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ORIGINAL RESEARCH ARTICLE



## Value addition of homemade pickles in selected areas of Dhaka, Bangladesh

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### ABSTRACT

The pickles are popular food item in Bangladesh. Different types and kinds of pickles are sold by the vendors in the roadside those are processed by themselves at their home. This study has been conducted to assess the value addition of homemade pickles. The four homemade pickles (mango pickle, tamarind pickle, jujube pickle and elephant apple pickle) were selected for this study. The study was conducted in Gulshan, Dhanmondi, Uttara and Mirpur of Dhaka in Bangladesh. This study was based on primary data. Primary data were collected through face-to-face interview method in the month of mid-September to mid-October 2019. Data were collected from 20 vendors (selected conveniently) and 60 consumers (selected purposively) of homemade pickles. Descriptive statistics (mainly mean, percentage) was used to analyze the data. Value additions of homemade pickles were calculated by deducting the cost of production from the selling price of pickle which can be found from the value addition tables. The study found that the vendor's added value of Tk. 330.44 (\$3.94) to one kg raw mango, Tk.293.32 (\$3.49) to one kg tamarind, Tk.340.01 (\$4.05) to one kg jujube and Tk.425.57 (\$5.07) to one kg elephant apple by processing to make pickle if it is ignored the value addition of other ingredients. In percentage term, it was 182.67 to 448.90 according to pickles. So, this is a productive activity creating form utility for the consumers that can contribute to the economy of Bangladesh.

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### INTRODUCTION

The street foods play an important socioeconomic role in meeting food and nutritional requirements of city consumers at affordable prices to the lower- and middle-income groups and are appreciated for their unique flavors and convenience (Ackah *et al.*, 2011; Muzaffar *et al.*, 2009). Street foods also assure food security for low-income urban population and livelihood for significant proportion of the population in many developing countries. Street foods are described as wide range of ready-to-eat foods and beverages or prepared at home and consumed on the streets without further preparation (Rane, 2011). While street vended foods are appreciated for their unique flavors as well as their convenience, they are also important in contributing to the nutritional status of the population. In contrast to

these potential benefits, street foods are perceived to be a major public health risk (Bhowmik, 2010). Street food satisfies the food consumption need of a significant section of the population. The food sold on the streets is relatively cheap and readily available. It is sometimes brought to the door step of the customers. Street food, therefore, not only meets the food requirements particularly of those of the low-income categories but also the busy customers who do not have much time either to prepare their own food or to go to other eating houses where probably the food is more expensive and servicing is time consuming (Khairuzzaman *et al.*, 2014).

Pickle is one of the oldest and successful methods of food preservation techniques and has a great contribution. For lengthening the shelf life of fruits and vegetables, food preservation has one of the strategies in the form of pickle. Pickles are

cucumbers preserved in a solution of vinegar, salt, and other flavorings. They are typically fermented with naturally-occurring bacteria prior to vinegar preservation. The optimization of pickle quality depends on maintenance of proper acidity, salt, concentration, temperature and sanitary condition. Pickle serve as appetizers and help in digestion by aiding flow of gastric juices. Fermented pickles also have beneficial bacteria that can control harmful intestinal microbes (Science Direct, 2019). In our country, we found different pickles (made from mango, olive, jujube, elephant apple, tomato, tamarind, garlic, hog plum etc.) selling in open places (e.g., road side places, park, market, town etc.) those are mainly home-made. Vendors also sell their pickles in a place where different cultural programs are being organized. The vendors who made these pickles are poor people. Some of them are depend on these processing activities for maintaining their family and some of them are taking as a subsidiary occupation. These pickles are sold traditional way, these are not packaged, and even sometimes these are sold without weighing.

