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Consumer perception towards edible cutlery in Telangana: A case study on WTP

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Abstract
Cutlery are the tools used for preparing, serving, and eating food. Knives, spoons, cups, and forks are the four most often used types of cutleries. Most of the cutlery made from the plastic which is harmful to environment as well as for humans, there is an alternative called edible cutlery, which can be consumed after the use of cutlery. The survey was conducted in Hyderabad, Warangal and Karimnagar districts of Telangana, India. Random sampling technique was used to select the sample size of 200 consumers. The consumers were surveyed by using structured schedule through interview. The opinion of the consumers has been examined with respect to their knowledge, taste, preference, availability, and factors effecting the purchase of edible cutlery. The results showed that, In Hyderabad 66 percent of respondents are aware of material with which edible cutlery is made of. Whereas in Warangal (52%) and Karimnagar (60%) most of them are unaware. The Binary logistic regression results revealed that in Hyderabad, for a unit of increase in education level and annual income, their willingness to pay increases by 1.120 times and 1.226 times whereas increase of one member in their family, their willingness to pay for edible cutleries decreases by 0.712 times. In Warangal, a unit increase in educational level and annual income of the respondent, increases their willingness to pay by 3.034 and 2.447 times. Similarly in Karimnagar, increase in annual income, concerned towards health and educational level willingness to pay for edible cutleries increases by 1.308, 2.956, 0.354 times.

Keywords: Edible cutlery, consumer perception, plastic waste, environmentally friendly, biodegradable

Introduction
The major part of plastic waste produced in the worldwide is plastic cutlery. A significant problem the world is facing is how to recycle, reuse, reduce, and up-cycle the vast volume of plastic waste. Plastic cutlery is a practical option, but it is also bad for your health and the environment, it is a petroleum by-product and contains carcinogens and poisons that are easily absorbed by the human body. Because plastics take up a lot of space and often fill landfills, their disposal is now dangerous for the environment because toxins and carcinogens can seep into food through the natural ecosystem (Hemraj and Preeti 2018) [5]. Since plastic cutlery was designed to be "disposable," the trash can is where it will ultimately end up. Polypropylene and polystyrene, the two plastics that make up the majority of plastic utensils are technically recyclable, but most recycling facilities do not take them since they are difficult to process and not cost-effective per unit (Gupta *et al*.,) [6]. Alternatives to the current ordinary plastic cutlery must be developed, and one workable alternative is to use edible cutlery (Kumbar and Masali 2020) [4]. With a projected Compound Annual Growth Rate (CAGR) of 11 per cent from 2019 to 2026, the edible cutlery market is expected to grow from its value of $24,860 thousand during 2018 to $56,970.4 thousand by 2026 (Allied Market Research Report, 2020). Edible Cutlery' is natural, bio-degradable, and compostable and can be engineered to be nutritious, which overcome the issues of plastics for disposable cutlery (Chowdhury *et al*., 2021) [1]. These cutleries are made from plants, and are considered as a healthy alternative to plastic products. Spoon, fork, knife, and chopstick are among the most popular choice for edible cutleries worldwide. Edible cutleries can be made of millets (Jowar, sorghum), rice, wheat, fruits and vegetables. Edible cutlery is becoming very popular in the emerging markets with the increase in number of people choosing healthy products. These plant-based cutlery items are viewed as a healthier substitute for goods produced of plastic. Kumbhar and Masali (2020) [4] conducted a study on bio degradable edible cutlery by using moringa pod husk that is used for making biodegradable cutlery which acts as an alternative to conventional plastic cutlery. The developed cutlery biodegrades in such a short time period it can serve as a promising alternative for the conventional plastic cutlery which is hazardous to the environment.

Benefits of edible cutlery

1. **Functionality:** Edible cutlery usually come in simple designs and they are easy to use
2. **Ease of manufacturing:** Edible cutlery is easy to manufacture.
3. **Healthy:** Edible cutleries are made of healthy products and are nutritious.
4. **Attracts customers:** Usage of edible cutlery by food sellers can attract the customers.
5. **Eco-friendly:** Edible cutlery is eco-friendly and reduce the waste generated by use of harmful plastics considerably.
6. **Biodegradable:** Edible cutlery unlike plastic cutlery is bio-degradable and do not pose a serious threat to the environment. (Chowdhury *et al*., 2021) [1]

In India, the first edible cutlery on a commercial scale was produced by Bakey's company in Telangana which has earned recognition worldwide. A Delhi based project called "Patradaya" makes edible bowls in different sizes by engaging Afghan refugees in India. The Defence Food Research Laboratory (DFRL) has been producing the technology related to edible cutlery since 2017. Edible cutlery is becoming increasingly popular in India, as people become more aware of the environmental impact of plastic. There are a number of companies that produce edible cutlery in India, and it is becoming more widely available in restaurants, cafes, and even supermarkets.

