A STUDY ON USE OF NATURAL EDIBLE CUTLERY IN NAGPUR CITY

Author
Vishal W Chawre
(BHMCT, PGDCA, MHM)
TULI COLLEGE OF HOTEL MANAGEMENT, NAGPUR
(Assistant Professor)

Abstract

Edible cutlery is made of food materials and they come with nutritive contents. It contains no chemicals, additives or even preservatives. They are 100% natural and baked products. Edible cutlery falls under food category and hence, hygiene is of paramount importance. Edible cutlery cannot be reused. These are baked at high temperatures; therefore, the likelihood of microbial spores to survive is very little. Even if these micro-spores land after production, they are not likely to germinate because, the products are dehydrated (which is why they have long shelf life, even without preservatives).

The concept of edible cutlery is came due to increase in plastic pollution, which is covering the most of our Indian landfills. As plastic is a material, which can't be recycle, it is non- biodegradable. Plastic is creating most of the dangerous disease to human being and animals, like cancer, which is the most dangerous disease for human being. So considering the factors which are responsible for the plastic pollution and the harms which are facing by the human being and animals on the earth, the alternative of plastic cutlery that is edible cutlery has been introduced. Once we start using the edible cutlery, the usage of plastic cutlery will be stop automatically, once people habitual to it.

The purpose of this research project is to create the awareness about the edible cutlery in the people of Nagpur city. The best alternative for the plastic cutlery is edible cutlery, now why edible cutlery, as we all know that plastic may harm the human so by using edible cutlery no one will be harm using this. While travelling we can use this cutlery without creating the pollution like plastic cutlery. We know how plastic cutlery harms human body like irritation in the eye, vision, failure, breathing difficulties, respiratory problems, headache, cancers, skin diseases whether edible cutlery provides vitamins that we don't get from our day to day meal, this edible cutlery also provides the good amount of minerals, such as zinc, iron, magnesium, which is the good source of nutritional diet.

Aim –

A STUDY ON USE OF NATURAL EDIBLE CUTLERY IN NAGPUR CITY

Objectives-

1) To avoid the use of plastic cutleries in hotel & street food.
2) To find out the feasibility of edible cutleries.
3) To provide the nutritive values to human body.
4) To create the awareness about edible cutlery in people of Nagpur city.

Limitations-

1) The study was limited in Nagpur city only.
2) Sample size was limited to 8 judges only.
3) Time, money & energy will be major constraints.
4) The study does not consider the personal background of employees.

Hypothesis:

- Ho - Most of the participants are aware about the edible cutlery concept.
- Ha – Most of participants feels that the edible cutlery concept is not worth for using in daily rutine.

INTRODUCTION

Cutlery was ordinarily known as flatware or silverware. The term silverware, point to the material it is made from, so the term tableware is more commonly used to avoid confusion, because the material was very rarely silver – only the wealthy could afford silver.

Cutlery can be made from many different materials. Historically, sterling silver was the traditional material that had the advantage over other metals. Good quality cutlery must be made from metals which are less chemically reactive, because it can lead to unpleasant tastes. It can also be made from gold, it is less reactive than silver, but is too expensive and only the monarchs could afford it. (restrofusion, 2017)

Spoons are one of the oldest eating utensils on the planet. This isn't particularly surprising if one considers that nearly as long as humans have needed food, they've required something to scoop it up with. Unlike knives and forks, that for the most part needed to be fashioned, natural spoons could be utilized by

employing such things as seashells or conveniently shaped stones. Sure, the earliest known instances of these didn't have handles yet, but from these humble beginnings, the spoon was born.

DEFINITION

Cutlery

- Cutlery includes any hand implement used in preparing, serving, and especially eating food in Western culture (https://en.wikipedia.org)
- Knives, forks and spoons used for eating food (https://dictionary.cambridge.org)

Review of Literature

Edible cutlery is made from a mix of jowar (sorghum), rice and wheat flour. The spoons and chopsticks do not get soggy if placed in water and food. They only soften after some time (10- 15 minutes), and thus can be eaten easily at the end of the meal. Even if discarded, they decompose within five to six days, if not eaten by insects or rodents.The idea about how to make the cutlery struck Narayana during a flight from Ahmedabad to Hyderabad, when he saw a passenger using a piece of Gujarati ***Khakra*** as a spoon to eat dessert.