The history of pickles stretches so far back that no definite time has been established for their origin, but it estimated to be over 4000 years ago (BULLA, 2010). Drying fruits, vegetables and meats was one of the major techniques practiced by the ancient people (Ratti, 2001). For preserving the food Pickling of plant, fruits, vegetables and animal foods is a relatively old method. In the Indian sub-continent, especially in the Himalayan and adjacent belts, pickle is popularly known as 'achar' and generally no meal is complete without a smidgen of pickle. Pickles are often consumed along with main course dishes and act as good appetizer and digestive agent (Monika et al., 2016). This review aims to explore the different forms of pickles, like mango, jujube, and tamarind, elephant apple (elephant apple) pickle that are prepared and consumed by consumer. Homemade pickles contain several beneficial micro-organisms which help to enrich the natural micro-flora of the gastrointestinal system (Medical News Today, 2019). Fermented pickles are full of good bacteria called probiotics, which are important for gut health. Pickles contain carotene which is powerful compound that's been shown to help lower chances of dying of heart diseases, stroke, cancer, respiratory disease, and other conditions. Pickle juice may work slightly better than water to relieve muscle cramps. Pickle juice may help keep blood sugar level low that may benefit people who are at risk for diabetes (Angela Nelson, 2021).

Most generally, value added "represents what a business adds to raw materials it purchases" (Nichols and Goodwin, 1993). A company may add value through several methods, including "changes in genetics, processing, or diversification" and "increasing the consumer appeal of an agricultural commodity" (Nayga et al., 1999). Another component of value added is demand driven. The food and agribusiness literature defines value creation or value adding in agribusiness when a firm changes a product's current place, time, and form to characteristics more preferred in the marketplace (Anderson and Hanselka, 2009; Coltrain et al., 2000). Value addition is the transformation of raw agricultural commodities to consumer-ready food products. It includes local processing, packaging, or marketing, which

improves the value of raw agriculture products (Tronstad, 1999). It is also known as the difference between the value of the produced commodity and the value of the materials used in its production. In the case of the final product, it is the difference between the cost and the sale price (Jassim et al., 2020). Omitti et al. (2007) and Okello et al. (2009) have argued that value addition (among other things) in rural agriculture should be enhanced in order to promote market-oriented small holder agriculture in the developing countries. Islam et al. (2017) conducted a study on street food eating habits in Bangladesh: a study on Dhaka city. This paper seeks to identify the reasons for which the street foods are eaten by the people living in Dhaka city. The confirmatory factor analysis identified that the street food eating habit of the people of Dhaka City is significantly influenced by the pleasure and soundness, convenience and variety, cost, and attractiveness to the food. A cross-sectional study was conducted by Mamun et al. (2020) to investigate food safety knowledge, attitudes and behavior of street food vendors and consumers in Dhaka city. Results showed food safety knowledge of street vendors in the High-tech Industries Development Zone was the lowest, where education levels are generally relatively low. Food safety attitudes of the youngest consumers were significantly better than those of older age groups. The scenario of street homemade pickles is well known to everyone in our country. The pickles are popular food item in the Asian region. The street foods play an important socioeconomic role in meeting food and nutritional requirements of city consumers at affordable prices to the lower- and middle-income people. This study has been conducted to assess the value addition of pickles to examine whether this activity add enough value to the fruits those are processing to prepare pickles.

## MATERIALS AND METHODS

### Selection of study area

Present study is conducted based on field survey method. Dhaka was selected as study area for data collection. Gulshan, Dhanmondi, Uttara, Mirpur were the area for collecting the necessary information to see how values are added to the homemade pickles. There are four homemade pickles namely mango pickle, tamarind pickle, jujube pickle and elephant apple pickle selected for assessing the value addition.

### Period of data collection

The study is based on primary data. Data were collected in the period from mid-September to mid-October 2019. The researcher collected data from pickle processors and consumers from the study area.

### Selection of vendors

Twenty vendors were selected by using convenience sampling technique from the selected areas who were involved to process mango, tamarind, jujube and elephant apple pickles. All the vendors were seller of their products. They provide direct marketing of homemade pickles.

