# Food Hazards

***Imagination is more important than knowledge***
***— Albert Einstein***

# Bottled Water : Microbial Quality of Alternative Water Supply

**by Dr. Sirajul Islam Khan**

***Unfortunately the scenario with most bottled waters produced in our country is that they have not been thoroughly microbiologically examined. Often false certification is obtained by some means because a large number of the bottled waters produced locally falls short of requisite standard. These findings suggest that locally produced bottled water requires stringent microbiological quality control before it goes to the retail outlets.***

WATER is an absolute necessity for life and less than 1.0% of water on earth is potable. Water can also be a carrier of suffering and death. Apparently crystal clear water can be associated with a high incidence of microbial pathogens that can cause infective diseases. The list of potentially pathogenic microorganisms transmitted by water is increasing significantly each year. The quality of water used for drinking has a profound effect on the health and hygiene of the user. In Bangladesh about 80% of diseases are associated with drinking water and about 28% of the children's death is attributed to waterborne diseases caused by pathogenic microorganisms. The supply of safe drinking water to the home can no longer be taken for granted, not even in the United States, Western Europe, Canada, Australia or anywhere else. This has led to resurgence of novel approaches to reassess the whole gamut of drinking water microbiology around the world.

The pathogens most frequently transmitted through water are those which cause diseases of the intestinal tract namely typhoid, paratyphoid, diarrhoea, bacillary and amoebic dysentery and other enteric diseases. The most common waterborne bacteria are *Vibrio choleare*, enterotoxigenic and enteropathogenic *E. coli*, *Salmonella*, *Shigella*, *Campylobacter*, *Legionella*, *Proteus*, *Streptococcus*, *Flavobacterium*, *Moraxella* including enteric viruses and parasites. Since faecal material contains pathogens, contamination of supply or source water with faeces increases the chance of disease manifestation. Supply water at extraction point appears to be reasonably pure, but chances of contamination increases during distribution and storage. Water quality assessment and monitoring is an aspect of microbiology second only to medical diagnostic testing in the volume of work performed worldwide.

### Bottled water : an alternative source

People have lost confidence in the piped water supply undertaken by the WASA in different cities. Reports on disease incidence is not rare when people drink WASA-supplied water owing to its poor quality and heavy infestation with diarrhoeagenic microbes. Quality bottled water may serve well as an alternative source – particularly for people having less financial constraints. The production of bottled water started about a decade back and its sale has increased throughout the world, including Bangladesh, in the last couple of years. Bottled water is any potable water that is manufactured, distributed or offered for sale which is sealed and packed in food grade plastic bottles is intended for human consumption. The source of bottled water may be springs, under ground or municipal systems that is supposed to be safe. The water may be subjected to a number of treatments such as distillation, carbonation, ozonation, reverse osmosis and /or filtration. The overall treatment strategy is dependent on quality of source water, being manufactured and location of extraction. With the significant increase in bottled water consumption over the last couple of years, there has been a growing concern over the microbiological quality of such products. Like any other food products, bottled water should be processed, microbiologically examined, packaged, transported and stored in a safe sanitary manner and be accurately labelled. *As is the case with most foods, bottled waters are generally not sterile and can contain many types of microbes from naturally occurring sources. Microbial contamination many also occur during filtration, processing and handling. The water processing plant must conform to strict sanitary condition, air quality inside the processing plant must be free of contaminant bacteria and the workers must wear clean and hygienic dresses and head gears. Contamination may also occur during manufacturing, storage and handling of the bottles. Strict precautionary measures have to be adopted for stringent compliance of aseptic techniques as are followed in the pharmaceutical industries.*

### Choice of indicator bacteria as water quality standard

The introduction of bacterial indicator system is to allow prediction of health risks associated with bottled or any other source of potable water. The detection and quantifying of indicator species allows assessment of the likely presence of pathogens that pose risk to health. Indicator bacteria must be present when the pathogens concerned are present; it must be derived exclusively from the same source as the pathogens and it must survive in the environment in the same manner as the pathogen and be easily detected. Inept identification process/techniques could entail errors and lead to false ranking and certification. The coliform test is currently the widely used indicator test of water quality. The coliform test with the meaningless prefix 'total' are based on the detection of *E. coli* and related coli-like organisms. The coliform and faecal coliform tests were originally designed to test for organisms of faecal origin but it is now known to detect other bacteria of non-faecal origin. The coliform test is on the verge of losing its credibility owing to natural adaptation of the indicator bacteria and even reports are there that members of coliform have been isolated from pristine environment. Similar fate is perhaps awaiting for faecal coliforms since thermotolerant *E. coli* and *Klesiella pneumoniae* have also been isolated from non-faecal water sources. It is implicit in indicator tests that gut organisms behave and survive in water in the same manner as faecally derived bacterial pathogens such as *Salmonella*, *Shigella*, *Vibrio* etc.