Person Who Invented Edible Cutlery - Narayana Peesapati (the cutlery can be eater after consuming the food and drink)

Today, he has found a way to replace plastic cutlery with edible cutlery. Ok, so plastic is bad for the environment. Everyone knows that. But what's wrong with not washing plastic cutlery and putting it in one's mouth? Narayana says it is because we "abuse and misuse plastic; plastic should not be applied to food." He has said as much in this talk, where he gives many reasons as to why plastic, especially cutlery, should be taken out of our lives. Some of these reasons have to do with the manufacturing process for plastic cutlery and others with hygiene.

Ingredients are as simple with absolutely no preservatives. The lack of water, moisture, or fat in product allows it to have a long shelf life without the need for extra preservatives. They include: sorghum flour, rice flour, and wheat flour. (kickstarter, n.d.)

TABLE-1 TRANSPARENCY OF EDIBLE CUTLERY

WHY YOU SHOULD NOT USE PLASTIC?	HOW EDIBLE CUTLERY IS BETTER
Plastic contains several chemical complexes that leach into food. Many of these are carcinogenic and neuro -toxic. The increasing trends in cancer incidences across the world is due to excessive exposure to plastic in form of packaging in food industry (eg: milk pouches) and plastic disposable cutlery before using it. Thus, would be actually licking this industrial contamination.	Edible cutlery is made of food materials and they come with nutritive contents.
The food law all over the world is silent on how hygienic the utensils should be. These fall under industrial production law.	Edible cutlery contains no chemicals, additives or even preservatives. They are 100% natural and baked products.
The character of plastic does not change even after several times use. Therefore, there is a high opportunity for the unscrupulous food vendors to pocket more profits by putting the cutlery to unhygienic reuse. This time, the user would be susceptible to licking bacteriological contamination. Please remember, there is no law that prohibits reuse of cutlery and the law is also silent on the hygiene standards for the utensils to serve food	Edible cutlery cannot be reused. These are baked at high temperatures; therefore, the likelihood of microbial spores to survive is very little. Even if these micro-spores land after production, they are not likely to germinate because, the products are dehydrated (which is why they have long shelf life, even without preservatives). Moisture is essential for life to germinate/generate
When and if thrown away, plastic cutlery adds to the mounting non-degradable material garbage	These disintegrate in less than a week, unless stray animals and insects do not eat them up sooner.

BENEFIT OF EDIBLE CUTERY

1.) Edible Cutlery Is Environmentally Friendly and Sustainable-
The production of plastics contributes to around 3.8% of the world's greenhouse gas emissions Throughout their lifecycle. These emissions contribute to climate change and global warming, which are already having a devastating effect on our planet.
2.) Edible Cutlery Is Safe To Eat- Nutritious & Healthy-
Edible cutlery is completely safe to eat. This makes them a much healthier alternative to plastic utensils, which usually contain harmful chemicals like BPA (bisphenol A). Some plastics can leach these chemicals into our food, which could have serious health implications.
3.) Edible Cutlery is Functional-
Edible cutlery comes in many different shapes and sizes, which makes them functional as well as sustainable. They come in regular silverware shaped like spoons, straws, forks and knives, and more.
4.) Edible Cutlery Is Strong And Durable-
Plastic utensils are brittle and often break into shards after only a few uses. If you ever find yourself eating with plastic cutlery you'll know that the utensil often breaks in half, and it's very difficult to eat your meal.
5.) Edible Cutlery can be Flavorless or Flavorful-
Edible cutlery is made from all-natural ingredients, some of which are flavored. For example, the edible spoons can complement both sweet and savory catering events.

Edible cutlery is a new concept in which the cutlery like bowl and spoons are eaten along with the meal. This idea has been used for long but has not got enough impetus in the developing world. In this world, where the sale of plastic cutlery is growing at a rate of 30 percent, is generating non-biodegradable waste and is contributing to overflowing landfills. Edible cutlery is a solution that provides the same convenience as disposable forks, spoons and chopsticks without any environmental problems. It’s tasty, it’s healthy, it’s convenient, and it promotes a cleaner tomorrow. (Tanwar, 2016)

