onset is sudden with chills, fever, nausea, vomiting and a profuse watery diarrhea which lasts 2-3 days.
- Mortality is about 1 per cent.
- Carrier state last for several weeks.

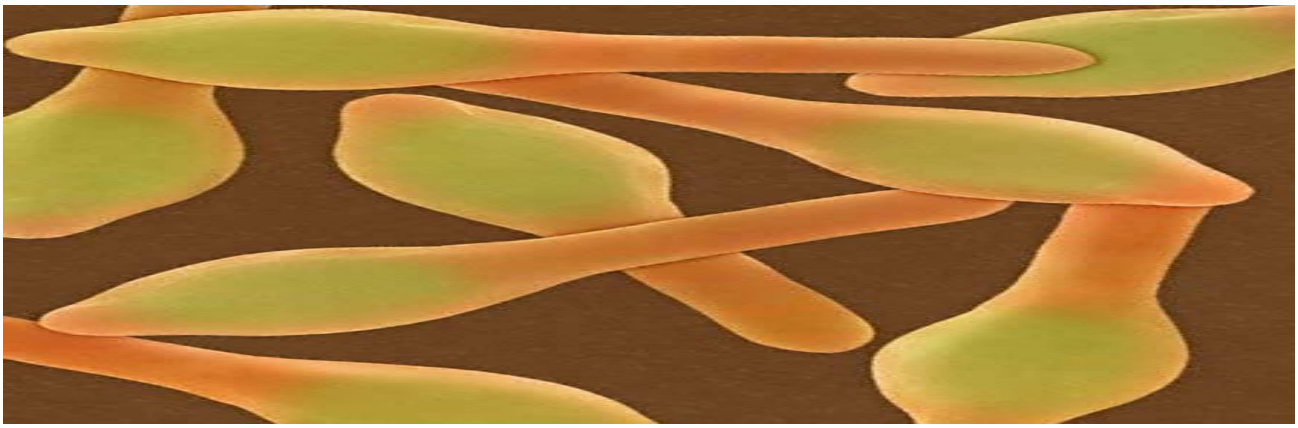
(b) Staphylococcal food poisoning:-



- **Agent:-**
  - Enterotoxins of certain strains of staphylococcus aureus.
  - Toxins can be formed at temp. 35 to 37 deg.c.

- **Source:-**
  - Staphylococci are found in the skin and in the nose and throat of man and animals.
  - Cows suffering from mastitis cause outbreak of food poisoning involving milk and milk products.
  - The foods involved are salads, custards, milk and milk products which get contaminated by staphylococci.
- **Incubation period**: - 1-6 hours.
- **Mechanism of food poisoning:-**
  - Food poisoning results from ingestion of toxins preformed in the food in which bacteria have grown.
  - Since the toxins are heat resistant, so can remain in food after the organisms have died.
  - The toxins act directly on the intestine and CNS.
  - The illness becomes manifest by the sudden onset of vomiting, abdominal cramps and diarrhea.
  - In severe cases, blood and mucus may appear.
  - It rarely causes fever.
  - Death is uncommon.

(c) Botulism food poisoning:-Most serious but rare. It kills two-thirds of its victims.



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- **Agent: -**Exotoxin of Clostridium botulinum.

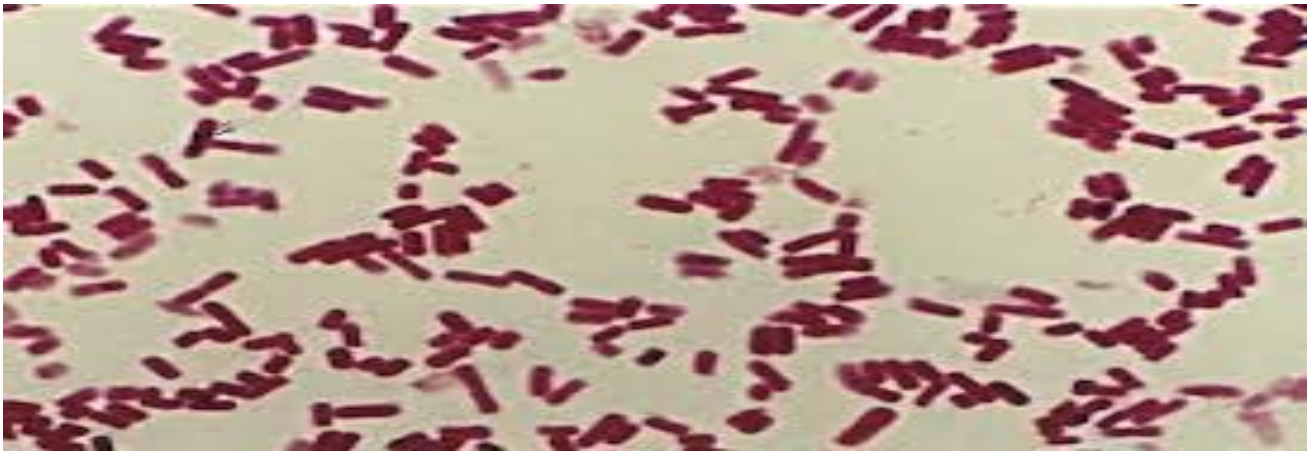
- **Source:-**
  - The organism is widely distributed in soil, dust and the intestinal tract of animals and enters food as spores.
  - The food most frequently responsible for botulism are home preserved foods such as home-canned vegetables, smoked or pickled fish, home-made cheese and similar low acid foods.
  - Botulism derives from Latin word botulus means sausage.

- **Incubation period**: 12 to 36 hours.

- **Mechanism of food poisoning:-**
  - The toxin is performed in food under suitable anaerobic condition.
  - It acts on the parasympathetic nervous system.
  - Botulism differs from other forms of food poisoning in that the GIT symptoms are slight.
  - The prominent symptoms are dysphagia, diplopia, ptosis, dysarthria, blurring of vision, muscle weakness and even quadriplegia.
  - Fever is generally absent, and consciousness is retained.

- The condition is frequently fatal.
- Death occurring 4-8 days later due to respiratory or cardiac failure.
- Botulism in infants called “infant botulism”

(d) Cl. Perfringes:-



- **Agent:** Cl. Perfringes (welchii)
- **Source :-**
  - Found in feces of humans and animals, and in soil, water and air.
  - Outbreak associated with ingestion of meat, meat dishes and poultry.
  - Foods usually cooked 24 hours or more before consumption.
- **Incubation period**: -6 to 24 hours, peak 10 to 14 hours.
- **Mechanism of food poisoning:-**
  - The spores are able to survive cooking.
  - Improper cooling of food favors the spores to germinate.
  - The organisms multiply and produce toxins like alpha, theta toxins etc.
- **Clinical symptoms:-**
  - Most common symptoms are diarrhea, abdominal cramps and little or no fever, occurring 8 to 24 hours after consumption of food.