### Measurement of value addition

Value added "represents what a business adds to raw materials it purchases" (Nichols and Goodwin, 1993). Value added is also defined as the value of outputs minus input value (Banga, 2013). On the basis of the above concept of value addition, the researcher estimated value addition of pickles in this study. Here only the cost of ingredients is considered for assessing the value addition of pickles. Value addition of homemade pickle was calculated by deducting costs of ingredients (such as for mango pickle these are cost of mango, Gur, oil and spices) from the sales value of pickle.

## RESULTS AND DISCUSSION

### Value addition of homemade pickles

Processors /sellers are the value adding actors in this present study. Mainly processors are the sellers of their products in this case. So, their value adding activities are not calculated separately. Sellers (or vendors) prepared pickles themselves in their house. And that's why it is called homemade pickles. Added value is the first step for starting a business. This section aims at identifying different costs incurred during product processing by processors, selling prices and value addition.

### Cost of homemade pickles

Cost of processed food is necessary for the estimation of value addition. For calculating the costs of homemade mango pickles,

tamarind pickle, jubebe pickle and elephant apple pickle, at first it was found out that which ingredients (items) were used to make those pickles. The respondents (vendors) reported that gur, mustard oil and spices (panchpharon, garlic, red chilli and turmeric powder) with fruit (main ingredient; here raw mango, tamarind, jujube and elephant apple) were the ingredients of pickles. They also reported that gur, mustard oil and spices were needed same amount for each pickle. The respondents provided costs of ingredients for pickles of 5 kg of mango, 5 kg of tamarind, 5 kg of jujube and also 5 kg of elephant apple; and usually they prepared pickles for this amount. The respondents normally could not mention the amount of mustard oil and spices but they mentioned the value of these items; however, the researcher tried to find out the amount of these items for getting the better ideas of ingredients used in the pickles. Then the respondents roughly reported the amount of these ingredients. The average amount of mustard oil and spices, and cost of homemade pickles are shown in Table 1. It was found from Table 1 that total cost of preparing mango pickle was Tk. 627.90 (\$ 7.48) in which main ingredients i.e., mango constituted 43.80 per cent, gur constituted 35.83 per cent, spices were 15.51 per cent and small amount was for mustard oil and it was 4.86 per cent. Total cost for preparing tamarind pickle was Tk.802.90 (\$ 9.56), for jujube pickle was Tk.652.90 (\$7.77) and it was Tk.472.90 (\$5.63) for elephant apple pickle. Tamarind pickle accounted for highest cost (because of higher price of tamarind than mango, jujube or elephant apple) followed by jujube, mango and elephant apple.

