INTRODUCTION

Food safety, an important global public health issue to ensure sound health, refers, to addressing all those hazards, whether chronic or acute, the may make food injurious to the health of the consumer”(1) Important food hazards include microbial hazards, pesticide residues, misuse of additives, chemical contaminants, including biological toxins and adulteration. Although microbiological contamination and chemical hazards have received most attention, it is recognized that food adulteration and food fraud should not be neglected considering their role in public health (2).Food adulteration includes various forms of practices, such as mixing, substituting , concealing the quality of food by mislabeling, putting up decomposed or expired food, and adding toxic substances (3). It is an age-old problem that affects people at all societal strata. The consequences of food adulteration are two-fold for the consumers: the economic loss by paying more for lower quality food items and the health hazards. The health hazards can result from either addition of deleterious substance or removal of a vital component (4). Some adulterants may even lead to death (1, 3).

More than half of the food samples tested during 2002 at the Institute of Public Health in Dhaka were adulterated; among the samples tested, 100% samples of butter oil and banaspati dalda , 90% condensed milk/sweetmeats, 72.3% ghee and honey, and 57.2% cow’s milk were adulterated (6). During 2002-2003. Bangladesh Standards and Testing institute (BSTI) had 250 surveillance team/mobile courts that collected 226 food samples from open market for testing, issued 117 show cause notices to manufactures for substandard products, cancelled 45 trade licenses, and undertook 35 legal actions (7). The mobile court raids against food adulteration intensified in 2005 when electronic and print media featured reports on horrendous food adulteration practices. Sixty-four percent sellers/producers in study in Bangladesh reported using chemicals in their products, although 74% were aware that mixing chemicals with food was harmful to health. They used harmful chemical to make the products more lucrative, increase shelf life , substitute for unavailable natural raw materials, and reduce price of the goods(8). Recently, a growing concern has been the use of prohibited food colours, such as textile dyes in many foods to increase acceptability of food.

There are several laws and regulations in our country to ensure the standard of food manufacture and sale. Enforcement of food laws, rules and regulations in Bangladesh is a shared responsibility of different ministries and their concerned departments. The food samples are analyzed at different government food laboratories. The Consumer Right Protection ordinance 2008 was passed in the parliament on 1 April 2009.

Bangladesh Standards and Testing Institution Ordinance, 1985(XXXVII of 1983)

Bangladesh Standards and Testing Institution (Amendment) Act, 2003

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| Table 1. Food adulteration detected by Dhaka City Corporation during January 2001- December 2005 | | | |
| Year | No. of food items tested | No. of samples tested | No. (%) of samples adulterated |
| 2001  2002  2003  2004  2005 | 37  29  36  33  38 | 563  581  960  674  1193 | 422(75)  453(78)  713(74)  487(72)  763(64) |

Adulterated food items and adulterants used

According to PHFL of DCC, 39 food items were adulterated during January 2001 to December 2005 (Box 3). Traders used various adulterants indifferent food items (Table 2 and table3)(16,17)

Consumer awareness (knowledge, attitude, and practice)