- Nausea and vomiting are rare.
- Illness is of short duration, usually 1 day or less.
- Recovery is rapid, no deaths have been reported.

(e) Cereus food poisoning:-

➢ **Agent**:-Bacillus cereus is an aerobic, spore-bearing, motile, gram positive rod.

It is found in soil, and in raw, dried and processed foods.

The spores can survive cooking and germinate and multiply rapidly.

B. Cereus produces two types of enterotoxins causing two distinct forms of food poisoning.

1. Emetic form: short duration, upper GIT symptoms develop.

2. Diarrheal form: longer incubation period, lower GIT symptoms.

(f) Others:-

- **Campylobacteriosis** is caused by *Campylobacter* bacteria.
- **Cryptosporidiosis** *(Cryptosporidium* enteritis) is caused by*Cryptosporidium* protozoa.
- ***Escherichia coli* food poisoning** is caused by eating food or beverages contaminated with certain types of *E. coli* bacteria (for example, *E. coli* O157:H7).
- **Listeriosis** is caused by *Listeria monocytogenes* bacteria.
- **Mushroom poisoning** is caused by eating raw or cooked poisonous mushrooms.
- **Shigellosis** is caused by *Shigella* bacteria.
- **Staphyloenterotoxicosis** is caused by *Staphylococcus* bacteria.

Chapter 4: Current Situation in Bangladesh

Food poisoning problem is the most common problem in Bangladesh. That is always known to us via various reports on various newspapers. This always highlighted the food poison at various purposes. I would like to present some highlighted news from various newspaper in my project. That's are given below as a articles-

4.1. Food Poisoning' Kills 3 in M'singh:

- **Published in Daily-sun, 02 Apr 2015**

Sun Online Desk Thu, 02 April 2015, 2:12:50 pm Three members of a family died 'after eating wheat bread' at Badam Miah village in Trisalupazila on Thursday morning, reports Channel Ekattor. The deceased were identified as Salma, Ruma and a minor girl. Maniruzzaman Mia, officer-in-charge of Trisal Police Station, said AbulKalam's family bought some wheat breads from a shop beside their house in the morning. All six members of the family became unconscious after eating the wheat breads. Locals rushed them to the Mymensingh Medical College Hospital where three of them died later. Condition of the rest three was said to be critical. However, Doctors primarily suspects that it might be happened due to food poisoning.

4.2. Four die of food poisoning after eating bread:

theindependent

- FRIDAY, 03 APRIL 2015 AUTHOR / SOURCE: OUR CORRESPONDENT, MYMENSINGH

Four people died of 'food poisoning' and four fell sick in Trishalupazila of Mymensingh yesterday morning. The deceased were identified as Bithi Akhtar, 12, her niece Dilruba Akhtar, 8, of DhanikholaDakkhinBhatipara village, Najma Begum, 15, of Badamia village in Trishalupazila, and Hazera Begum, 50. The doctors have primarily suspected that the four died of severe food poisoning, but it will be confirmed only after the autopsy, DrTanimulHaqueRizvy, assistant registrar of ward no-12 of Mymensingh Medical College Hospital said. Dilruba's

mother RahimaKhatun said her mother-in-law AmbiaKhatun along with Dilruba and Bithi went to the house of one of their relatives Kalu Mia at Badamia village on Wednesday afternoon. Kalu bought flour and sweet potato for them from nearby Purabari Bazaar in the evening.

They fell sick after having breakfast with the bread prepared with the flour and sweet potato yesterday morning, said Rahima. AmbiaKhatun, 45, Asma Begum, 24, Ruma Akhtar, 22, Salma Akhtar, 10, all relatives of Kalu Mia, is undergoing treatment at Mymensingh Medical College Hospital.

Police detained Saiful Islam, the shopkeeper who sold the flour to Kalu Miah, said Moniruzzaman, officer-in-charge of Trishal police station. Saiful was being interrogated by the police yesterday.

4.3. Formalin Is Available in Dhaka's Market:

Formalin's another name of the poison. This poison is available in Dhaka's market. The businesses of seasonal fruits are going with much pomp and grandeur. PoribeshBachaoAndolon (POBA) found 95% formalin in Lychee and 100% in Black Berry by experimenting with the sample fruits from the capital's various markets during the current season.They informed it by a press conference held at the organization's headquarters on Wednesday morning. Before that from 1st June to 10th June, they collect these samples from capital's various markets.

Known from sources, from 1st June to 10th June, they collect sample fruits, and they are Mango 128 pieces, Lychee 21 pieces, Black Berry 14 pieces, Apple 39 pieces, eight pieces of Grapes and 16 pieces Malta from 35 locations under the Monsoon Fruits Formalin test in Dhaka's

market program. Then these fruits are tested in POBA office with Z-300 formaldehyde test.After reviewing the test, they found 65.63% formalin in Mango, 95.24% in Lychee, 100% in Black Berry, 58.97% in Apple, 87.50% in Grape and 68.75% formalin in Malta.

4.4. Fifteen RU female students hospitalized for canteen food poisoning:

Thursday, 14 May 2015

RU Correspondent,

At least 15 female students of Khaleda Zia Hall, Rajshahi University (RU) were hospitalized as their condition was deteriorated after eating poisonous food from hall canteen.Source said, the students fell sick eating rice on Saturday night and Sunday morning.Some of the affected students were shifted to Rajshahi Medical College Hospital (RMCH) and others are taking treatment from university Medical Center.The residential female students of the hall alleged that the musty, dirty and poor food, provided by the hall canteen, is responsible for the mass illness.

The ailing students included- ArniaKhatun of Management department, Mariam Akter of Bangla dept, Manira Sultana of Finance dept, RahimaKhatun and ManiraKhatun of Botany, Airin Sultana and Sonia of Statistics dept, AkhiAkter and ArbiKhatun of Crop Science and Technology, Sabina Akter of Sociology, Priyanka of Applied Chemistry, HasnaHena of Psychology and Mouri of Zoology dept.While asked, Khaleda Zia Hall provost Dilruba Akhter

Banu said, "It seems that food poisoning is the primary reason behind the sickness of the students.

We will look into the matter soon." The agitating students complained that unhygienic foods are always provided in most of the dining rooms and canteens of the university residential halls. But nobody here to ensure the food security of the students.

4.5. 21 Dhaka University students fall sick after lunch at Mohsin Hall canteen:

bdnews24.com
Bangladesh's First Internet Newspaper

Published: 2015-04-21

Doctor JU Ahmed of the university's medical centre told bdnews24.com they were having stomach ache. "Five of them had to be admitted. The rest were released after first aid," he added. One of the victims, journalism student Kamal Hossain told bdnews24.com, "My stomach started aching immediately after lunch. Diarrhoea started in a while. I also threw up twice."Meanwhile, hall students beat up the manager of the canteen. The hall's resident teacher, AKM Iftekharul Islam, said, "Students are complaining about the quality of food. But we are trying to see if it could have been caused by anything else."Provost Ali Akkas said they had warned the canteen manager a number of times before about the quality of food.