**Table 1.** Processing costs of homemade pickles.

Pickle	Ingredients	Amount (kg)	Price (Tk./kg)	Cost (Tk.)	% of total cost
Mango pickle	Raw mango	5.000	55.00(\$0.65)	275.00(\$3.27)	43.80
	Gur	3.000	75.00(\$0.89)	225.00(\$2.68)	35.83
	Mustardoil	0.158	192.43(\$2.29)	30.50(\$0.36)	4.86
	Spices	-	-	97.40(\$1.16)	15.51
	Panchpharon	0.142	341.55(\$4.06)	48.50(\$0.57)	7.72
	Garlic	0.165	113.63(\$4.06)	18.75(\$0.22)	2.98
	Red chilli	0.097	224.80(\$2.67)	21.75(\$0.26)	3.46
	Turmeric powder	0.023	367.50(\$4.38)	8.40(\$0.1)	1.34
<b>Total cost</b>				627.90(\$7.47)	100
Tamarind pickle	Tamarind	5.000	90.00(\$1.07)	450.00(\$5.35)	56.05
	Gur	3.000	75.00(\$0.89)	225.00(\$2.68)	28.02
	Mustard oil	0.158	192.43(\$2.29)	30.50(\$0.36)	3.80
	Spices	-	-	97.40(\$1.16)	12.13
	Panchpharon	0.142	341.55(\$4.06)	18.75(\$0.22)	6.04
	Garlic	0.165	113.63(\$4.06)	21.75(\$0.26)	2.33
	Red chilli	0.097	224.8(\$2.67)	8.40(\$0.1)	2.71
	Turmeric powder	0.023	367.50(\$4.38)		1.04
<b>Total cost</b>				802.90(\$9.56)	100
Jujube pickle	Jujube	5.000	60.00(\$0.71)	300.00(\$3.57)	45.95
	Gur	3.000	75.00(\$0.89)	225.00(\$2.68)	34.46
	Mustard oil	0.158	192.43(\$2.29)	30.50(\$0.36)	4.67
	Spices	-	-	97.40(\$1.16)	14.92
	Panchpharon	0.142	341.55(\$4.06)	18.75(\$0.22)	7.43
	Garlic	0.165	113.63(\$4.06)	21.75(\$0.26)	2.87
	Red chilli	0.097	224.80(\$2.67)	8.40(\$0.1)	3.33
	Turmeric powder	0.023	367.50(\$4.38)		1.29
<b>Total cost</b>				652.90(\$7.77)	100
Elephant Apple pickle	Elephant Apple	5.000	24.00(\$0.26)	120.00(\$1.43)	25.37
	Gur	3.000	75.00(\$0.89)	225.00(\$2.68)	47.58
	Mustard oil	0.158	192.43(\$2.29)	30.50(\$0.36)	6.45
	Spices	-	-	97.40(\$1.16)	20.60
	Panchpharon	0.142	341.55(\$4.06)	18.75(\$0.22)	10.26
	Garlic	0.165	113.63(\$4.06)	21.75(\$0.26)	3.96
	Red chilli	0.097	224.80(\$2.67)	8.40(\$0.1)	4.60
	Turmeric powder	0.023	367.50(\$4.38)		1.78
<b>Total cost</b>				472.90(\$5.63)	100

Source: Authors' own calculation (Bangladesh Bank, 2019; \$ 1= Tk. 84).

**Table 2.** Estimation of weight of purchased pickles of Tk.40 and price (Tk/kg).

Product	Amount of pickle (gm)					Total (gm)	Average (gm)	Price (Tk./kg)
	Vendor 1	Vendor 2	Vendor 3	Vendor 4	Vendor 5			
Mango pickle	125	120	124	122	123	614	122.8	325.73 (\$ 3.88)
Tamarind pickle	140	145	140	143	137	705	141.0	283.69 (\$ 3.38)
Jujube pickle	142	140	130	133	135	680	136.0	294.12 (\$ 3.50)
Elephant Apple pickle	120	116	122	125	118	601	120.2	332.79 (\$ 3.96)

Source: Authors' own calculation (Bangladesh Bank, 2019; \$ 1= Tk. 84).

**Table 3.** Value addition of mango when it is processed as pickle.

Items	Price (Tk./kg)	Quantity (kg)	Total value (Tk.)	% of value addition of raw mango (=C/A×100)
Total cost of Mango pickle of 5 kg raw mango	-	-	627.90 (\$ 7.47)	
Sales value of mango pickle	325.73 (\$ 3.88)	7	2280.11 (\$ 27.14)	263.13
Value addition of 5 kg raw mango (=B-A)	-	-	1652.21 (\$ 19.67)	
Value addition of 1 kg raw mango (=C/5)	-	-	330.44 (\$ 3.93)	
Value addition of 1 kg mango pickle[= price of mango pickle per kg (i.e., Tk.325.73) – cost of producing of mango pickle per kg (i.e., 627.90÷7= Tk.89.70)]	-	-	236.03 (\$ 2.81)	

Source: Authors' own calculation (Bangladesh Bank, 2019; \$ 1= Tk. 84).