A few other indicator groups (bacteria) e.g. enterococci, faecal streptococci, *Pseudomonas aeruginosa*, *Aeromonas hydrophila*, *Clostridium perfringens* and total aerobic heterotrophs have been recommended by several authorities to include as reliable water quality indicators. These organisms are reported to remain detectable in bottled water for a longer period than the coliforms. The faecal streptococci are considered to be more complete as indicators of faecal contaminants because of the inclusion of the animal streptococci. Enterococci and faecal streptococci occur in lower concentrations in source water than do faecal coliforms and it has been suggested that their extended survival in bottled water may more closely reflect occurrence of faecally derived enteric viruses and parasites. Assessment of total aerobic heterotrophic bacteria or aerobic colony count (ACC) has gained confidence in the reliability of this indicator that correlates with the incidence of pathogens in drinking water. A long list of bacterial members do constitute the ACC group and even 100,000 of them are allowed by the WHO in about a glass of water (about 200 ml)! Although *Pseudomonas aeruginosa* and *Aeromonas hydrophila* are members of ACC group, their incidence at high number could deteriorate water quality. The use of faecal specific bacteriophages as an indicator for human viruses has been suggested to overcome this problem. The verification of the suitability of this system is in progress. So to assess microbiological quality of bottled water/drinking water, apart from coliform or faecal coliform tests, one has to perform at least 2-3 more tests e.g. estimation of ACC and faecal streptococci to certify as to the quality of drinking water. Any decision as to which water quality indicator to use requires consideration of whether the indicator organisms reflect the presence of other microorganisms such as pathogenic bacteria, enteric viruses and harmful parasites. Evidence suggests that presence of coliforms does not correlate with the presence of enteroviruses.

### Improvement of indicator/pathogen detection methods

Research in the last decade by a number of groups has revealed problems in recovering indicators or pathogens with conventional culture media. Owing to various environmental stresses like temperature and pH fluctuations, nutrient limitations and other physicochemical stresses and strains including spatial competition by biological agents both indicators and pathogenic microorganisms might alter their metabolic status and enter into a 'non-growth' state in conventional culture media. The non-growth condition envisages that the bacterial cells remain viable and infective but are no longer cultureable in media. This might give a false positive result in the low recovery of indicator organisms. Special enrichment approaches have to be followed to resuscitate the non-growing cells leading to their growth/recovery in isolation (culture) media. Designing of suitable culture media for the recovery of environmental organisms have been undertaken because most media were primarily designed for the medically important bacterial pathogens. Organisms in water and particularly in drinking water are not exposed to high concentrations of nutrients as in faeces and attempts to culture them in media basically designed for clinical purposes might reflect artefacts in the recovery process. For significant advance in water quality monitoring, there is a requirement for tests based on serological and molecular approaches.

*Unfortunately the scenario with most bottled waters produced in our country have not been thoroughly microbiologically examined. Often false certification is obtained by some means because a large number of the bottled waters produced locally falls short of requisite standard. These findings suggest that locally produced bottled water requires stringent microbiological quality control before it goes to the retail outlets. Otherwise things will happen as it is with the most pathological examination laboratories doing diagnostic tests on microbial pathogens. Until that time, let us be sincere and serious about the use and application of currently used along with the newly recommended indicator bacteria to assess/monitor drinking water quality, particularly bottled water, in which we have reposed so much faith and confidence.*

