



Formalin Crime in Bangladesh: A Case Study

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Abstract: Abuses of formalin in foods have become a great concern due to grim health hazard. The aim of this study was to shed light on formalin crime and also the situational analysis of food adulteration in Bangladesh. The primary objective of this paper is highlighting the response of formalin users, community and government about the abuse of formalin in Bangladesh. The secondary objective of this paper is drawing successful strategies to make adulteration free food on the basis of the existing laws and strategies to curb the threading perils arranging healthy and safe life. The study was conducted mainly using data from secondary sources.

Keywords: Formalin Crime, Food Victimization, Food adulteration, Case Study, Bangladesh

1. Introduction

Food adulteration with formalin is a cold blooded crime. Formalin is in great triumph on a tremendous public panic by dint of multidimensional bamboozle bid taken to focalize foods formalin by means of various campaigns, discussions, talk shows, raids and drives across the country now a day's [1-3]. The widespread formalin applying in fruits, vegetables, fishes, meats and milks for long term preservation poses a massive threat to the public health and nutrition at an alarming level. Formalin (40% aqueous solution of colour free and pungent formaldehyde) is in traditional application in paints, plastics, textile, nail varnish, constructive industries and renowned to preserve human corpse [4]. Our traders are applying the chemical in foods to aid an attractive look and keep them fresh for their ignorance, negligence and financial gaining. According to different sources, the level of formalin used in different foods, especially in the fruits are horrible and at toxic level for human consumption. Formalin is naturally available in various food stuffs at various ranges and also available in the air. Formalin inhalation poses greater health risks than consumption [5]. The quality controllers avoid the adherence of formalin in processed food but the raw foods are not in formalin curbed in markets. It is the acme dilemma on the route of ensuring safe food to both the carnivorous and vegetarian consumers in the adulterated

era. It is high time to take immediate bid for proper action to get formalin free foods in our markets for enjoying sound health [6, 7]. The preparation is essential leaving no stone unturned to the dashing beginning and splashing steps in various situations towards formalin rebuking movement to carry the day. It causes great havoc of human life and health which may be called food victimization [8]. Abuse of chemical named formalin in fruits, vegetables, fishes, meats, and some other foods as preservative is harming the health of the people of Bangladesh which will lead a sick nation in the near future [9].

1.1. Food Safety in Bangladesh

Current Scenario, Challenges and Prospects Food safety issues have become one of the most widely discussed topics of Bangladesh. One major food safety concern of Bangladesh is unhygienic practice in food handling. Majority of the activities done from production to consumption stage are done in extremely unhealthy environment. The unhygienic food is one of the main reasons of diarrheal diseases as well as malnutrition [10-12]. As per reports from Directorate General of Health Services (DGHS), on an average 3,850 people died from diarrhea each year from the period of 2003 to 2009 attributed mainly to unsafe food. Another major food safety concern of Bangladesh, which is in fact the discussion point of this article, is use of toxic and poisonous food

adulterators. Food adulteration with toxic chemicals has reached an astounding level in Bangladesh [13-15]. The range of chemicals and coloring agents that are being used in food is beyond imagination. Saying that everything we eat is intoxicated would not be an overstatement. For example, calcium carbide is applied on fruits to ripen, formalin on fish, fruits, milk and vegetables as preservatives, brick dust and poisonous yellow colorants in spices (chili powder and turmeric powder), urea to whiten rice and puffed rice, sawdust in loose tea, soap in ghee, and artificial sweetener, coal tar, and textile dyes in sweetmeats. Various coloring agents are used in sauces, juices, lentils, and oils. Sulphuric acid is used in milk for condensation. Many restaurants use burnt engine oil for deep fry. Even the cooking oil becomes poisonous due to repetitive use of same oil in restaurants. An official statistics published by the Ministry of Health and Family Welfare (MOHFW) of government of Bangladesh reveals that nearly half of the food samples have been found adulterated tested by Institute of Public Health (PH) from 2001 to 2009. We feel utterly helpless when we came to know from other various studies that between 70%-90% of the food products available in markets are contaminated in one way or another [16-20].

It is needless to say that unsafe food has severe negative impact on public health. As per global estimate, 2 million deaths occur annually due to unsafe food and more vulnerable are children. It causes more than 200 diseases, ranging from diarrhoea to cancers. In Bangladesh, the situation is also not different. Formalin, calcium carbide, various coloring agents, urea, sulfuric acid and other adulterator cause cancer, asthma, skin diseases, depression, respiratory diseases, infertility, convulsion and miscarriage; affect kidney and liver; damage cardiac system and nervous system; and adversely affect children's physical and mental growth. Experts say that the pattern of diseases in Bangladesh has changed over time. In earlier times, infectious diseases were more prevalent whereas now the number of patients suffering from cancer and other non-communicable diseases are on the rise due to food adulteration.

