



# **Awareness Situation Regarding Fruit Juice Adulteration among the Public University Students of Bangladesh: A Case from University of Dhaka**

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## **Author's contribution**

*The sole author designed, analysed, interpreted and prepared the manuscript.*

## **Article Information**

DOI: 10.9734/AJESS/2019/45022

### Editor(s):

(1) Dr. Osman Cardak, Professor, Necmettin Erbakan Universitesi, A. K. Egitim Fakultesi Matematik ve Fen Bilimleri Egitimi Bolumu-Fen Bilgisi Egitimi ABD, Turkey.

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Complete Peer review History: <http://prh.sdiarticle3.com/review-history/45022>

**Original Research Article**

**Received 21 September 2018**

**Accepted 26 November 2018**

**Published 08 December 2018**

## **ABSTRACT**

Food adulteration particularly fruit juice adulteration has been emanated a great concern for the consumers all across the country of Bangladesh as it bears some fatal diseases. Experts advocate that our future generation will be affected seriously for juice adulteration with vulnerable physical and mental growth. University of Dhaka is contemplated to be the premier public university in Bangladesh which is commonly distinguished as 'Oxford of East'. We chose Dhaka University as our research site to assess the awareness level about fruit juice adulteration among the common students. To address this fruit juice problem properly and awareness situation, this research paper aims to disclose this problem properly by creating more knowledge and information for all kinds of consumers including students of the studied area. The findings of the paper show that Students of the Dhaka University students are very much vulnerable to fruit juice adulteration. Most of the students are not well aware of fruit juice adulteration and its impacts. Students usually do not ask for hygienic conditions of the fruit juice. This paper discloses the current scenario of fruit juice adulteration in Dhaka University campus. At the end there some recommendations have been assembled about the roles of the concerned authorities to eradicate this problem from Dhaka University areas in particular and from whole Bangladesh in general.

**Keywords:** *Juice adulteration; food safety; awareness; vulnerability; health; consequences etc.*

## ABBREVIATIONS

*BCSIR* = Bangladesh Council of Scientific and Industrial Research  
*BSTI* = Bangladesh Standard and Testing Institute  
*CY* = Consumer Youth  
*CY-DU* = Consumer Youth Bangladesh.  
*CAB* = Consumer Advisory Board  
*DU* = Dhaka University  
*FAO* = Food and Agriculture Organization  
*HFCS* = High Fructose Corn Syrup  
*NGO* = Non Government Organizations  
*PPM* = Planned Preventive Management  
*WHO* = World Health Organization

## 1. INTRODUCTION

Fruit juices are an important part of the modern diet in many communities and societies as well as in Bangladesh. It can be treated as a nutritious beverage and can play a significant role making in a healthy diet because they offer good taste and a variety of nutrients found naturally in fruits [1]. But sometimes these can be a threat for the health of human beings. Adulteration of fruit juice is not a new phenomenon in Bangladesh. But it has increased its incident rampantly in the recent times. From various studies of journals, newspapers and books, it is evident that fruit juice is no more reliable for the health of human beings rather it has been a threat for the consumers [2]. Following the qualitative research method, this paper tried to find out the behavioural pattern regarding fruit juice adulteration among the young generation particularly students group of Dhaka City.

Different organisations are working for upholding the human rights of Bangladeshi citizens. Safe food is one of the rights of citizens provided the Constitution of Bangladesh. Unfortunately, this right is being violated in everyday. Even, some people do not know that their rights are being violated by the others. According to print and electronic media, Juice adulteration has been of the sources of earning more revenues by the producers [3].

According to, Food and Agriculture Organization (FAO) and World Health Organization (WHO), adulteration of food means substandard foods which do not fulfill the criteria of being safe food [4]. Very often, adulteration of food and food products are adulterated intentionally for

producing more profits or unintentionally such lack of rainfall, poor storage system, use of pesticides etc. So, juice adulteration is one kinds of food adulteration. We get different kinds of juice in Dhaka University campus every day. In different shops of campus areas, we see the packaging fruit juice of different brands. At the same time, juice making in streets sides in Dhaka University is very common where students have that very often. Most of the students do not ask about its safety. However, fruit juices can be adulterated in different ways. Either water can be polluted or other ingredients can be impure etc.