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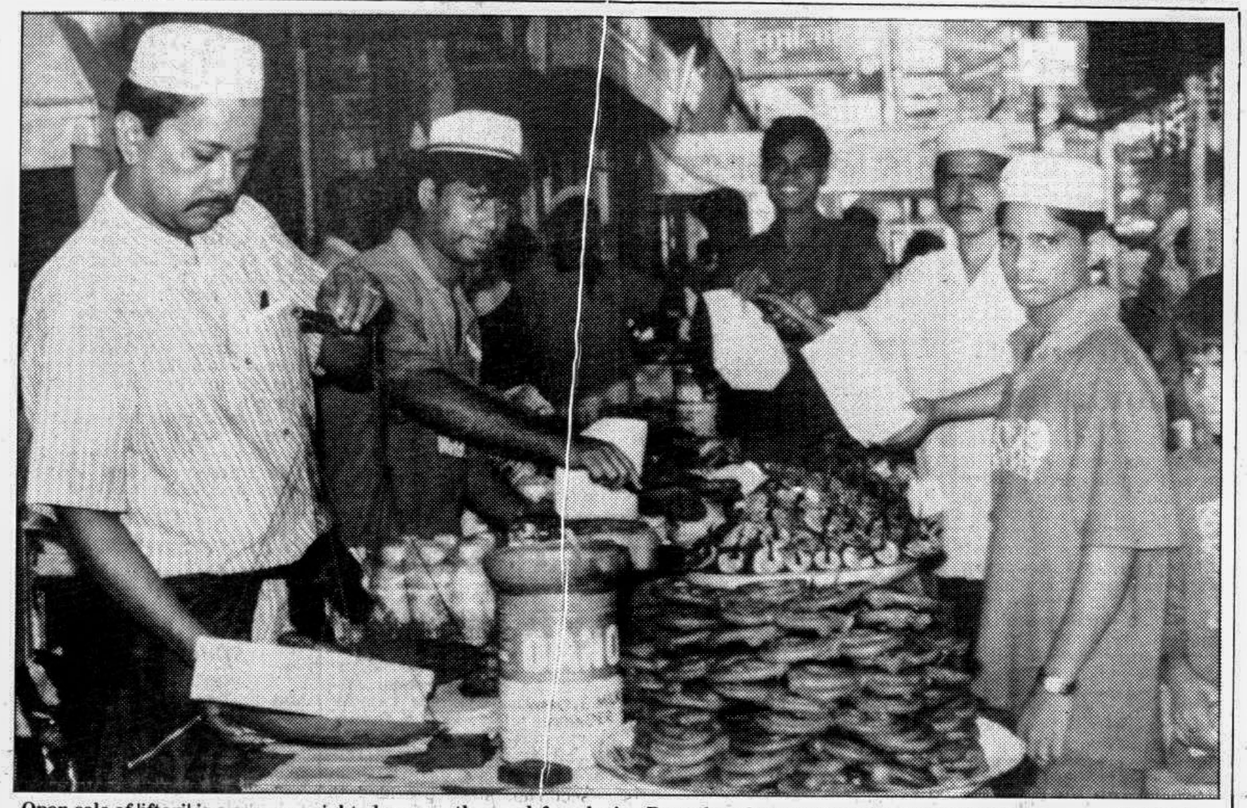

**Open sale of 'iftari' is a common sight along any thorough fare during Ramadan: Open to dust and fume as well. —Star photo**

The topic of our next issue is: **Life and Living in the Next Millennium.** Creative suggestions are invited from our esteemed readers. Please send your materials to: Dr Imtiaz Ahmed, Executive Director, Centre For Alternatives, Room No 431, Lecture Theatre, Arts Building, Dhaka University, Dhaka-1000. Tel: 9661900-19, Ext. 4550; Fax: (8802) 8316769; E-mail: imtiaz@bangla.net.

# Food and Dhaka University

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agement and self-service system may be encouraged.

**c) From the research group:**

* The research members, after carrying out the whole study, reached a conclusion that the food problem at DU halls is a side effect of other diseases like corruption, insincerity, campus violence, session-jam, unemployment etc rather than a disease in itself. Most of the diseases are the *legacy of non-food elements* like moral decadence and corrupt politics. Until the political parties stop patronising the armed cadres on the campus, the cadres will loom large and continue their influence on all issues in the hall (their den) including food; until the time when the society is really free from corrupt people, there will be malpractice and misappropriation of fund (from student's fund or from public purse); until the time the unemployment problem is completely solved, the helpless young will take up arms to earn bread. So, the food problem could not be completely solved if the non-food issues are not duly addressed.

* Dhaka University has an Environment Council. Within the framework of the prevailing Environment Council, a body could be constituted involving students, teachers, officials etc to monitor the hall foods. This might be a big step towards ensuring *check and balance* system in preparing and serving foods at halls.

* Serving food for thousands of students requires teamwork. Good working relationship should exist among the managers, cooks, kitchen-helps, dining-boys etc. Therefore, true working spirit should be restored which is absolutely missing presently.