**Table 4.** Value addition of mango and other ingredients when it processed as pickle.

Ingredients	Amount (kg)	Proportionately value addition (Tk.)	% of total value addition
Mango	5.00	962.27 (\$11.45)	58.24
Gur	3.00	577.35 (\$6.87)	34.94
Mustard oil	0.158	30.41 (\$0.36)	1.84
Panchpharon	0.142	27.33 (\$0.32)	1.66
Garlic	0.165	31.75 (\$0.38)	1.92
Red chilli	0.097	18.67 (\$0.22)	1.13
Turmeric powder	0.023	4.43 (\$0.05)	0.27
Total	8.585	1652.2 (\$19.67)	100

Source: Authors' own calculation (Bangladesh Bank, 2019; \$ 1= Tk. 84).

### Selling price determination of homemade pickles

The pickle vendors sell their pickles on the street or other public place such as, at a market, outside the girls' schools (to cater to their target demographic), college or fair etc. They are called also hawker. They did not sell their pickles to the consumers by taking weight of the pickle. They did not use any measurement scale. They sell it to consumers through their eye estimation; they sell pickles at Tk.10, 15, 20, 30, 40 etc. by using paper, paper packet, and polybag. For assessing the value addition, the researcher needs price of pickles per unit so that value addition can be calculated easily. Value addition is mainly expressed as the difference between total expenses incurred in processing, to buy a product, and total revenue acquiring from its sale. The researcher purchased all types of pickles that were taken into present study from five vendors for estimating the amount (weight) of pickles. When researcher purchased pickles from sellers (vendors), five different sellers gave in different amounts at same price. The researcher purchased each pickle at Tk. 40 from five pickle vendors. The amount of purchased mango pickle was 125g, 120g, 124g, 122g and 123g, where the average amount of mango pickle was 122.8gm. For tamarind pickle, it was 141gm, for jujube it was 136 gm and for elephant apple, it was 120.2 gm. The details amounts of purchased pickles are shown in Table 2. This average amount was used for the calculation of value addition per kg for the homemade pickles of mango, tamarind, jujube and elephant apple. By using this information, price (Tk. /kg) of

homemade pickles was calculated and shown in Table 2. Selling price of elephant apple pickle was the highest Tk. 332.79 (\$ 3.96) per kg followed by mango pickle Tk.325.73 (\$ 3.87) per kg, jujube pickle Tk. 294.12 (\$ 3.50) per kg and tamarind pickle Tk. 283.69 (\$ 3.37) per kg.

### Value addition of mango when it processed as pickle

During the processing of mango pickle of 5 kg raw mango, about 1.58 kg from the total weight was lost and finally about 7 kg of mango pickle found for selling reported by the pickle vendors in the study area. Now, the researcher calculated the sales value of mango pickle of 7kg and deducted its costs from the sales value for assessing the value addition of mango. These are shown in Table 3. Here, value additions of other ingredients (gur, oil, and spices) are ignored because product (i.e., mango pickle) is identified as its basic ingredients (i.e., mango). The researcher calculated value addition of 5 kg raw mango, because pickle vendors usually they processed this amount to prepare pickle, and it was found Tk.1652.21 (\$19.67). Then value addition of 1 kg of raw mango was estimated and it was found Tk.330.44 (\$3.93). Finally, it was found that the value addition of raw mango was 263.13 per cent when it processed as pickle. Value additions of other ingredients were also estimated if it is considered that value addition is not only for raw mango but also for other ingredients. In this case value addition was estimated proportionately on the basis of weight of the ingredients (Table 4).