4.6. 50% of food items sold on streets are contaminated:

DHAKA, Jan 25, 2015, (BSS) – More than 50 percent of food items and beverages sold on city streets are found contaminated with various groups of bacteria called coliform, said a study."More than 50 percent street foods and beverages are contaminated by coliform while more than one- third street foods is unhygienic by faecal pathogen (E.coli)," said the study.The International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), an international health research organization, today unveiled the information at a programme at its Sasakawa Auditorium in city's Mohakhali area. ICDDR, B conducted the study titled "Behavioral Intervention of Street Food Vendors for Strengthening Street Food Safety in Dhaka City, Bangladesh" with support from the Grand Challenges, Canada and in collaboration with the DSCC, Food and Agricultural Organization, RFL Plastics Ltd, and Bangladesh Consumers Association.State Minister of LGRD and Cooperative Moshiur Rahman Ranga was the chief guest at the programme while Executive Director of ICDDR, B Professor John D Clemens, Dr Shah Nawaz were also present with ICDDR,B Deputy Executive Director Dr Abbas Bhuiya in the chair. Ranga said, "Government will implement the Safe Food Act, 2013 soon to stop widespread food adulteration in the country."

The study tested different food items of 115 street vendors in Dhaka South City Corporation (DSCC) area between December 2013 and October 2014.

4.7. 300 RMG workers fall sick from food poisoning:

Monday, 18 May 2015, Miprobashi news

At least 300 workers of a garment factory fell sick after eating foods provided by the factory authorities in the Ashulia industrial belt on Thursday.Police said about three thousand workers were working at StarlingCreationLimited.The factory authorities distributed foods including egg, banana and bread among them at about 8:0pm.After eating the foods a good number of workers lost consciousness.About 300 workers were admitted to Woman and Children Health Complex, Nightingale Medical College Hospital and other hospitals.Incensed by the incident, workers vandalise 50 vehicles passing through the Abdullahpur-BaipileRoad.However, the authorities announced closure of the factory to avoid trouble.At one stage, the agitated workers tried to ransack the factory.

4.8. 50 falls sick for food poisoning in Kushtia:

Dhaka Tribune

- Published: 00:46 may 5, 2014

The victims had gone to a wedding ceremony in the village at noon. After the meal, they fell sick-

At least 50 people including 13 children fell ill after eating at a marriage ceremony at Farakpur village, Bheramaraupazila Saturday night.Locals said the victims had gone to a wedding ceremony at Abdul Barik's house in the village at noon. After the meal, they fell sick.Of them Siam, 10, Sajim, 3, Mina , 2, Darpan, 3, Lipi, 15, Ruhan, 11, Samia, 2, Ejaj, 6, Adori, 3, Salam, 28, Rahul, 4, Sagar, 17, Sumia, 11, Ismail, 5, Fakir Uddin, 70, Shamoly, 13, Shahin, 8, Rajani, 20, Rakhi, 4, Tarik, 38, Maria, 10 and Shanto, 10, were admitted to Bheramara Health Complex.

Bheramara Health Complex Residential Medical Officer (RMO) MoshiulAlam said: "The people fell sick due to food poisoning."Shariful Islam, son of Abdul Barik, said: "We bought 315 cups

of curd from Pabna Sweets. The guests might be fallen sick after eating the curd."On information, UNO Rejaul Karim and Bheramara police station officer-in-charge Parvez Islam visited the spot.

4.9. One dies, hundreds sick after BNP iftar in Gazipur:

Dhaka Tribune

- Published: 23:04 august 4, 2013

One dies, hundreds sick after BNP iftar in Gazipur.

Most victims are members of the BNP district unit. Some patients were sent to Dhaka's Cholera Hospital as their condition deteriorated.

Hundreds of guests at an iftar party on Thursday in Gazipur became sick and were admitted to hospitals.The victims were diagnosed with food poisoning and one of them died on Saturday.Most of the victims are members of the BNP district unit. Some patients were sent to Dhaka's Cholera Hospital on Sunday as their condition deteriorated. The deceased was identified as FazlulHaque, 50, of BangarKhola village.Tumulia union BNP organised the iftar on the ChuariKhola Government Primary School premises and bhuna khichuri containing both beef and chicken was served. Party members said the food was cooked on the spot and served.

Shourav, one of the food poisoning victims, said more than a thousand people had joined the iftar party. Within two to three hours of the meal many people started vomiting and complaining of stomach pain and dysentery. The sick were rushed to different clinics and hospitals nearby.

According to the admission register at the KaligonjUpazila Health Complex, 13 people were admitted on Thursday, 49 on Friday, 21 on Saturday and six on Sunday.

DrMdMasudRana of KaligonjUpazila Health Complex said a total of 89 patients were admitted in the hospital due to food poisoning.

President of Gazipur district BNP FazlulHaqueMilon, who also attended the iftar party, said: "We have already held several iftar parties in the upazila but this is the first time that such a thing has happened." •

Milon, who appeared to be in good health, said: "We feel sorry for the incident and hope that everyone will be cured soon." •

4.10. 150 workers sick after taking factory-provided food:

DhakaTribune

- Publised: 12:08 june 30, 2013

Doctor said the workers had suffered from food poisoning, which may have been because of the low quality of the food.At least 150 workers of a garments factory in Savar fell ill after taking food that was provided by factory authorities on Friday.Co-workers rushed them to a nearby hospital where doctors said they had suffered from food poisoning. The factory, The Rose Dresses Limited, is owned by Bangladesh Garments Manufacturers and Exporters Association (BGMEA) President AtiqulIslam.Several workers of Rose Dresses told our correspondent that authorities provide a meal for the workers when they are on overtime. On Friday night they were given bread, egg, banana and cake which were brought from a local bakery.

After taking the food, some female workers felt sick and vomited. They were rushed to the local Centre for Women and Child Health hospital. Some workers said they only had tap water to drink, which may have been the cause of the sickness.Duty doctor SurajitSaha of Centre for Women and Child Health Hospital told this correspondent that the workers had suffered from food poisoning, which may have been because of the low quality of the food.Four workers were released from the hospital after primary treatment. Others will be released soon as they are now out of danger, headded.The factory was declared closed for Saturday.Mithun Chakrabarty, general manager of the factory, said: "We will investigate why this incident has happened."BGMEA President and factory owner Atiqul Islam told our correspondent that samples of the food were sent to the International Centre for Diarrhea Disease Research, Bangladesh (ICDDR,B) for examination.

He denied the allegation that the workers were given tap water to drink. The sick workers will be sent to Enam Medical College if necessary, he said.Another readymade garment factory of Mitsuoka Apparel Limited, a Japan-funded factory, in Kumkumari Bazar of Ashulia, remained shut on Saturday as workers refused to work, protesting the termination of some of their fellow workers.Mitsuoka Apparel terminated 26 workers on Saturday morning and 46 others last week.AbdusSattar, assistant deputy director of Ashulia Industrial Police, said that they had urged the factory authorities and employees to settle the matter through discussion.