* Dhaka University, like any other public university, receives about 95% of its yearly expenditure from the Government. But no subsidy is provided on food. In fact, Government of a poor country like ours, already burdened with numerous problems, can hardly share the costs of food of university students. But the Hall authorities can both reduce their dependence on Government and lessen the pressure on poor students by making good use of already polluted fallen areas surrounding the halls. The fallen areas could be used for vegetation, fisheries, and dairy farm etc. Trained personnel should be appointed for systematic and scientific cultivation of the fallen areas.

* The already polluted ponds inside different hall compounds should be purified immediately with the dual aim of saving the university from environmental pollution and supplying food materials for the students. Fish cultivation will greatly help in meeting the protein needs of the students.

### Concluding Remarks

It is true that food hazards and food insecurity is everywhere. **But the university must show the path.** When all other social and political institutions collapse, the countrymen put up their expectations on institutions like universities. Dhaka University, therefore, must own up that responsibility with utmost fidelity

*The author, himself a member of the research group, is a free lance journalist. Other group members were Md. Sorowar Chowdhury, Kaniz Farzana, Fatema Afroz and Nusrat Zahan all of whom are presently doing their Masters in International Relations at Dhaka University. Prof. Dr. Imtiaz Ahmed was the research advisor.*

# Contemplating Food Hazard

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and prosperity of the country while the state plays the role of facilitator. However, in developing or least developed countries like ours where professionals are unusually less privileged, infrastructure and technology development activities are below the standard level and the activities for deriving short-term financial gain dominate the quality standard perfomances and activities, the intervention by the government bodies and agencies concerned through enacting and enforcing of regulatory rule and laws are necessary to neutralise the uneven economic forces for the interest of both the consumers and entrepreneurs. Members of the civil society must also monitor the activities of the commercial sector involved with food to ensure a healthy present as well as future.

*The author is a Professor at the Institute of Nutrition and Food Science, University of Dhaka & is a former Director General of Bangladesh Standards & Testing Institution (BSTI), MOI, GOB.*

# Combating Food Crimes: Need for Ombudsman

**by Mohammad Tanzimuddin Khan**

***It appears now that we have started to carry a seed of destruction-corruption by which only the ordinary people suffer. Food, which is essential for every citizen's life is not free from putting the same in risk, inviting early death. Lack of commitment to people, ideological bankruptcy results into converting food or items like drug into money-generating machine through unfair means.***

ADULTERATION in food is no less than a crime like murdering for economic gain. Let's begin with some newspaper reports to find out the underlying factors, which are giving way to crimes involving food:

**News report I:** In order to whiten the rice, some traders mixing up urea fertilizer, which causes headache, eyesight degradation and other stomach related diseases. Sale of such adulterated rice is rampant in Lalmonirhat. (*The Daily Ittefaq*, 13 December, 1999)

**News report II:** More than 50% of food and allied items marketed in the country is adulterated, according to Institute of Public Health Officials. (ASK, *Human Rights Report in Bangladesh1999*, November, 1998)

**News report III:** The Ministry of Commerce announced in the Import Policy for 1997-2002 that the requirement for radiation testing of all food items imports from SAARC countries will be withdrawn. (*The Daily Star*, 27 November, 1998)

**News report IV:** In case of sweets, 99 samples out of every hundred sweets are found adulterated while edible oil and honey come next with 65 per cent samples adulterated. (*The Daily Star*, 20 August, 1997)

These four reports illustrate that consumer's rights are not being protected. Traders, lawmakers and monitoring agencies for some illicit (!) reasons are ignoring the interest of common people. It however, unearths some assumptions, which drive these people to resort to adulteration in food.

**i. Endless Profit: Committing Silent Killing**

Motive for making endless profit taking advantage of liberal economy is pushing the traders to adulterate food. They are not thinking for a moment that if they impure one food item, the others may also do the same thing in the case of other items. As a result they not only put the lives of consumers in danger, but also become the victims of their own wrong-doing. It ultimately leads to a war of silent killing about which no one is concerned. Endless profit, which is nothing but motive for making money actually gives birth to latter factors described here.