In Telangana, Bakey's was founded in 2011 by a groundwater researcher, Narayana Peesapathy to produce edible cutlery as a replacement for the plastic cutlery. The idea of edible cutleries was first introduced in India as an advertisement product in 2010 by this organization. The merchandise has been further produced and by 2016 the company was able to supply 50,000 units a day and has earned worldwide orders of 25 million times (Kabir *et al*., 2021) [3]. Edco India, Agraganya Enterprises, Edibyl and KVR industries are other enterprises that make edible cutlery in Hyderabad. The statistics with respect to the quantity of edible cutlery produced and used in Telangana is not available. However, edible cutlery is slowly gaining acceptance among the food vendors as well as the consumers.

There is a need to decrease the use of Single Use Plastic and adopt the usage of Eco-friendly edible cutlery. Central government banned single-use plastic usage from 1st July, 2022 with units engaged in production, distribution, stocking, and sale of such items being closed. Telangana Government has started taking initiatives to reduce the Single-Use Plastic waste and T-Hub organization in Hyderabad is encouraging start-ups to find an alternative to plastic reduction. This particular study conducted to know more about the perception of consumers towards edible cutlery.

Limitations of edible cutlery

i) **Price-** The average price of edible cutlery (3-5 Rs) is higher than the price of plastic cutlery (1-2 Rs).
ii) **Shelf life-** Edible cutlery made of natural materials is more readily degraded and has a shorter lifespan than cutlery made of plastic.
iii) **Less customer base-** Edible cutlery is only available in particular place and only draws a small number of consumers.

Market demand: In comparison to plastic cutlery, edible cutlery is currently less in demand.

Materials and Methods Study area

Random sampling method was used to select the respondents to collect the data with regards to consumer awareness and consumer perception. In Hyderabad, 5 zones were identified and from each zone two localities were randomly selected (Table 1). And from each locality 15 respondents were selected, totalling to 150 consumers. Whereas from Warangal and Karimnagar 25 consumers were randomly selected in each district. In total, number of respondents selected are 200.

Table 1: Selection of respondents from each district of Telangana

State	City	Zone	Localities	Total number of respondents
Telangana	Hyderabad	LB Nagar	Uppal	15
			Saroornagar	15
		Charminar	Rajendrangar	15
			Charminar	15
		Khairtabad	Jubilee Hills	15
			Mehdipatnam	15
		Kukatpally	Kukatpally	15
			Moosapet	15
		Secunderabad	Secunderabad	15
			Malkajgiri	15
	Warangal		Kamalapur	5
			Hasanparthy	5
			Inavolu	5
			Kazipet	5
			Dharmasagar	5
	Karimnagar		Manakondur	5
			Huzurabad	5
			Choppadandi	5
			Kesavapatnam	5
			Jammikunta	5
Total	3 Districts	5 Zones	20 Localities	200

Methodology

1. **Tabular/Descriptive analysis:** Tabular analysis was used for the computation of frequency and percentages to present the data regarding the response of the consumers.
2. **Graphical Analysis:** Graphical analysis technique was used to represent the data of response of consumers by using bar graphs and pie charts.
3. **Likert Scaling Technique:** Likert scaling technique was used to identify the consumers attitude towards edible cutlery. Likert-type scale assumes that the strength/intensity of experience/response is linear *i.e*., on a continuum from strongly agree to strongly disagree and makes the assumption that attitudes can be measured. Respondents were offered a choice of five or seven pre-coded responses with the neutral point being neither agree nor disagree.
4. **Binary logistic regression method:** The target variable in a regression model called binary logistic regression (LR) can only take one of two possible values: 0 or 1. Given that the result is represented as readmitted (1) or not readmitted, it is the most widely used regression model for readmission prediction (0).

The binary logit regression model was used to determine the relationship between the willingness to pay for edible cutlery and the various factors that influence it. The model is well established in describing relationships between a dependent variable and a group of explanatory variables.