The urge of making profit at any cost and moral degradation among food traders are the fundamental reason of all the malpractice. Malpractice pervades at every level of food chain starting from production to consumption [21-25]. Manufacturers, farmers, processors, transporters, middlemen, sellers - everyone is involved in the process; though their degree of involvement varies. Thus, the question automatically comes that isn't there any law which will punish those culprits and protect us from adulterated unsafe food? The answer is 'YES'. In fact, approximately 15 laws are supposed to ensure food safety in Bangladesh. Yet, there are loopholes in the food safety regulatory regime of Bangladesh (FSRRB) that are causing implementation failure. The first and foremost is the multiplicity of law. We don't really need a large number of laws for one purpose. Rather it creates confusion among traders, consumers and enforcers about which particular law is applicable to which

particular cases. Moreover, there are various regulatory bodies involved with these laws. Hence, lack of coordination and overlapping of the bodies are also hampering enforcement of laws. There are also issues with transparency, autonomy and bureaucracy within these regulatory bodies. Last but definitely not the least is inadequacy of penalties. The penalties that are provisioned in various food safety laws are really trivial compared to the severity of the problems they create [26-30].

However, the good news is that, the government of Bangladesh started implementing the Safe Food Act 2013 from February 2015 to fight adulteration and protect public health.

1.2. Health Hazards of Formalin

Formalin is such a harmful chemical that the handlers of them are not safe. Formalin has a bad effect on eyes and nose. Eyes are most sensitive to formaldehyde (formalin) exposure. The eyes, nose, and throat are irritated by formaldehyde vapors at levels as low as about 0.3 part formaldehyde per million parts of air (0.3 part per million, or 0.3 "ppm"). The lowest level at which many people can begin to smell formaldehyde is about 0.05ppm. Exposure from its gas or vapor can cause irritation to the eyes, nose and respiratory tract, resulting in watery eyes, sneezing, headache, and burning sensations in throat, cough, and difficulty in breathing [31]. Multiple exposures (5-30 ppm and higher) can trigger or aggravate asthma symptoms. Serious inhalation or ingestion can cause severe pain with inflammation, ulceration and necrosis of the mucous membranes, which lines almost every internal organ of the body. Formaldehyde solutions can destroy your skin's natural protective oils, causing dryness, flaking, cracking, and dermatitis (skin rash). Skin contact can also cause an allergic reaction (redness, itching, hives, and blisters). Sometimes formalin can affect the retina and cause blindness. Fruits dipped in formalin are harmful to health. The ingestion of formaldehyde over a prolonged period can develop respiratory, digestive, cardiac, nephrological and neurological problems, along with cancer [32-35].

Formalin is highly toxic to all animals, regardless of method of intake. Ingestion of as little as 30 ml (1 oz.) of a solution containing 37% formaldehyde has been reported to cause death in an adult human. Water solution of formaldehyde, i.e. formalin, is very corrosive and its ingestion can immediately cause severe injury to the upper digestive system. This may show up as symptoms of nausea, vomiting blood, and diarrhoea with bloody stool, blood from the urine, breathlessness, vertigo, and circulation failure, then death. 30ml is the suggested lethal dose of formalin. When formaldehyde enters into the body it is converted to formic acid, increases the acidity of blood and causes severe shortness of breath. But its long term use has a delayed effect such as damaging of kidneys, liver, brain, bone marrow, body defense and on fetus in pregnant women.

Some other studies also show formalin will cause kidney failure, liver damage, and lung problems like- bronchitis