4.11. 70 fall sick due to food poisoning in Bangladesh:

- **20:51, April 01, 2010**

Some 70 people fell sick after eating leftover wedding food in Bangladesh's northwestern Rangpur district town, some 304 km away from the capital Dhaka, early Thursday.They were admitted to local hospitals.

Quoting local sources, leading English newspaper The Daily Star in its online edition said a wedding party was held at a community center in the town Wednesday night.After the party, the leftover food was distributed among the poor people of that area at night.

The people ate the food and started vomiting and also complained of abdominal pain. It might be an incident of food poisoning, the report added quoting hospital sources.

Earlier, some 780 students of nine primary schools in Bangladesh reportedly fell sick after having eaten biscuits distributed under a feeding program of the World Food Program in June last year.

Chapter 5: Research Result

From various survey reports and data sources, now I am going to presents some results of food poisoning and range of food poisoning due to use of chemical and other composition in various years by statistically in my project.

5.1. Statistical Yearbook of Bangladesh 2010

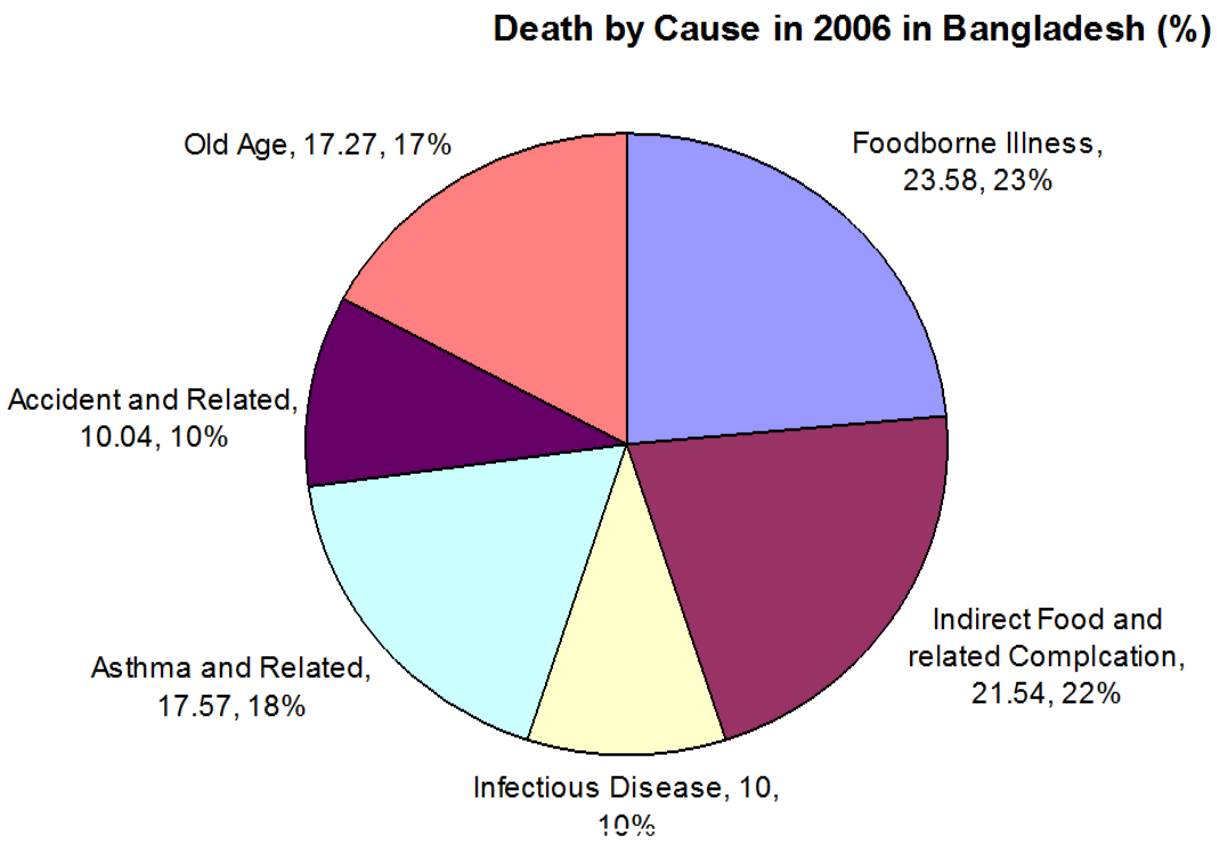


Chart percentages represent detail cause below: 23%(food borne illness): Liver diseases, jaundice, diarrhea, dysentery, TB, peptic ulcer, malnutrition, skin diseases, leprosy, arsenic, kidney, appendicitis, warm and other, 22%(indirect food and related): heart disease, stroke, blood pressure, diabetes, paralysis, tumor, cancer, 10%(infectious diseases): Chicken pox, measles, polio, fever, malaria, typhoid, influenza, diphtheria, meningitis, tetanus, gonorrhea, HIV, 18%(Asthma and related): Asthma, respiratory diseases, rheumatic fever, rheumatism, ENT diseases, 10%(Accident and related): suicide, murder, burn, snakebite, poisoning,

drowning, rabies, mental diseases, drug abuse, epilepsy, pregnancy and abortion problem and the rest17% old age.