The logit model is expressed as

$\mu = B0 + B1X1 + B2X2 + B3X3 + BnXn$

where,
μ= willingness to pay for edible cutlery.
It is quantified as:
Yes = 1, Willingness to pay more than plastic cutlery No = 0, Not willingness to pay more than plastic cutlery B0 = intercept
B……n = estimated coefficient
X…. n = Set of independent variables. List of parameters selected for analysis X1 = Age in years
X2 = Gender (1 Female, 0 Male) X3 = Education (in years)
X4 = Marital status (Married 1, 0 otherwise) X5 = Family size (continuous number)
X6 = Annual income (in Rs)
X7 = Concern towards health (1 Yes, 0 No)
X8 = Availability of plastic cutlery (1 Yes, 0 No)
X9 = Awareness/Knowledge on edible cutlery (1 yes, 0 No)

Results and discussion General profile

The respondents' profile in general with respect to their age, gender is presented in Table 2. Majority of the respondents in three areas are males as compared with females. It can be observed from the table that respondents were from different age groups, In Hyderabad and Warangal majority belonged to age group of 20-29 years whereas in Karimnagar they belonged to 30-39 years. The annual income of the respondents indicated that in Hyderabad majority (32.66%) of them are earning around 6-8 lakhs per annum whereas in Warangal and Karimnagar, the majority of individuals falls under category of 4 to 6 lakhs per annum.

Table 2: General profile of the respondents

Characteristics	Particulars	Frequency		
		Hyderabad	Warangal	Karimnagar
Gender	Male	91 (60.66)	20 (80.00)	16 (64.00)
	Female	59 (39.33)	5 (20.00)	9 (36.00)
Age (years)	20-29	77 (51.33)	9 (36.00)	6 (24.00)
	30-39	51 (34.00)	8 (32.00)	15 (60.00)
	40-49	13 (8.66)	2 (8.00)	3 (12.00)
	50-59	6 (4.00)	6 (24.00)	1 (4.00)
	>60	3 (2.00)	0 (0)	0 (0)
Income (Lakhs)	>2	4 (2.66)	1 (4.00)	0 (0)
	2-6	9 (6.00)	4 (16.00)	4 (16.00)
	4-6	45 (30.00)	10 (40.00)	11 (44.00)
	6-8	49 (32.66)	7 (28.00)	7 (28.00)
	8-10	25 (16.66)	3 (12.00)	3 (12.00)
	>10	18 (12.00)	0 (0)	0 (0)

Note: Figures in parentheses indicate percentages

Classification of respondents willing to pay for edible cutlery

The willingness to pay for edible cutlery was represented in Fig 1. Result revealed that in Hyderabad 81 respondents are willing to pay equal to the price of plastic cutlery and about 52 respondents are willing to pay higher price than the plastic cutlery for edible cutlery and whereas in Karimnagar and Warangal there is no much difference in the customers willingness to pay for edible cutlery.