**Table 5.** Value addition of tamarind when it processed as pickle.

Item	Price (Tk./kg)	Quantity (kg)	Total value (Tk.)	% of value addition of tamarind (=C/A×100)
Total cost of tamarind pickle of 5 kg tamarind	-	-	802.90 (\$ 9.56)	
Sales value of tamarind pickle	283.69 (\$ 3.38)	8	2269.52 (\$ 27.02)	182.67
Value addition of 5 kg tamarind (=B-A)	-	-	1466.62 (\$ 17.46)	
Value addition of 1 kg tamarind (=C/5)	-	-	293.32 (\$ 3.49)	
Value addition of 1 kg tamarind pickle {= price of tamarind pickle per kg (i.e., Tk.283.69) – cost of producing of tamarind pickle per kg (i.e., $802.90 \div 8 = \text{Tk.}100.36$ )}	-	-	183.33 (\$ 2.18)	

Source: Authors' own calculation (Bangladesh Bank, 2019; \$ 1= Tk. 84).

**Table 6.** Value addition of tamarind and other ingredients when it processed as pickle.

Ingredients	Amount (kg)	Proportionately value addition (Tk.)	% of total value addition
Tamarind	5.00	854.18 (\$10.17)	58.24
Gur	3.00	512.50 (\$6.10)	34.94
Mustard oil	0.158	26.99 (\$0.32)	1.84
Panchpharon	0.142	24.26 (\$0.28)	1.66
Garlic	0.165	28.19 (\$0.34)	1.92
Red chilli	0.097	16.57 (\$0.19)	1.13
Turmeric powder	0.023	3.93 (\$0.04)	0.27
Total	8.585	1466.62 (\$17.46)	100

Source: Authors' own calculation (Bangladesh Bank, 2019; \$ 1= Tk. 84).

**Table 7.** Value addition of jujube when it processed as pickle.

Item	Price (Tk./kg)	Quantity (kg)	Total value (Tk.)	% of value addition of jujube (=C/A×100)
Total cost of jujube pickle of 5 kg jujube	-	-	652.90 (\$ 7.77)	
Sales value of jujube pickle	294.12 (\$ 3.50)	8	2352.9 (\$ 28.01)	260.39
Value addition of 5 kg jujube (=B-A)	-	-	1700.06 (\$ 20.24)	
Value addition of 1 kg jujube (=C/5)	-	-	340.01 (\$ 4.05)	
Value addition of 1 kg jujube pickle {= price of jujube pickle per kg (i.e., Tk.294.12) – cost of producing of jujube pickle per kg (i.e., $652.90 \div 8 = \text{Tk.}81.61$ )}	-	-	212.51 (\$ 2.53)	

Source: Authors' own calculation (Bangladesh Bank, 2019; \$ 1= Tk. 84).

#### Value addition of tamarind when it processed as pickle

During processing of tamarind pickle, very small amount weight is lost from total amount of pickle. Here about 8 kg of tamarind pickle is made by producer with 5kg tamarind, 3 kg gur and about 0.585 kg other ingredients reported by the pickle vendors in the study area. Now, the researcher calculated the sales value of Tamarind pickle of 8kg and deducted its costs from the sales value for assessing the value addition of tamarind. These are shown in Table 5. Here, value additions of other ingredients (gur, oil, and spices) are ignored because product (i.e., tamarind pickle) is identified as its basic ingredients (i.e., tamarind). The researcher calculated value addition of 5 kg tamarind, because pickle vendors usually they processed this amount to prepare pickle, and it was found Tk.1466.62 (\$17.46). Then value addition of 1 kg of tamarind was estimated and it was found Tk.293.32 (\$3.49). Finally, it was found that the value addition of tamarind was 182.67 per cent when it processed as pickle.

Value additions of other ingredients were also estimated if it is considered that value addition is not only for tamarind but also for other ingredients. In this case value addition was estimated proportionately on the basis of weight of the ingredients (Table 6).

#### Value addition of jujube when it processed as pickle

During processing of jujube pickle, very less amount weight is lost from total amount of pickle. Here about 8 kg of jujube pickle was found by producer with 5kg jujube, 3 kg gur and about 0.585 kg other ingredients. The researcher calculated the sales value of jujube pickle of 8kg and deducted its costs from the sales value for assessing the value addition of jujube. These are shown in Table 7. Here, value additions of other ingredients (gur, oil, and spices) are ignored because product (i.e., jujube pickle) is identified as its basic ingredients (i.e., jujube).