Source: Statistical Yearbook of Bangladesh 2010

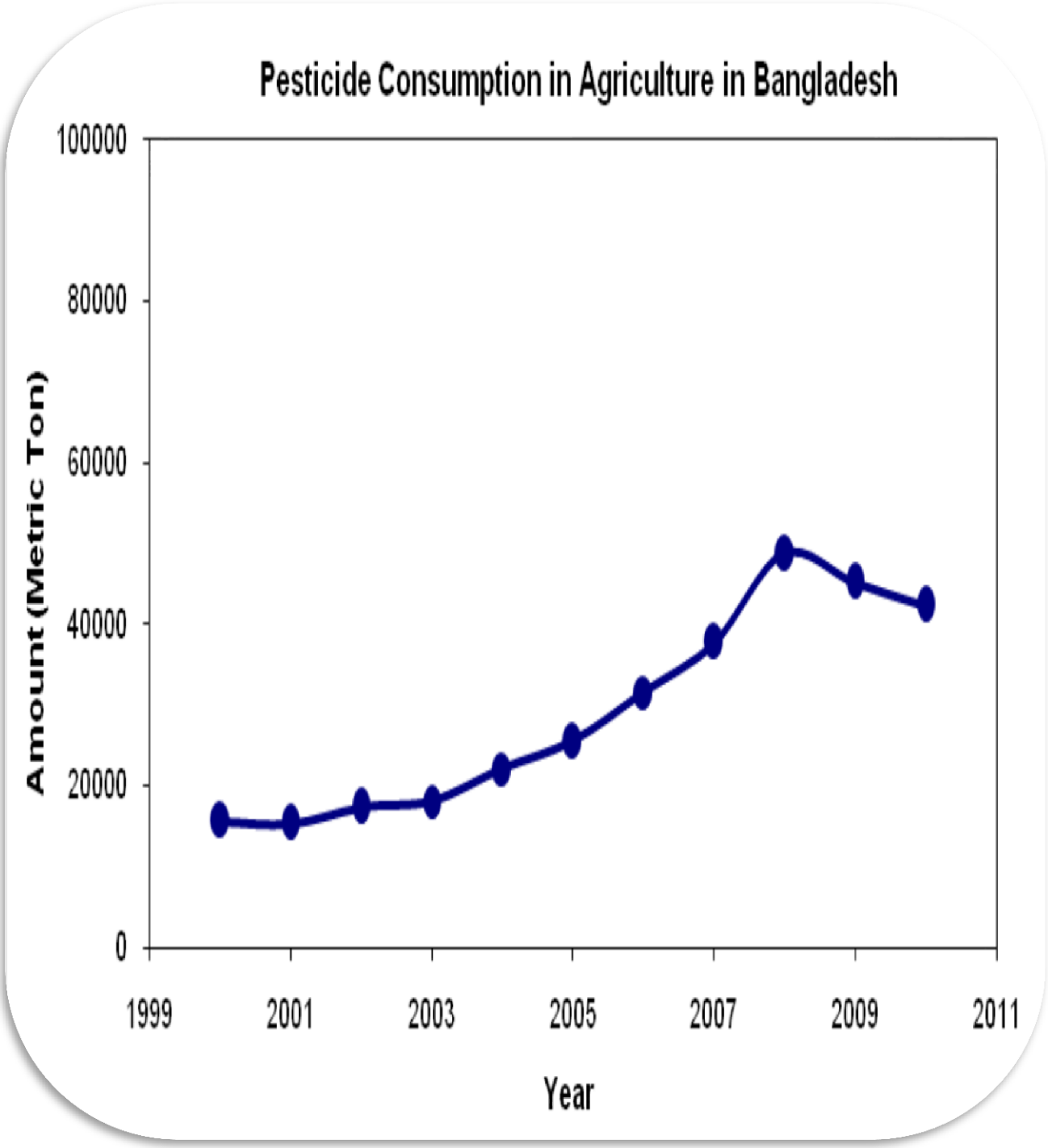
From the above figure we can see that, in 2006 about 23% people of Bangladesh were died by foodborne illness which was results from food poisoning.

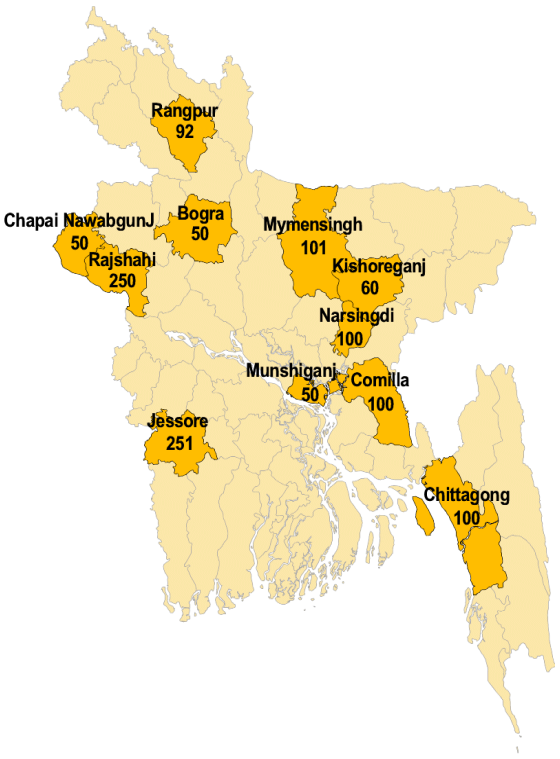
5.2. Pesticide-related poisoning is a major cause of death in Bangladesh:

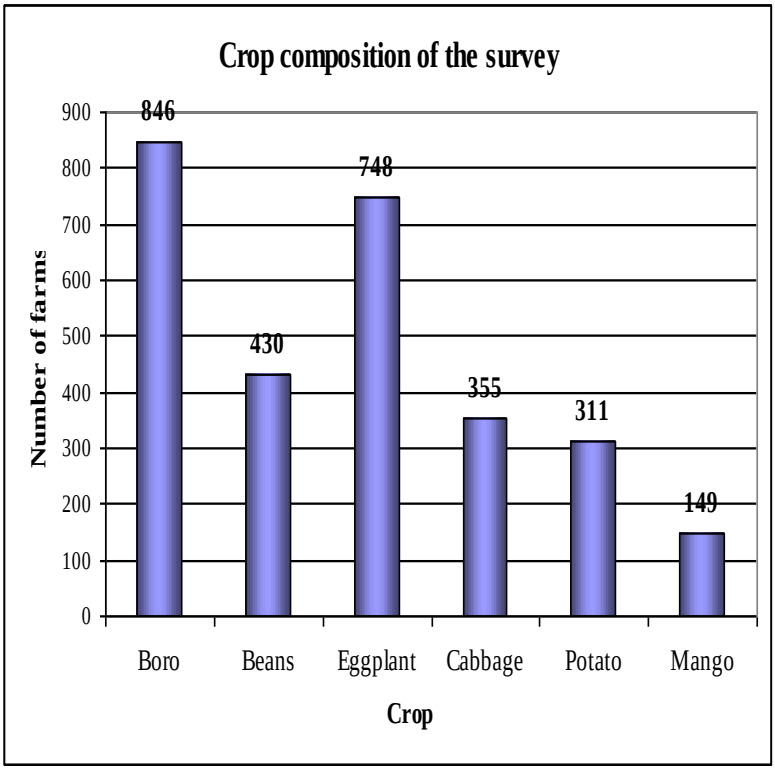
DHAKA, 18 January 2010 (IRIN) - An annual government survey of Bangladesh's health situation has found that pesticide-related poisoning is a leading cause of death, underscoring a major health concern. The 2009 Health Bulletin, which compiles health statistics from 2008, recorded 7,438 pesticide-related poisoning deaths at more than 400 hospitals nationwide amongst men and women aged 15-49.

Farmer spraying pesticides in northern Kurigram District.

This above graph indicates that the use of pesticide in agriculture purpose was raised and also continues day by day.