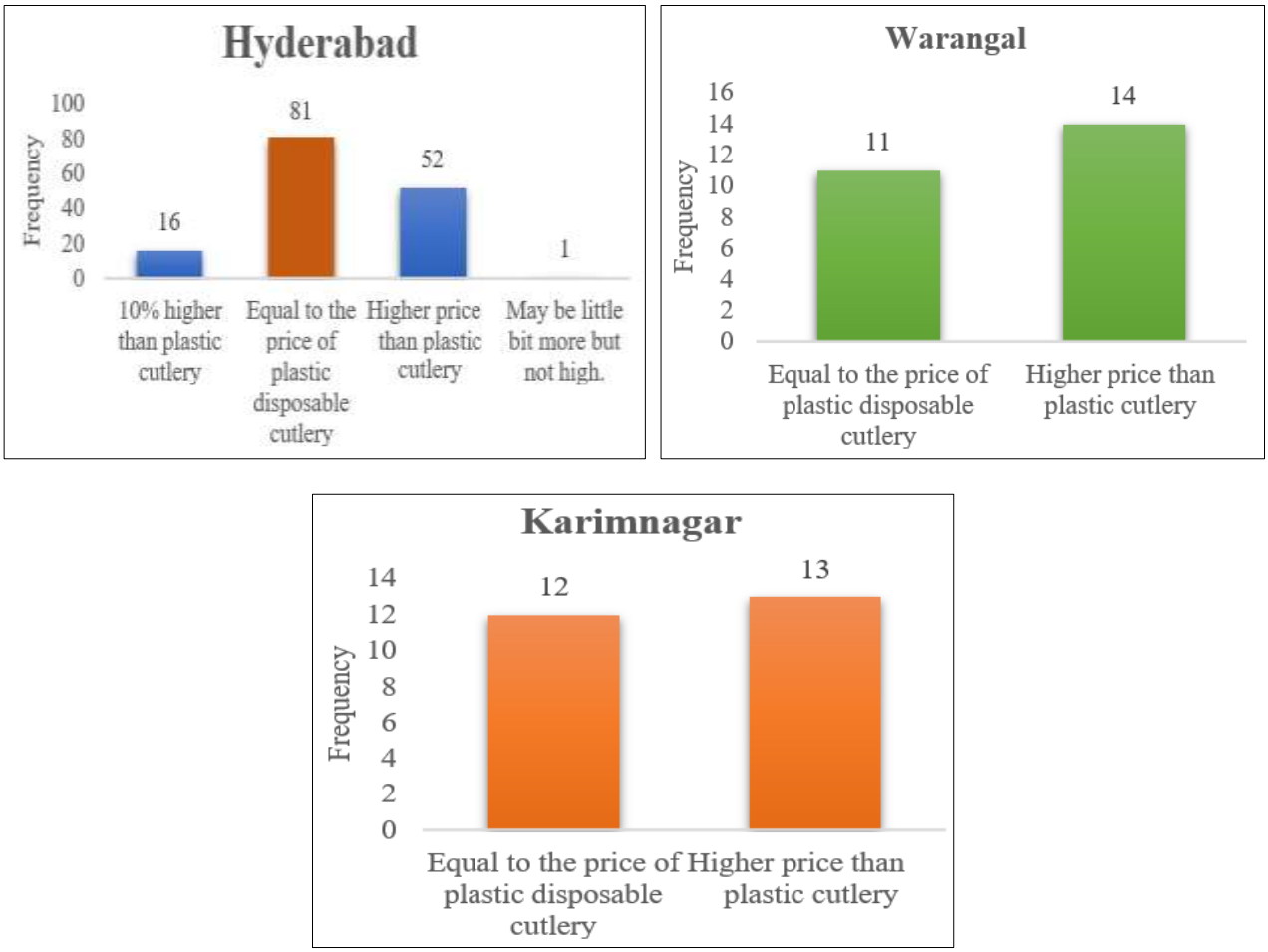

Fig 1: Respondents classification based on willingness to pay for edible cutlery

Table 3: Factors influencing the willingness to purchase the edible cutlery in Hyderabad

Variables	Willingness to pay equal to or higher than plastic cutlery			
	B	Co-efficient	Standard error	Exp (B)
Age	0.015	0.542	0.024	0.985
Gender	0.395	0.268	0.356	1.484
Education	0.113	0.003*	0.217	1.120
Marital status	0.174	0.680	0.422	1.190
Family size	-0.339	0.031*	0.349	0.712
Annual income	0.204	0.007*	0.076	1.226
Concern towards health	0.083	0.877	0.540	1.087
Availability of plastic cutlery	0.371	0.643	0.801	1.450
Awareness/Knowledge on edible cutlery	0.029	0.008*	0.463	1.029
Intercept	1.877	0.353	2.022	0.153

* Significant at 5% level

-2 Loglikelihood - 197.642 Cox and Snell R square – 0.060 Nagelkerke R square - 0.081

Hosmer and Lemeshow Test- 0.109 (More than 0.05, so significant) Chi – square test – 0.229 (< 15.507, significant)

From table. 3, it could be understood that education, annual income and awareness/knowledge on edible cutlery had significant positive influence on the willingness to pay of the respondents for edible cutleries. For a unit increase in education level, their likelihood of willingness to pay increases by 1.120 times. Similarly, a unit increase in annual income of the respondents, their likelihood of willingness to pay for edible cutleries increases by 1.226 times.

Whereas, family size of the respondent had negative significance over their willingness to pay which indicates that for increase of one member in their family, their likelihood of willingness to pay for edible cutleries decreases by 0.712 times. The remaining all other variables such as gender, frequency of usage of edible cutlery, marital status of the respondent had no significant influence over their willingness to pay and chi-square test has a test value of 0.229; which indicates the significance of the model.

It could be inferred that as the educational status, their annual income along with knowledge regarding healthy edible cutlery allows the respondents to switch over use of sustainable eco-friendly products rather than the plastic cutlery and willingness to pay equal or higher than plastic cutlery.