(chronic cough), pneumonia (severe inflammation in lung), asthma and allergic reactions. Researchers said its effects on the brain can cause dementia and loss of memory. Anemia and blood cancer can be consequences of bone marrow depression when formalin travels in blood. It also weakens the body's defense mechanism against infections, resulting in repeated attacks of diseases. Formalin's effect on pregnancy and the reproductive system has been studied in both humans and in laboratory animals. Formaldehyde has been shown to decrease fertility and increase the risk of spontaneous abortion (miscarriage) in humans. In laboratory animals, formaldehyde can harm (birth defects and IQ) the developing fetus and damage sperm. Formalin that was recently found in food, not only cause such health hazards, it can precipitate cancer. A study showed mice exposed to formalin with concentration of 6 to 15 ppm for 2 years developed squamous-cell carcinoma (a type of cancer in mucous membrane) in the nose, sinuses, stomach as well as some types of blood cancer (leukemia and lymphoma). Formalin is dangerous for all ages; children and older people are affected easily and badly. It is said, once formalin is added, it cannot be removed. So washing of fruits is not effective to make it safe. Few of our superstores claim they are selling formalin free fruits but these small efforts are not in the reach of general people. Most people are exposed to the risk of formalin intoxication. Intoxication of food stuffs like fruits by formalin silently ruin our future generation. The ingestion of formaldehyde over a prolonged period can develop respiratory, digestive, cardiac, nephrological and neurological problems, along with cancer [36-40].

Table 1. Effect of formalin treated food consumption on health.

Exposure routes	Effect on human
Carcinogenicity	Formalin has the potential effect to cause cancer, repeated and prolonged exposure increases the risk of cancers of the lung, nasopharynx, oropharynx and nasal passage
Reproductive health	It has a harmful effect on reproduction system by inducing oxidative stress.
Skin (dermal)	Prolonged and repeated contact with formalin could cause numbness (lack of feeling) and a hardening or tanning of the skin
Eye contact	Formalin solution splashed in the eye can cause injuries from transient discomfort to severe such as loss of vision

1.3. Legal Remedies of Formalin Crime in Bangladesh

Nature and Scope of Formalin control act, 2015:

This Act bears six chapters and 37 sections. The offences mentioned in this Act are cognizable and non-bailable offence. The Mobile court has been given the jurisdiction for quick action. A formalin control committee will be constituted in every district and sub-district. The owner of the warehouse will be punished for hoarding or possessing without government approved license. Controlling measure needs to be taken in each level of production, import, transport, hoarding; sale and use. Government will issue Licenses for its proper use.

Formalin Defined:

Formalin means Formalin, Formaldehyde, Para formaldehyde, any amount of its liquefaction and any other government approved specific substance to produce Formalin (Section-2).

Table 2. Punishment of formalin crime (according to formalin control act, 2015) [41].

Offences and Punishment			
Offence	Highest Punishment	Lowest Punishment	Prescribed Provision
Importing, producing, hoarding without license.	Imprisonment not amounting to imprisonment for life. Fine not exceeding 20 lakh taka.	Fine not less than 5 Lakh taka.	Section – 20
Violate the terms of License.	Imprisonment not exceeding 7 years. Fine not exceeding 5 lakh taka. Both	Imprisonment not less than 3 years. Fine not less than 2 lakh taka. Both	Section – 21
Sale or use of Formalin without License.	Imprisonment not exceeding 2 years. Fine not exceeding 4 lakh taka. Both	Imprisonment not less than 6 months. Fine not less than 1 lakh taka. Both.	Section– 22
Transport or possess without License	Imprisonment not exceeding 2 years. Fine not exceeding 3 lakh taka. Both	Imprisonment not less than 6 months. Fine not less than 1 lakh taka. Both.	Section–23
Person without license possess or control any Machine, equipment or substance to produce Formalin.	Imprisonment not exceeding 2 years. Fine not exceeding 2 lakh taka. Both	Imprisonment not less than 6 months. Fine not less than 50 thousands taka. Both.	Section–24
Person knowingly allows using his house, land, vehicle, equipment.	Imprisonment not exceeding 2 years. Fine not exceeding 2 lakh taka. Both	Imprisonment not less than 6 months. Fine not less than 50 thousands taka. Both.	Section – 25
False or vexatious accusation.	Imprisonment not exceeding 1 year. Fine not exceeding 2 lakh taka. Both	Imprisonment not less than 3 months. Fine not less than 50 thousands taka. Both.	Section – 26
Person Assist in committing offense.	Same as offender	Same as offender	Section – 27
Committing same offence again. (Except offence mentioned in section-20).	Double of the mentioned punishment.		Section – 28

Table 3. *Safety food laws in Bangladesh.*

Food Safety Law	Year
<i>Penal Code</i>	1860
<i>Control of Essential Commodities Act</i>	1956
<i>Food Act</i>	1956
<i>Pure Food Ordinance</i>	1959
<i>Pesticide Ordinance</i>	1971
<i>Special Power Act</i>	1974
<i>Fish and Fish Products Ordinance</i>	1983
<i>The Breast Milk Substitutes Ordinance</i>	1984
<i>Bangladesh Standards and Testing Institute (BSTI) Ordinance</i>	1985
<i>Iodine Deficiency Disorders Prevention Act</i>	1989
<i>Vokta Odhikar Songrokkhon Ain</i>	2009
<i>Stanio Sarkar Ain</i>	2009
<i>Mobile Court Ain</i>	2009
<i>Safe Food Act</i>	2013
<i>Formalin use restriction law</i>	2014 (life time imprisonment)