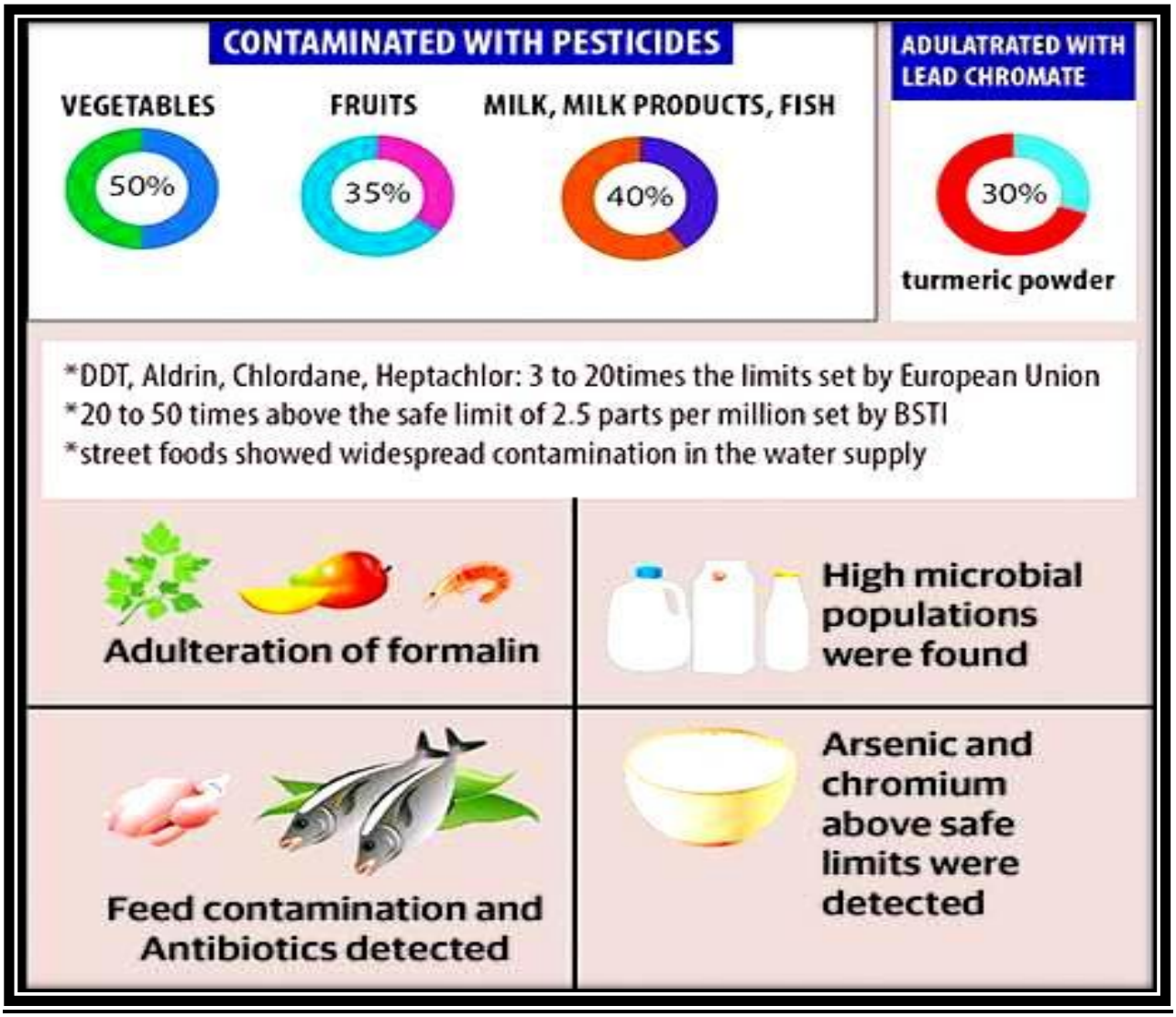
Source: World Bank Research on Pesticides

5.3. Food adulteration reaches new height:

Dhaka Tribune

Published: 03:01 April 30, 2014

A 15-member team of the National Food Safety Laboratory, with support from the FAO came up with the findings after collecting and testing food samples from the capital's Gulshan, Karwanbazar and Mohakhali markets. Unsafe levels of pesticides are present in around half of the vegetables and more than a quarter of fruits sold in the capital's markets, a recent survey has found-



A 15-member team of the National Food Safety Laboratory, with support from the Food and Agriculture Organization (FAO), came up with the findings after collecting and testing food samples from the capital's Gulshan, Karwanbazar and Mohakhalimarkets.The survey report, a copy of which was acquired by the Dhaka Tribune, read that –

- Nearly 40% of 82 samples of milk, milk products, fish, fruits and vegetables contained banned pesticides such as DDT, Aldrin, Chlordane and Heptachlor.
- The amounts of pesticide in these samples were found to be three to 20 times greater than the limits set by the European Union.

- Around 50% vegetables and 35% fruits were found to be contaminated with unsafe level of pesticides.
- Analyzing more than 30 samples of turmeric powder (branded, packaged and open), the team also found that nearly 30% of the samples contained traces of lead chromate, which can be fatal if swallowed or inhaled.
- These samples also contained lead at 20 to 50 times above the safety limit of 2.5 parts per million set by the Bangladesh Standard Testing Institute (BSTI).
- Arsenic and chromium above safety limits were detected in a total of five out of 13 rice samples.
- Using a sensitive high-performance liquid chromatography (HPLC) method developed by the food safety lab, 66 samples were analysed for the presence of formaldehyde, while adulteration was detected in samples of coriander, mango and fresh shrimps.The tests indicated that poultry feed in the country had also been contaminated, as samples of chicken and fish contained traces of antibiotics.
- High microbial populations were found in several samples of pasteurised milk, indicating poor processing procedures by the manufacturers. Samples of cucumber and street foods also showed high microbial populations, suggesting widespread contamination in the water supply.
- At least four samples of package juice were mislabelled as containing no preservative, although they contained benzoic acid within safety limits.
- The petition told the court about the recent study which found that 40% food in the capital's market contained high levels of pesticide.

5.4. Formaldehyde tests report:

Appealing Products, Inc. the parent company of FormaldehydeTests.com has tested many commercially available foods for the presence of Formaldehyde. Tests have been run in duplicates, as well as on different batches of the same fish. A portion of the results from API's tests can be found below.

#	Type of Sample	Local or Imported	Results
1	Swai (Fish)	Imported	Positive
2	Tilapia (Fish)	Local	Negative
3	Tuna (Fish)	Local	Negative
4	Cod (Fish)	Imported	Positive
5	Tilapia (Fish)	Local	Negative
6	Swai (Fish)	Local	Negative
7	Cod (Fish)	Imported	Positive
8	Cod 2 (Fish)	Imported	Positive
9	Pollock (Fish)	Imported	Positive
10	Shrimp (Fish)	Imported	Positive
11	Swai (Fish)	Imported	Positive
12	Tilapia 1 (Fish)	Imported	Positive
13	Whiting (Fish)	Imported	Positive
14	Cod 3 (Fish)	Imported	Positive
15	Salmon (Fish)	Local	Positive <5 ppm
16	Tilapia (Fish)	Local	Positive <5 ppm
17	Lamb	Local	Negative
18	Mexican Taco Cheese	Local	Negative
19	Colby Jack Cheese	Local	Negative
20	Sharp Cheddar	Local	Negative
21	Whole Milk Ricotta Cheese	Local	Weak Positive <5 ppm
22	Cottage Cheese	Local	Weak Positive <5 ppm
23	Low-Fat Cottage Cheese	Local	Weak Positive <5 ppm
24	Greek Nonfat Yogurt	Local	Weak Positive <5 ppm
25	Sour Cream	Local	Weak Positive <5 ppm

It was found that many of the fish imported from other countries such as China, Indonesia and Vietnam have much higher levels of Formaldehyde than what is naturally present in fish. This may indicate intentional adulteration to increase the food's shelf-life.