Juice adulteration is very much threatening issue for the consumers' wellbeing specially it can cause different health hazards. This problem should be addressed properly for ensuring proper rights of consumers. It claimed that there is no element of pure fruits in the juice like strawberry, mango, pineapple, orange and apple' produced by Pran Company and is risky and harmful for health [5]. Several newspaper reports say that Juice companies are too busy to earn their profits. They are not concerned about the health risks of consumers at all. Thus, young are having different kinds of fruit juices every day.

### 1.1 Research Objectives

The general objective of the research is to explore the state of the students of the University of Dhaka in context of juice adulteration happening in the campus. With the general objective there are some specific objectives of the research for better understanding of the study. The general objectives are:

- To find the status of consciousness level among the students of the University of Dhaka regarding fruit juice adulteration.
- To examine the role of the authority for making the students aware and keeping the atmosphere congenial for the stakeholders of the University of Dhaka.

## 2. LITERATURE REVIEW

It is proven that locally available fruit juices do not contain safe levels of nutritional and microbial elements and significant variation in nutritional information for human consumption. Each juice provides a different range of nutritional components that are desirable in a diet. In a study it is found that the levels of all metals were

within the limit of the BSTI standard for fruit juice. On the basis of standard plate count, about 100% of the samples recorded an acceptable range based on the Gulf standards for fruit juices [6]. The intensity of juice adulteration in Dhaka city is high because of rapid urbanisation and pressure of over population.

Fruit juice adulteration presents an economic and regulatory problem. The most common forms of adulteration include simple dilution and blending of inexpensive and synthetically produced juices into the more expensive ones [7]. Over the years, several methods for adulterating juice have been used. Adulteration ranges in sophistication from simply diluting juice with water to adding beet sugar, the adulterant that is most difficult to detect. Introducing these ingredients is not illegal; however, knowingly selling the resulting product as pure juice constitutes fraud. Processors can increase their margin of profit or undercut competitors' prices to increase sales by adulterating juice and selling it as 100-percent-pure juice [8]. Detection and prevention of fruit juice adulteration is a very complex task due to the natural variation in the cultivars, as well as differences that occur with different growing regions, storage conditions, and processing techniques. Analytical methods that have been used to identify adulteration have been comprehensively reviewed. The most common forms of adulteration that occur within the fruit juice industry usually take the form of juice dilution, the addition of high fructose corn syrup (HFCS), or the addition of other fruit juices [9]. Thus juice has been adulterated in different ways.

Adulteration of food items began a couple of decades ago and this practice is increasing day by day. Dishonest traders, importers and manufacturers, cultivators and processing agencies are involved in these unethical practices. There is no lack of laws and regulations to control adulteration of food in Bangladesh such as Bangladesh Standard Testing Institute (BSTI) Ordinance of 1985, and the Pure Food Ordinance of 2005. In 2005, 12 brands of juices from 8 companies were collected from different markets of Dhaka by CAB and tested at BSTI as per Bangladesh Standards where 11 (92%) of the 12 samples had BSTI certification mark. Two orange juices had no fruit juice at all, and two juices had the preservative sulphur dioxide at more than the permitted level of 10 ppm. One brand of mango juice was substandard and did not have BSTI

certification mark. The labels on the package also lacked information on percentage of the ingredients (58%), production date (25%), and expiry date (17%) [10].

### 3. MATERIALS AND METHODS

The research is based upon primary and secondary sources to find out the overall scenario of juice adulteration in Bangladesh and vulnerability of Dhaka University students to it. The major sources of data used in this study are collections and analysis of different published books, evaluation of government and semi-government reports, programs and census reports, published newspaper reports and articles etc.

To assess the scenario and impact juice adulteration, the research is going to be conducted in Dhaka University areas. This paper is basically on secondary data. Thus, quantitative research method has been ignored from this paper and qualitative research method has been applied. For collecting data from the primary sources, questionnaire survey has been conducted. In this purpose more than 75 students have been survived.

For realising the objectives, the study has depended upon both primary and secondary information; in understanding the current status of fruit juice adulteration in Dhaka University areas and students' concerns over this policy/programme and strategy of concerned authority. For understanding the actual field level situation of juice adulteration, I have talked with several NGOs those are working with this issue in Bangladesh in general and Dhaka University in particular. Thus basically primary information was collected from the students, authorities, NGOs, staffs and other stakeholders by personal interview or through questionnaire survey. I have conducted a one to one interview with the coordinator of Consumer Youth Bangladesh and I have done several focus group discussions to get proper insights of correspondents.

#### 3.1 Field Work

I have conducted field work in Dhaka University areas and collected data from students and shop keepers. Mixed method has been used to conduct this research work whereas qualitative research method is the dominant one.