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| Box 3. Adulterated food items in Dhaka city,2001 - 2005 | |
| Milk and milk products: | Food grains, cereals, and cereal products: |
| Milk | Rice |
| Dried milk powder | Wheat |
| Curd | Lentil/Dal |
| Icecream | Beson (flour made of peas or chickpeas |
| Butter | Ata (course wheat flour |
| Cream | Suzl (semolina) |
| Ghee (clarified fat) | Lachsa semai (kind of vermicellis) |
| Rosogolla | Spice: |
| Kalakand/kalajam |  |
| Sandesh | Turmeric powder |
| Chhana |  |
| Kheer | Bakery products: |
| Mawa | Cake |
| Malai | Biscuit |
| Edible oil and oil products: | Fruits, vegetables and miscellaneous products: |
| Butter oil | Jelly |
| Soybean oil | Juice |
| Mustard oil | Sauce |
| Palm oil | kickles |
| Coconut oil | Ring chips |
| Dalda/Banaspati | Honey K  Khair (edible catechu) salt |
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| Table 2. Adulterants used in different food items of vegetable origin as reported in lay press reports, Dhaka 2006 | | |
| Food category and food  item | Adulterant | |
| Edible oil | |  |
| Soybean oil | | Palm oil, chemical\*, colour\*, burnt mobil\*\* from rail locomotives, burnt oil from electric transformer |
| Mustard oil | | Chemicals\* |
|  | |  |
| Food grain and grain products | | |
| Lentils, mugdal, chola, mosur dal, dabli,,  Mashkalai, butter dal (lentil types) | | Toxic colouring agents\*, imported low quality inedible lentils mixed with textile dye\* and have fungal growth; less expensive Mashkolai dal powdered with champa colour\* and sold as mugdal |
| Rice | | Urea added to make it whiter |
| Dhekichata chal (husked rice), ata (course flour) | | Red toxic colour\* mixed rice and ata to sell as husked rice, red atta |
| Muri (puffed rice) | | Urea fertilizer to make it whiter and puffer |
| Wheat , corn | | Animal feed packaged as human food |
| Semai(vermicllis)\*\*\*  Vegetables and tubers | | Dalda made with rotten potato, cow intestine, low quality palm oil |
| Vegetables | | Organophophorus complounds and other pesticides |
| Tometo | | Calcium carbide for artificial ripening |
| Potol (pointed gourd), peas | | Textile dye\* |
| Eggplant | | Pesticide\* |
| Green pesa | | Chemically coloured\* Dabli |
| Potato | | Red toxic colour\* |
| Spices | |  |
| Mixed spices (powder) | | Brick dust, saw dust, chaler kura(dust from outer layer of rice) |
| Turmeric powder | | Brick dust, buter dal, (lentils), artificial powder, colour\* |
| Chilli powder | | Powder with colour\* |
| Coriander powder | | Chaler kura(dust from outer layer of rice), toxic colour\* |
| Zera (cumin )powder pepper  Peppar | | Brick dust, toxic colour\*, powder\*  Papaya seed |
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| Salt | | No iodine |
| Bakery products | |  |
| Cake\*\*\* | | Textile dye, chemicals\*, inedible date expired ata/maida, fertilizer urea, substandard inedible dalda, rotten egg |
| Biscute\*\*\* | | Ammonium bicarbonate, sodium cyclamate , fertilizer urea, toxic colouring agents\*, plam oil, burnt oil, outdate inedible ata/maida |
| Bread\*\*\* | | Rotten egg, outdated ata/maida |
| Fruit and fruit products | |  |
| Mango, banana, pineapple | | Calcium carbide for artificial ripening |
| Koromcha (Carissa caradas, Christ’s thorn) | | Chemical colour\* to sell as cherry |
| Orange and lychee juice | | Water, flavor, textile dye\*, sweet pumpkin, and colour\* |
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| Table 2. Contd. | | |
| Food category and food  item | Adulterant | |
| Imported juices | | Substandard, date expired |
| Snacks | |  |
| Noodles\*\*\* | | Dhekichata chal, lal atta (coarse wheat flour), red potato |
| Chanachur  Peyaju, begun | | Fried in burnt mobil\*\*, no potato, imported powder, and colour\*  Toxic dye\* |
| Chocolate, sugar, and honey | | |
| Chocolate | | Powder, sugar, colour\*, chemical\* |
| Sugar | | Soda used instead of sugar in food |
| Honey | | Sugar syrup |
| Others | |  |
| Pickle | | Inedible ingredients |
| Jorda (smokeless tobacco) | | Wood dust, chemical\* |
| Mineral water and  Drinking water\*\*\* | | Tap-water arsenic contaminated , contaminated with bacteria,  no mineral |

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| Table 4. Adulterants used in different food items of animal origin as reported in lay press reports Dhaka 2006 | | |
| Food category and food  item | Adulterant | |
| Egg, fish, meat, and meat products | | Substandard, date expired |
| Hen egg | | White eggs of farm hens coloured red with textile dye to sell as local hen eggs. Tortoise sold as hen eggs |
| Fish | | Inject formalin through the gills or dip fishes in water treated with chemicals, such as chloro-fluoro carbon |