5.5. Ninety percent of randomly-collected samples of sweetmeats from different parts of Bangladesh were also found adulterated in 2002 (6); 97% of randomly-collected 400 samples of sweetmeats from Dhaka in 2003 were adulterated, and 91% samples had less than 10% milk fat which should have been at least 10% as per Bangladesh standard laid down by BSTI and The Bangladesh Pure Food Rules, 1967 (19).

Chapter 6: Discussion

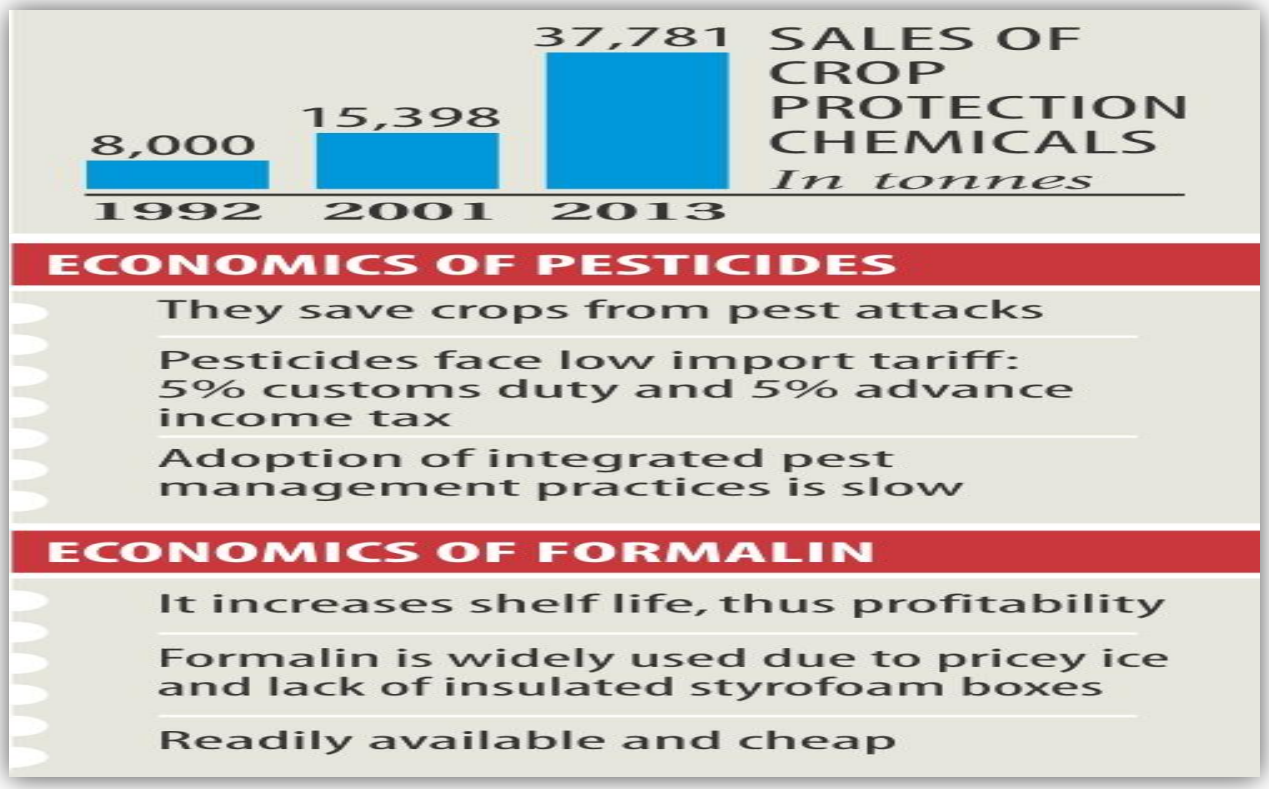
There are some laws and regulation in Bangladesh for food safety. These are –

- The Bangladesh Pure Food Ordinance, 1959 (Bangladesh Ordinance No. LXVIII of 1959)
- The Bangladesh Pure Food (Amendment) Act, 2005
- The Bangladesh Pure Food Rules, 1967
- Bangladesh Standards and Testing Institution Ordinance, 1985 (XXXVII of 1985)
- Bangladesh Standards and Testing Institution (Amendment) Act, 2003
- The Food Grain Supply (Prevention of Prejudicial Activity) Ordinance, 1956
- The Essential Commodity Act, 1990
- The Iodine Deficiency Disorder Prevention Act, 1989
- The Animals Slaughter (Restriction) and Meat Control (Amendment) Ordinance, 1983
- Fish and Fish Products (Inspection and Quality Control) Ordinance, 1983
- Fish and Fish Products (Inspection and Quality Control) Rules, 1997
- The Radiation Protection Act, 1987
- Destructive Insects and Pests Rules, 1966 (Plant Quarantine) amended up to 1989
- The Pesticide Ordinance, 1971 and The Pesticide Rules, 1985
- Agricultural Produce Markets Regulation Act, 1964 (revised in 1985)
- Fish Protection & Conservation Act, 1950 (latest amendment in 1995)
- Marine Fisheries Ordinance, 1983 and Marine Fisheries Rules, 1983
- The Special Powers Act, 1974
- Agricultural Products Market Act, 1950 (revised in 1985)

Although there are many laws and regulation for food safety, it is very sad news to us that these laws are not properly maintained in our country. Besides this lacking of monitoring systems are also highlighted now a day. For example-Bangladesh's 1985 Pesticide Rules outline stringent procedures for the registration, import, manufacture, sale, packaging and advertisement of pesticides. But pesticide importers and traders pay scant attention to these regulations, experts