##### 3.1.1 Research area

Campus area of University of Dhaka, Dhaka, Bangladesh

### 3.1.2 Primary data

The principal tools for collecting the primary data are questionnaires and interviewing two techniques of the survey method. The major sources of data used in this study are collections and analysis of local level office report, evaluation of government and semi-government projects, programs and census reports, published reports and articles etc. I have conducted a sample research survey for collecting primary data.

### 3.1.3 Secondary data

The Secondary information and data are collected from respective government offices and agencies like NGOs office, Circle office etc. Basically, secondary data is not used widely in this research paper.

## 4. RESULTS AND DISCUSSION

There are total 75 correspondents in this research paper. There were 54 male respondents and 21 female respondents. Fruit juice is a common item in the campus premise of Dhaka University. I found out of two types of fruit juice over there. First one is packed one and second one is handmade. I talked with respondents about their initial choice. Which one is their priority in the case of fruit juice? About 77% respondents showed preference to fresh juice that means 58 out of 75 respondents are interested to fresh juice. On the other hand only 23% of all respondents showed their preference to bottled juice.

**Table 1. Juice preference among the students**

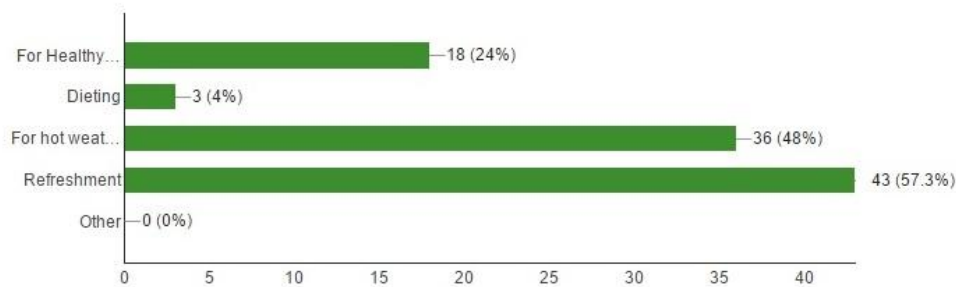
Items	Number of Students	Percentage
Bottled Juice	58	77%
Fresh Juice	17	23%

In the case of items of juice most of the correspondents do like mixed juice. About 40% correspondents have mixed juice and then second choice is orange juice.

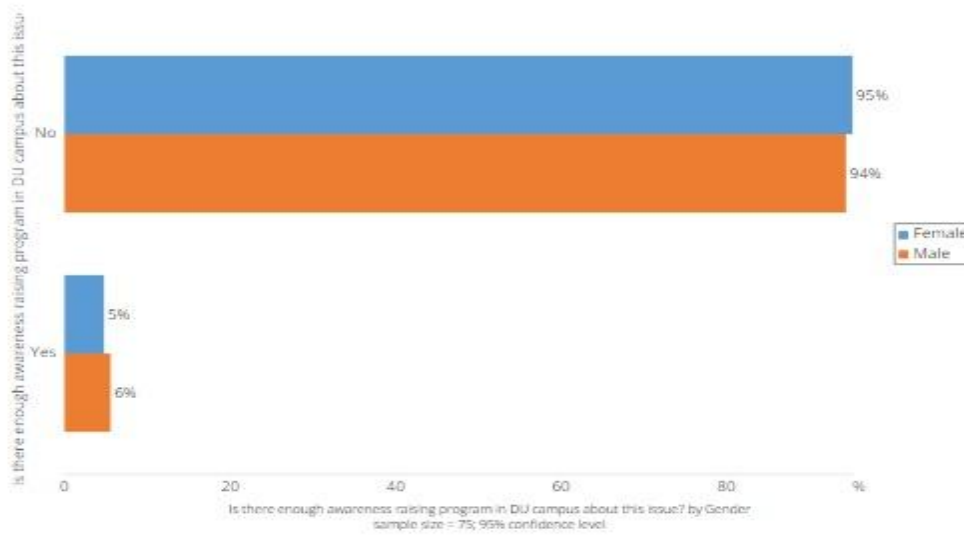
Then I asked respondents the most important question about the fruit juice where majority said refreshment. About 58% percent respondents only have juice for refreshment where for hot weather was in the second position

In the case of origin juices, respondents showed preference to Bangladeshi juices. In these case male correspondents are more interested to Bangladeshi juice than female correspondents. Then in the case of checking of expiry date, 72% correspondents replied affirmative on this question. After these entire questions, I asked directly whether they have the victims of fruit juice adulteration. About 28% students already faced this problem. 56 respondents out of 75 replied negative answer on this question. On the other hand, only 19 correspondents of total 75 answered affirmative.