The researcher calculated value addition of 5 kg jujube, because

**Table 8.** Value addition of jujube and other ingredients when it processed as pickle.

Ingredients	Amount (kg)	Proportionately value addition (Tk.)	% of total value addition
Jujube	5.00	990.13 (\$11.78)	58.24
Gur	3.00	594.08 (\$7.07)	34.94
Mustard oil	0.158	31.29 (\$0.37)	1.84
Panchpharon	0.142	28.12 (\$0.33)	1.66
Garlic	0.165	32.68 (\$0.39)	1.92
Red chilli	0.097	19.21 (\$0.23)	1.13
Turmeric powder	0.023	4.55 (\$0.05)	0.27
Total	8.585	1700.06 (\$20.24)	100

Source: Authors' own calculation (Bangladesh Bank, 2019; \$ 1= Tk. 84).

**Table 9.** Value addition of elephant apple when it processed as pickle.

Item	Price (Tk./kg)	Quantity (kg)	Total value (Tk.)	% of value addition of elephant apple (=C/A×100)
Total processing cost of elephant apple pickle of 5 kg elephant apple	-	-	472.90 (\$ 5.63)	
B. Sales value of elephant apple pickle	332.79 (\$ 3.96)	7.8	2595.76 (\$ 30.90)	448.90
Value addition of 5 kg elephant apple (=B-A)	-	-	2122.86 (\$ 25.27)	
Value addition of 1 kg elephant apple (=C/5)	-	-	424.57 (\$ 5.05)	
Value addition of 1 kg elephant apple pickle {= price of elephant apple pickle per kg (i.e., Tk.332.79) – cost of producing of elephant apple pickle per kg (i.e., 472.90÷7.8= Tk.60.63)}	-	-	272.16 (\$ 3.24)	

Source: Authors' own calculation (Bangladesh Bank, 2019; \$ 1= Tk. 84).

**Table 10.** Value addition of elephant apple and other ingredients when it processed as pickle.

Ingredients	Amount (kg)	Proportionately value addition (Tk.)	% of total value addition
Jujube	5.00	1236.38 (\$14.72)	58.24
Gur	3.00	741.83 (\$8.83)	34.95
Mustard oil	0.158	39.07 (\$0.46)	1.84
Panchpharon	0.142	35.11 (\$0.42)	1.65
Garlic	0.165	40.80 (\$0.48)	1.92
Red chilli	0.097	23.99 (\$0.29)	1.13
Turmeric powder	0.023	5.68 (\$0.07)	0.27
Total	8.585	2122.86 (\$25.27)	100

Source: Authors' own calculation (Bangladesh Bank, 2019; \$ 1= Tk. 84).

pickles vendors usually they processed this amount to prepare pickle, and it was found Tk.1700.06 (\$20.24). Then value addition of 1 kg of jujube was also estimated and it was found Tk.340.01 (\$4.05). It was found that the value addition of jujube was 260.39 per cent when it processed as pickle. Value additions of other ingredients were also estimated if it is considered that value addition is not only for jujube but also for other ingredients. In this case value addition was estimated proportionately on the basis of weight of the ingredients (Table 8).