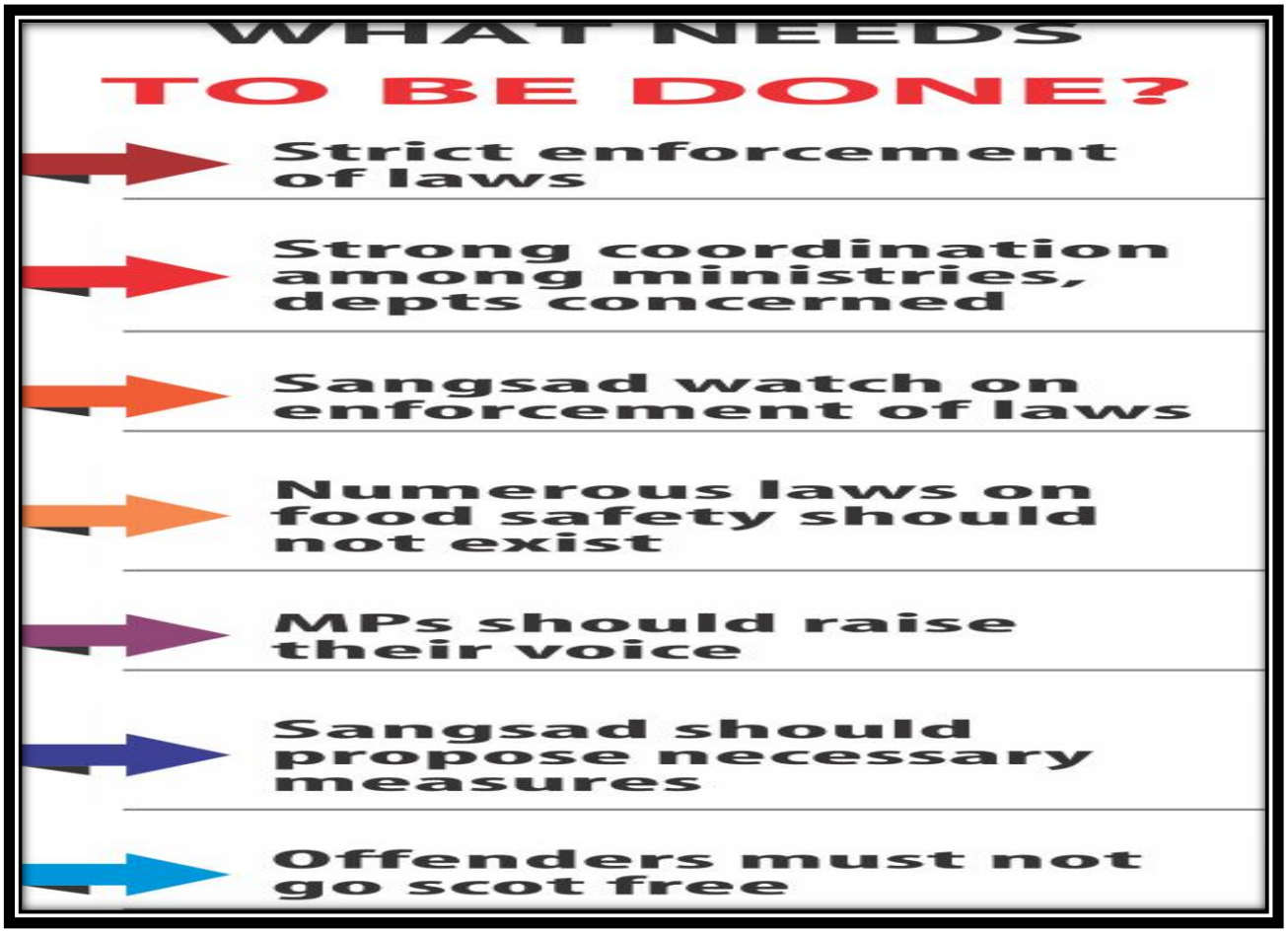
say. Illiterate farmers are also persuaded by unscrupulous traders and various incentive schemes to buy unregistered pesticide formulations that promise to protect crops against pest attacks and disease. Meanwhile, suppliers continue to sell many chemical substances banned by the government, as well as chemical compounds such as aldrin and endrin, which are classified as "highly hazardous" by the World Health Organization (WHO).

In addition, many pesticides continue to be sold in the market without names or under false labels, and with no clear warnings or instructions to farmers, contravening the law, according to experts.Adulteration of particular food items is still rampant. Rosogolla, one of the most popular sweetmeats in Bengali culture, has been consistently found to be 100% adulterated. A comparative study on the quality of laboratory-made and local market rosogolla conducted in Mymensingh also found the laboratory-maderosogolla to be of better quality than ones in the market in terms of physical and chemical parameters. Manufacturers do not always maintain the quality of marketed food products after receiving the certification mark from BSTI that may be intentional for more profit or due to ignorance. Since the packaged food items are produced and marketed throughout the country, quality control of marketed food products clearly warrants



more stringent monitoring.

Different coloring agents and textile dyes were extensively used in a variety of food items but detection of the nature and level of the coloring agents has not been possible due to the lack of advanced laboratory facilities. A study in India found synthetic food color exceeding the statutory limits in the majority of food items and non-permitted colors in some of the foods sold at kiosks. Chemicals, such as calcium carbide, formalin, sodium cyclamate, DDT, and urea, were widely used. Formalin was detected in 9 out of 11 fishes tested in the Pharmaceutical Technology Department of the University of Dhaka. Although food adulteration received considerable media attention, the consumers in our study lacked knowledge on what comprises food adulteration, commonly adulterated food items, and the adulterants used. A survey on awareness of consumer right found that most of the consumers knew about toxic colours and chemicals in fruits and vegetables.The practice of considering BSTI approval was substantially



low among our respondents. Consumers should be made more aware of the quality of the food they should consider while buying different food items.

First and foremost, commitment from the political establishment to wage a sustained campaign against these perpetrators of heinous crime, and establish our fundamental right to have safe and nutritious food! For this to achieve, relentless enforcement of existing laws with the execution of highest penalty possible, awareness-building campaign among consumers, promotion of ethical practices among the business community with active involvement of the business leaders, and capacity development of public health labs to test food items for adulteration on the spot are needed. The consumer rights groups should be more vocal and play active role in developing a mass campaign/movement in the country.

Safe and unadulterated food is out human right...Let's work together to achieve this.

Chapter 7: Conclusion

The extent of food adulteration was high enough to warrant further action to control the situation. Collection procedure of food samples has the potential for biased estimation and, therefore, undermines the validity of the extent. A systematic procedure of random food sample collection incorporated in surveillance for food adulteration could give an accurate picture of the situation. The extensive use of different chemicals and dyes in food calls for appropriate measures. The majority of the consumers lack proper knowledge, attitude, and practices relating to food adulteration. Publicizing the newly-passed consumer protection law, other existing food adulteration-related laws, and different aspects of food adulteration via mass media could play a crucial role in raising consumer awareness. Stringent enforcement of the forthcoming unified food law 'Safe Food Act 2013' by the Government would substantially decrease food adulteration in the country. Drives by mobile magistrate court were found to be effective and should be re-started in collaboration with the media that can publicize the results of the drive for building awareness. Epidemiologic and toxicologic studies should be undertaken for risk assessment of different synthetic food colors and chemicals used in food items to better understand short-term and long-term adverse effects on health, nutrition, and intellectual performances. Studies on epigenetics should also be performed to investigate the association of food adulteration.

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