The last question was about authority's concern and awareness raising programme. About 95% correspondents replied that there is no enough raising programme. About 71 correspondents answered negative on this question. Only 4 people said that there is enough awareness raising programme.



**Graph 1. Reasons behind drinking juice**



**Graph 2. Gender based response on awareness program**

Most of the students prefer Bangladeshi fruit juices and fresh Juices. As Bangladeshi juice is more dangerous, students tend to be exposed to adulterated juice more. Besides, fresh juices have more reasons to be adulterated. Bottled juices are labeled with production and expiry date but fresh juices are not labeled at all. Sellers can adulterate fruit juice easily in the case of fresh juices. This situation indicates more openness of fruit adulteration in Dhaka University areas.

Most of the students eat fruit juices without knowing the scientific nutritional knowledge of fruit juices. They just eat for refreshment or hot weather. They don't bother about nutritional value of fruit juice. However, though they only eat for refreshment, it will add value automatically. But in the future students may not be interested to eat fruit juice as most of them are not aware of the nutritional value or health benefits. It is matter of hope that majority percent of students check the expiry date of bottle fruit juices. Though are branded fruit juice companies are not reliable completely for consumption of fruit juices.

About 26% students already have been affected by fruit juice adulteration which is not satisfactory at all. In future the number may rise as there are symptoms of increasing the existing number. There is not enough awareness raising programmes in the Dhaka university areas. So, it shows the overall vulnerability of fruit juice adulteration and the awareness salutation among students.

Most importantly students are not conscious about their health and fruit juice adulteration. Most of the students do not have fruit juices for health benefits rather they have only for enjoyment or refreshment. Even they do not ask producers about their nutritional value or adulteration ingredients. So, situation in future can be catastrophic in Dhaka University campus. Dhaka University authority may huge apathy in this issue as there is no enough awareness raising programs or enough monitoring cells for controlling adulteration campus. Some youth organisations are coming out to address this issue and to make students aware of this problem.

The extent of food adulteration is high enough to warrant further action to control the situation in Dhaka University campus. A systematic procedure of random food sample collection and systematic examination for food adulteration provide an accurate picture of the situation in Dhaka University campus. The extensive use of different chemicals and dyes in food has deteriorated the situation. Finding of the study shows that the majority of the students lack proper knowledge, attitude, and practices relating to juice adulteration. Publicising 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 can substantially decrease food adulteration in the country in general and in Dhaka University campus in particular [11]. Drives by mobile magistrate court were found to be effective and should be re-started in collaboration with the media that can publicise the results of the drive for building awareness. Thus all parties have their respective duties and responsibilities to resist this problem from Dhaka University campus and to make an adulteration free campus in the long run. Now pragmatic measures from concerned authorities can bring positive change of existing scenario [12].

#### **4.1 Status of Traceability of Fruit Juice in Dhaka University and Student's Response**

It is not easy to find out the key reasons of biological contamination of the fruit juices due to unavailability of the information regarding the origin of juice stuffs and microorganisms [13]. Anyway, traceability of the food items has been popular tool for ensuring the safety of the food stuffs. It provides the expected regulation information to the consumers for their own well being. Thus, traceability basically gives the products story identifying the batch and the raw materials used in the production [14]. The aim of this traceability system is to ensure nutritious and healthy products to the customers. From the study it is revealed that most of the shop keepers and consumers in the studied area are not conscious about this issue. They do not care of the batch number of the products and their nutritional values. They mostly consider the taste of the juice items and respective costs. It is evident from here students including other customers are vulnerable to fruit juice adulteration. Such vulnerability will reduce the productivity of the students bringing new health hazards and diseases.

There has been a study on the microbiological quality of some drinks sold in the streets of Dhaka University campus assessing the traceability of the fruit juices. The result of the study shows a threatening high level of microbial load exists in the juices. All the drinking juices present heavy microorganisms whereas Tukmaria Sherbet is the most contaminated one. Some other issues like unhygienic water for dilution, dressing with ice, insanitary surroundings, raw materials, chemical properties stand for as the factors of contamination in the campus area [15]. This paper taking this issue in consideration

tried to find out the conscious level of the students in the University area. University authority does not have any mechanisms to check the traceability of the fruit juice strictly. This exposes their inability and incompetency to combat with the fruit juice adulteration in the campus premises.