**ii. Protecting vested Class Interest: Common Mass Ignored**

Article 15 of the Constitution guarantees:

*It shall be a fundamental responsibility of the state ... a steady improvement in the material and cultural standard of living of the people, with a view to securing its citizens-*

*a. The provision of basic necessities of life including food...*

But it is seen that persons as well as state as a whole, endowed with the responsibilities to protect such rights are not doing enough for ordinary people. Rather a system is growing in which vested interest of certain group is preserved. For example, on 22 November 1998, six patients died after receiving expired saline in the Rangpur Medical College and Hospital. The investigation committee led by Professor Abdus Sobhan concluded that the patients had died from fatal conditions rather than as a consequence of receiving time barred saline. Moreover, few days back, in a 'paracetamol disaster' a number of innocent children were killed. But government did not bother at all to make it public, what punishment the responsible pharmaceutical companies had received for using illegal ingredient in paracetamol. I have given here the example of drug, as it is not less essential than food. Drug is itself a temporary food for an ailing person.

**iii. Inordinate Influence of Business Firms: Manoeuvring Government Policies**

It is increasingly recognised that big business firms through their strong influence can manipulate government policies in their own favour, even sometimes by subverting democratic policies. Recently published report in the daily *Ittefaq* shows that Health Ministry has formed a Parliamentary Standing Committee on Drug Import violating Drug Ordinance, 1982. According to Drug Ordinance any decision relating to import from abroad can be taken by the Drug Administration Parliamentary Standing Committee which includes several drug importers. One of the importers, alleged to be the member of the committee, has succeeded in getting approval of importing 6 million Benjathene Injections while locally produced injections are capable of meeting market demands.

**iv. Rampant Spread of Corruption: Absence of Intervening Force**

Corruption in every sphere of public life has become a central problem. Transparency International comments, 'It has even been quite common to hear it being suggested that the taking of bribes by government officials in these countries (third world countries) with equanimity to the extent that it at least an understanding of how market forces operate in a liberal economic environment'.

Profit or money-making tendencies are further complemented by the weak official commitment to observance or enforcement resulting into legitimisation of adulterated food in markets.

These factors are accompanied also by lack of effective institutional mechanism:

**BSTI and others: Toothless Quality Control Agencies**

We have food department, Drug administration, Bangladesh Standard and Testing Institute (BSTI) which have so far been proved ineffective in combating food adulteration. BSTI is responsible for only quality checks. But it does not monitor crime like adultery. Nor does it have the authority to start legal proceedings or seize adulterated food items. It makes us understand that our country lacks effective mechanism to ensure pure food or drug to the consumers regardless of existing laws.

**Role of Non Government Organisation: Yet to Live up to the Expectation**

Apart from government and traders non-government organisations role in safeguarding ordinary people's genuine interest is not above criticism. There is lack of transparency regarding their much-publicised people-oriented activities. Consumers Association of Bangladesh (CAB) and other business bodies last year proposed a draft of Consumer Protection Bill. But it is yet to scrutinised by the Commerce Ministry before being forwarded for approval. It is also not clear what and to what extent interests of the consumers were upheld in the proposed draft. It is further complicated by the fact that people are not well aware of such draft. So there remains a scope of the draft proposal being manipulated by a handful of persons.

**No Room for Ordinary People: Need for Ombudsman**

It appears now that we have started to carry a seed of destruction-corruption by which only the ordinary people suffer. Food, which is essential for every citizen's life is not free from putting the same in risk, inviting early death. Lack of commitment to people, ideological bankruptcy results into converting food or items like drug into money-generating machine through unfair means.

The existing ambience where there is no existence of any mainstream commentator or political party that can contemplate the possibility of any change in the regulatory framework to put real pressure on traders or public officials to take account of the public interest into account makes the situation more critical. Truly the principle of democratic accountability is being undermined by the 'commercial confidentiality' which leads to subordination of all other interests to that of corporate one. As a result credibility crisis appears in public life.

The system has lost its appeal to common people to some extent. We now therefore need to create a new institute, which can rise above mere class or party interest in administering justice and establishing rule of law. Yes I suggest for establishing the office of Ombudsman under Article 77 of the Constitution immediately. At the same time some more works need to be completed at administrative and legal levels to combat food or drug related crime. In this context the following are suggested:

1. Establishment of a separate 'Food Court' for consumers to smoothen the access to justice, regarding food or drug related crimes.
2. Forming separate law enforcing agencies to deal exclusively with food and drug monitoring.
3. Treatment of food and drug with equal importance and merging food and drug departments into one administrative unit under which new law enforcing agencies would remain.
4. Imposition of severe punishment for crimes relating to food and drug crimes
5. BSTI and other organisations alike must be well equipped with a right of monitoring.
6. Formation of consumers rights associations.

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**Sorting onions at a wholesale depot: Will they throw the rotten ones out? It may be noted that demand for onions augments in the market during Ramadan. —Star photo**