Table 4: Factors influencing the willingness to purchase the edible cutlery in Warangal

Variables	Willingness to pay equal to or higher than plastic cutlery			
	B	Co-efficient	Standard error	Exp (B)
Age	0.338	0.159	0.240	0.713
Gender	7.557	0.152	5.276	0.001
Education	1.110	0.031*	1.266	3.034
Marital status	10.399	0.096	6.238	0.000
Family size	1.043	0.512	1.591	2.837
Annual income	0.895	0.012*	0.655	2.447
Concern towards health	2.669	0.454	3.564	0.069
Availability of plastic cutlery	0.45	0.52	0.624	1.93
Awareness/Knowledge on edible cutlery	3.307	0.557	5.638	0.037
Intercept	31.680	0.161	22.587	5.73

* Significant at 5% level

-2 Loglikelihood - 18.519

Cox and Snell R square – 0.468 Nagelkerke R square - 0.627

Hosmer and Lemeshow Test- 0.424 (More than 0.05, so significant) Chi – square test – 0.015 (< 12.592, significant)

From table.4, it could be understood that education level and annual income of the respondents are positive and significantly contributing to their willingness to pay for edible cutleries in Warangal district. It depicts that increase in educational level of the respondent, increases their likelihood of willingness to pay for edible cutleries (3.034 times). Similarly, increase in the annual income of the respondents, increases their likelihood of willingness to pay towards edible cutleries (2.447 times) In addition, the Hosmer and Lemeshow test has a significance value of 0.424 and chi-square test has a test value of 0.015; which indicates the significance of the model.

In Warangal, increase in the educational status, and annual income of the respondents increase their preference and willingness to pay towards edible cutlery. But, the other variables such as age, marital status, gender, family size, awareness and concern towards health had no significant influence over their willingness to pay higher for edible cutleries.

Table 5: Factors influencing the willingness to purchase the edible cutlery in Karimnagar

Variables	Willingness to pay equal to or higher than plastic cutlery			
	B	Co-efficient	Standard error	Exp (B)
Age	0.051	0.565	0.088	1.052
Gender	0.580	0.696	1.487	1.787
Education	1.038	0.039*	1.204	0.354
Marital status	2.133	0.330	2.191	8.437
Family size	0.953	0.126	0.788	2.594
Annual income	0.269	0.003*	0.322	1.308
Concern towards health	1.084	0.017*	0.692	2.956
Availability of plastic cutlery	0.674	0.490	0.778	1.961
Awareness/Knowledge on edible cutlery	1.037	0.008*	1.746	2.821
Intercept	-7.073	0.383	8.107	0.001

* Significant at 5% level
-2 Loglikelihood – 25.621

Cox and Snell R square – 0.302 Nagelkerke R square - 0.403 Hosmer and Lemeshow Test- 0.952 (More than 0.05, so significant) Chi – square test – 0.253 (< 14.067, significant)

From table.5, it was reported that the variables such as education, annual income, concern toward their health and the awareness/knowledge on edible cutlery of the respondents had positive and significant influence over their willingness to pay for edible cutleries. It depicts that increase in educational level of the respondent, increases the likelihood of willingness to pay for edible cutleries (0.354 times). Increase in the annual income and awareness on edible cutlery of the respondents, increases the likelihood of willingness to pay towards edible cutlery by 1.308 times and 2.821 times respectively. The Hosmer and Lemeshow test has a significance value of 0.952 and chi-square test has a test value of 0.253; which indicates the significance of the model.

In Karimnagar, the respondents reported that frequent usage of edible cutleries positively changed their mindset towards edible cutleries; as a result, the respondents were willing to pay higher for edible cutleries. Similarly, increase in earning members of the family, their annual income enables to satisfy their preferences and pay higher for edible cutleries.