2. Discussion

It is expected to resolve the issues of current multi-bodied control mechanisms of food safety issues with the existing laws in Bangladesh. It aims to control food adulteration at various stages of the supply chain and also take care of other food-related concern. The new act also has raised penalties substantially –both financial and imprisonment. Nonetheless, the law itself does not guarantee that scenarios will change overnight. We need to devise effective enforcement mechanism. Clear implementation strategies should be outlined so that all non compliance issues can be dealt accordingly. The law's strict and clear implementation and rigorous monitoring in the marketplaces would gradually improve the situation [42-44].

Lack of awareness, negligence and indifference among consumers are also obstacles to ensuring food safety. We are not aware about our consumer rights. We do not know nutritional value of the food we take. Surprisingly, it does not exist only among illiterate people. Even educated people are not cognizant about what food they are eating. They get affected by many food-related challenges, including micro-nutrient deficiencies, obesity, and non-communicable diseases. These challenges are fuelled, mostly, by cheap, convenient, and highly-processed foods that are appealing to the taste. The changing cultural and social practices are also playing a role. We love to celebrate festivals with food and buy food from outside. For example, during Ramadan we buy deep fried foods from restaurants and food shops which are not at all safe and hygienic. Demand will gradually increase among young generation to eat out. However, food behavioral change among people and awareness among of food sellers about maintaining safe food supply are imperative to reduce the risk to vulnerability to unsafe food [45-48].

Everyone's collective effort can reduce food adulteration. Food adulteration is a punishable offence and government should take serious action against it. The government along

with non-governmental and private sectors should frame out national plan to create public awareness about food safety and health hazards. A major social movement should be initiated with high level political commitment, strong leadership, mass social communications, intense community engagement and robust policy advocacy. Consumer right activists, civil society, youth group and women activists should be more vocal and loud and implement mass campaigns to prevent adulteration and promote food safety. Key players must have access to reliable and up-to-date information. Everyone should work towards the common motto: safe food from farm to plate. Only then it is possible to ensure food safety [49-51].

Fruits are known to be foods of heaven. Fruits are being considered as nature's best gift for human beings. Everyone knows that fruits are delicious, that is why, and all generations of people are fond of them very much. But these heavenly foods aren't that heavenly in our country [52]. A section of unscrupulous traders were mixing formalin with foodstuff, including fruits. For the last few years, the contamination of foods with formalin is a burning issue; gradually people are coming to know how formalin is injurious to our health [53]. Now people fear to eat fruits, even though fruits are proven to be very nutritious scientifically for centuries. Many essential nutrients are only present in fruits; therefore, contamination of formalin with fruits has deprived children from these essential nutrients. Conscious parents, who are concerned about this contamination, are not willing to give fruits to their children [54].

3. Trick to Get Rid of Formalin

There are digital trick to spread out panic about simple conditions but the simple and economic technologies to conquer this trouble are hardly advised. The trick the consumers can maintain for their healthy eating are:

- Soaking fruits in fresh water, chlorinated water, tepid water
- Reduction of fruits peel is the best option
- Soaking and washing vegetables in fresh water
- Soaking fishes in fresh water or hot water or vinegar or in brine solution
- Cooking fishes to vaporize formalin in order to having 960C boiling point and 100% volatility of formalin
- Soaking meats in fresh water
- Cooking meats to vaporize formalin in order to having 960C boiling point and 100 % volatility of formalin
- Heating of milk. Adding fresh water with milks in very low amount prior to heating. Boiling milk to vaporize formalin in order to having 96⁰C boiling point and 100% volatility of formalin [55].

4. Conclusion

Using Formalin in foods (fruits, fishes and vegetables etc.) turns into silent poison which harms our health and causes

several fatal diseases. Despite having detrimental effects on human health; this imminent contingency has been come about with an alarming rate inducing great economical losses. Law cannot ensure the controlling measure; government will have to take adequate executive action to control the abuse of formalin as well as formalin crime. So, a collaborative action is badly needed by all the stakeholders to create awareness and enforcing laws to curb the peril arranging a safe and healthy life.

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