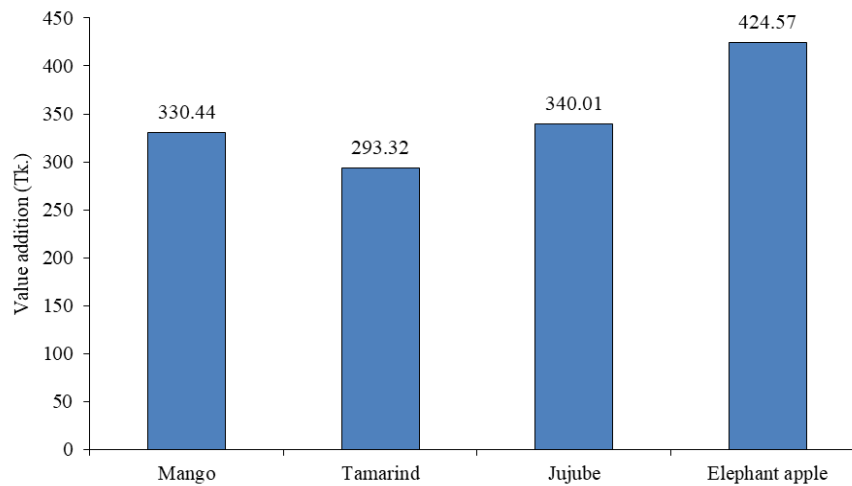
#### Value addition of elephant apple when it processed as pickle

Same way the value addition of elephant apple was estimated. On an average vendor received 7.8 kg of elephant apple pickle by processing of 5 kg elephant apple, 3 kg gur and about 0.585 kg other ingredients. The researcher calculated the sales value of elephant apple pickle of 7.8 kg by using the price of elephant apple pickle and deducted its costs from this sales value for assessing the value addition of elephant apple. These are shown in Table 9. Here, value additions of other ingredients (gur, oil, and spices) are ignored because product (i.e., elephant apple pickle) is identified as its basic ingredients. The researcher calculated

value addition of 5 kg elephant apple, because pickle vendors usually they processed this amount to prepare pickle. Value addition of elephant apple was estimated Tk. 2122.86 (\$25.27) for 5 kg elephant apple. Then value addition of 1 kg of elephant apple was also estimated and it was found Tk.424.57 (\$5.05). Value addition of elephant apple was 448.90 per cent when it processed as pickle. It was the highest among the studied four fruits. Value additions of other ingredients were also estimated if it is considered that value addition is not only for elephant apple but also for other ingredients. In this case value addition was estimated proportionately on the basis of weight of the ingredients (Table 10).

#### Comparison of Value Addition of Mango, Tamarind, Jujube and Elephant Apple

Value additions of the four fruits were not the same when they were processed to make pickle. Value addition of elephant apple was the highest Tk. 424.57 (\$ 5.05) followed by jujube Tk.340.01 (\$ 4.04), mango Tk.330.44 (\$ 3.93) and tamarind Tk.293.32 (\$ 3.49).



**Figure 1.** Value addition (Tk.) of 1 kg of mango, tamarind, jujube and elephant apple when processed as pickle (ignoring the value addition of other ingredients).

## Conclusion

There is an important role of homemade pickles in developing countries, which can accelerate the growth of economy, because it can reduce the unemployment problem. Many people are engaged in production and marketing of homemade pickles. Value addition aims to increase the availability of the commodity, enhance capacity building, and get a pathway out of poverty. The study took a deep look on the value addition of four homemade pickles. Those are mango pickle, tamarind pickle, jujube pickle and elephant apple pickle. To calculate the value addition of homemade pickle the formula, (value addition = selling price – cost of production) was used and percentage was also calculated. The result showed that value addition for homemade pickle was TK. 236.03 (\$ 2.81) per kg and percentage was 263.13. Value addition for Tamarind pickle was TK. 183.33 (\$ 2.18) per kg and percentage was 182.67. For Jujube pickle TK. 212.51 (\$ 2.53) was added to per kg and percentage was 260.39. Lastly, for elephant apple, TK. 272.16 (\$3.24) was added per kg elephant apple pickle and percentage was 448.90. Homemade pickle is questionable regarding the hygienic condition. Therefore, the vendors should improve their hygienic matter while marketing their homemade pickles. The results of the research could be used for planning to improve marketing activities of homemade pickles.

## Conflict of interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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