#### **5. RECOMMENDATIONS**

There are some recommendations from my side to improve the existing scenario of fruit juice adulteration in Dhaka University areas.

1. Open seminar can be arranged on the bad impacts of juice adulteration & various lecture; documentary can be shown about its bad effect.
2. Dhaka University authorities by collaborating with different organisations can conduct workshop on this issue. Social media can be an important platform for benefitting the consumer.
3. University authorities can make a topic out of it in the guest-room at every Hall so that first year students always get updated about the issue.
4. Making some documentaries on this issue how the fruit juice is being made and manufactured in our country may be very helpful to raise awareness.
5. Colorful posters can make students notice while they're going to their own faculty to attend classes. Besides, posters can be put in hall and shops as the most students eat in their own hall dining area and "tonger dokan"(a small shop).
6. The government-authorised institute such as Bangladesh Council of Scientific and Industrial Research (BCSIR) and Bangladesh Standard and Testing Institute (BSTI) may take steps to check the diet quality of the fruit juices as well as undertake initiate public awareness programs on contaminated and adulterated juice in the studied area.

#### **6. CONCLUSION**

Consumption of adulterated fruit juice is severely harmful for public health. It is evident that Dhaka University students are more vulnerable to adulterated fruit juice. It is the demand of the day to stop juice adulteration. Dhaka University authority should increase its monitoring system to eradicate the practices of juice adulteration in Dhaka University campus to save the lives of the

most brilliant students of the country. There are lots of laws in the country but most of them do not have any implementation or few some cases. Combined efforts from Dhaka University authority and law enforcing agencies can change the existing scenario. Simultaneously students' awareness can be the key factor for reducing this problem. Campaigns, seminars can be viable option for raising awareness among students. Besides, civil society, print and electronic media, social organisations and NGJOs can play important roles to ensure adulteration free juice for students. I hope the existing the existing situation will change and Dhaka University students will have safe fruit juice for their healthy life.

## 7. LIMITATIONS

This study has several limitations. The survey on consumer awareness was conducted through online survey method. As a result, the knowledge, attitude, and practice of the consumers interviewed may not represent that of Dhaka University students and need further large-scale survey for better understanding. I have conducted my survey on only 75 students. This is very small sample size for an effective research. Besides, I have collected qualitative data from the students, staffs etc mainly. Quantitative data is not so available in this paper. Recommendations are mainly prepared for specific areas those cannot be applicable for other areas most of the times. Furthermore, I have prepared this paper within very short time which is a shortcoming of this paper. These are some limitations of this research paper on fruit juice adulteration.

## 8. SIGNIFICANCE OF THE STUDY

The main purpose of this paper is to find out the root causes of juice adulteration and its various impacts on health of consumers. This research will cover the concerning scenario of fruit adulteration in Bangladesh especially in Dhaka University areas. Consumers will be aware of the fruit juice adulteration and different health hazards by this research is conducted in Dhaka University areas. Policy makers can take findings implications from this research for formulating future policies for protecting consumers' rights. Besides, this research will be a great resource for the future academicians and researchers for conducting further research on this discourse.

## COMPETING INTERESTS

Author has declared that no competing interests exist.

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## APPENDIX

**Department Name:**

Gender:

Male  Female

Which do you prefer?

Fresh Juice  Bottled Juice

Which fruit juice would you prefer?

	First Choice	Second Choice	Third Choice
Mango			
Pineapple			
Orange			
Mixed/ Others			

Which season do you generally drink juice more?

Summer	Rainy	Autumn	Late Autumn	Winter	Spring	All Year

What is your most important consideration when choosing juice?

Price	Brand	Quality	Taste	Color	Others

Which one do you prefer?

Bangladeshi  Imported juice

Do you drink fruit juice regularly? Yes  No

Are you aware of issue like juice adulteration? Yes  No

Are there enough awareness raising programs in DU campus about it? Yes  No

Why do you drink fruit juice?

For healthy life	Dieting	For hot weather	Refreshment	Others

Do you check expiry date fruit juice?

Yes, always  Sometimes  No

Have you been affected by adulterated fruit juice ever? Yes  No

Do you think authority is taking enough steps to raise awareness regarding this issue? Yes  No

What do you recommend to check this problem?.....

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*Peer-review history:*  
*The peer review history for this paper can be accessed here:*  
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