Table 6: Binary logistic regression-overall

Variables	Willingness to pay equal to or higher than plastic cutlery			
	B	Co-efficient	Standard error	Exp (B)
Age	0.017	0.413	0.020	0.983
Gender	0.169	0.595	0.319	1.185
Education	0.029	0.019*	0.192	1.030
Marital status	0.006	0.987	0.386	1.006
Family size	-0.132	0.018*	0.264	1.141
Annual income	0.207	0.003*	0.070	1.230
Concern towards health	0.227	0.049*	0.328	1.255
Location	0.309	0.193	0.238	1.363
Availability of plastic cutlery	0.680	0.395	0.800	1.974
Awareness/Knowledge on edible cutlery	0.742	0.371	0.830	0.476
Intercept	-2.226	0.191	1.701	0.108

* Significant at 5% level
-2 Loglikelihood – 264.71

Cox and Snell R square – 0.059 Nagelkerke R square - 0.079 Hosmer and Lemeshow Test- 0.715 (More than 0.05, so significant) Chi – square test – 0.141 (< 15.507, significant)

From table.6, it was reported that the variables such as education, annual income and concern towards health has positive and significant influence in the consumer willingness to pay. The family size of the respondents had negative and significant influence indicating that the family size would reduce the likelihood of willingness to pay for the edible cutlery. In other words, increase in one year of educational level, their likelihood of willingness to pay for edible cutleries increases by 1.030 times; unit increase in annual income increases their likelihood of willingness to pay by 1.230 times; increase in concern towards health by using edible cutlery increases their likelihood of willingness to pay by 1.255 times. Whereas, increase in size of their family members, decreases their willingness to pay by 1.141 times. In addition, the Hosmer and Lemeshow test has a significance value of 0.715 and chi-square test has a test value of 0.141, which indicates the significance of the model.

Conclusion

The binary logistic regression model was used to determine the effects of age, education, family size, annual income, gender, concerned towards health, marital status of the respondents, Availability of plastic cutlery, Awareness/Knowledge on edible cutlery over their likelihood of willingness to pay for edible cutleries. The comprehensive findings indicate that education, income, and health consciousness positively impact the respondents' willingness to pay. Conversely, family size demonstrates a negative influence, while awareness and availability do not exhibit statistical significance in explaining the willingness to pay among the sampled respondents. Therefore, it is highly essential to raise awareness about the detrimental effects of plastic usage and highlight the benefits of adopting sustainable and eco-friendly edible cutlery. By fostering a sense of concern for both personal health and the ecosystem, individuals may reduce their reliance on plastic and, in turn, increase their willingness to pay for environmentally friendly alternatives.

Future perspectives

While many are aware of the detrimental impact of plastic on the Earth's ecosystem, there is a growing need for a shift and a collective effort to bring about change. Due to the widespread availability of plastic cutlery and its affordability compared to edible alternatives, it is essential for the government to implement a complete ban on the usage of plastic utensils. This proactive measure will contribute to fostering increased adoption of edible cutlery in the market. Companies should find smart ways to make edible cutlery more affordable. Advertisers should focus on making biodegradable products that are even better than regular plastic ones and gain people's trust. Using ads and famous young people to promote these products can make them popular and boost sales. The main goal is to convince people to choose biodegradable items over plastic, and the government can help by giving rewards/incentives to companies making eco-friendly products and organizing events to encourage new ideas.

References

1. Chowdhury GR, Dutta S, Pal N, Mitra A. Edible Cutlery: Futuristic Dining to Functional Sustenance. Parana Journal of Science and Education. 2021;7(8):84.
2. Conner C. Consumer Perceptions of Plastic-Free Food Packaging. Human Nutrition and Hospitality Management Undergraduate Honors Theses; c2021. Available from: https://scholarworks.uark.edu/hnhiuht/18.
3. Kabir MH, Hamidon N. A Study of Edible Cutleries by Using Sorghum Flour. Progress in Engineering Application and Technology. 2021;2(1):292-300.
4. Kumbhar K, Masali P. Biodegradable Cutlery Using Moringa Pod Husk: An Alternative to Conventional Plastic Cutlery. International Journal of Innovative Science and Research Technology. 2020;5(10):2456-2165.
5. Hemraj NP, Preeti S. A study on Edible Cutlery: An Alternative for Conventional ones. A Journal of Hospitality. 2018;4(2):45-51.
6. Gupta S, Khedekar P, Sabu SK, Vignesh KG, Shaik S. IBS, Report.
7. Agyekum CK, Haifeng H, Agyeiwaa A. Consumer Perception of Product Quality Microeconomics and Macroeconomics. 2015;3(2):25-29.
8. Vaghela P. A Study on Consumer Perception Towards Online Shopping. IJMT 2014;4(12):200-210. ISSN: 2249-1058.
9. Sirisha S. Consumer perception and application of edible coatings on fresh-cut fruits and vegetables. LSU Master's Theses; c2003.