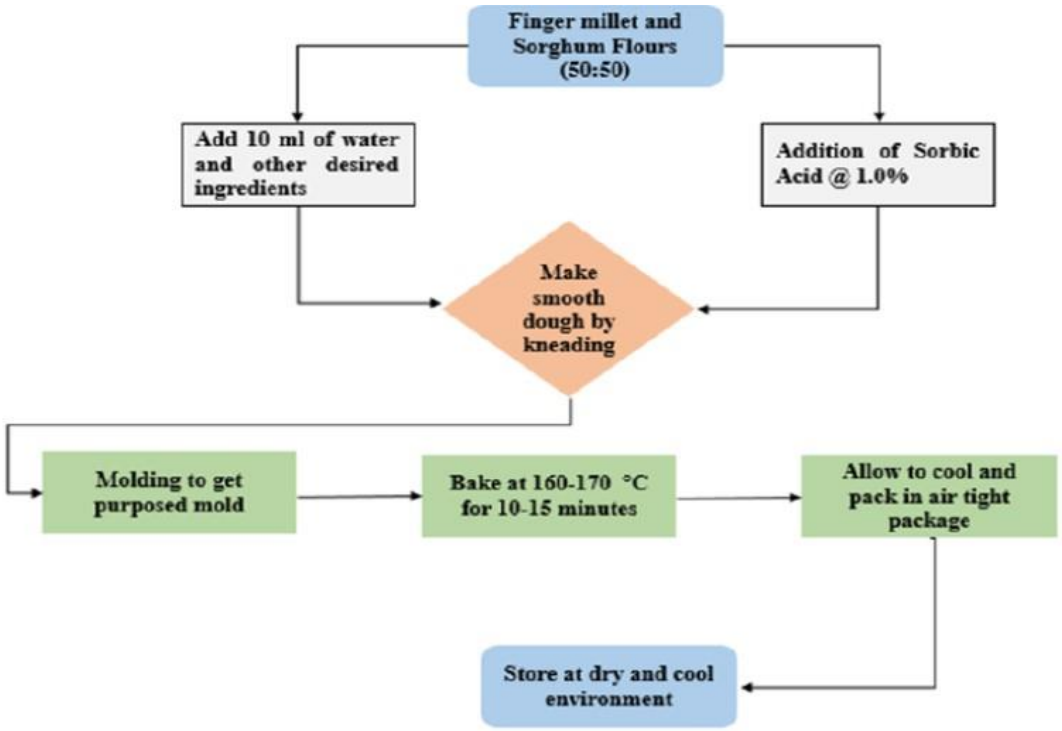


Fig 1. *Schematic presentation of Unit operation of edible cutlery*

TABLE-2 Varieties of cutlery

Cutlery name	Raw Materials	Nutrients	Techniques/ Process	References
Edible Plate	Spinach Extract Rice Flour Sorghum Flour Sorbitol	Moisture – 2.57% Ash – 1.60% Crude fat – 1.72% Crude protein – 4.81% Crude fibre – 0.6% Detergent fibre – 3.40% (neutral) Detergent fibre – 1.64% (acid) Starch – 4.25% Flavonoids – 2.72% Carotenoids – 0.64mg	Mixing, Kneading, Sheeting, Moulding, Baking, Cooling and Packing.	Sood and Deep-shikha, 2018
Edible Spoon	Wheat Flour Sorghum Flour Rice Flour	Proteins – 1.06g Fat – 0.12g Mineral – 0.13g Fiber – 0.19g Iron – 0.56mg Calcium – 2.43mg Carotene – 3.97mg Thiamine – 0.03mg Riboflavin – 0.01mg Niacin – 0.28mg Folic acid – 1.33mg	Mixing Kneading Moulding Baking Cooling and Packing	Rashid, 2019
Munch Bowls	Wheat Bran Wheat Flour Canola Seed Oil Salt Rooibos Tea	Energy – 380Kcal Protein – 3.5g Carbohydrates – 15.6g Total Sugar – 0.7g Saturated Fat – 0.1 Dietary Fibre – 4.5g Total Sodium – 71.1g	Preheating Mixing Sheeting Cutting Molding Baking Cooling and Packing	Poonia and Yadav, 2017

RESEARCH METHODOLOGY

Research methodology is the systematic, experimental analysis of the methods applied to a field of study or research work. It acts as the nerve center because the entire research work is bounded by it. In other word it is the way of searching or solving the research problem. The section represents an overview of the methods used in study. Areas covered here include Research Design, Sample (dish preparing)& Sampling Techniques, Population, Data Collection and Analysis

Research Design**:**

A experimental research was done to know the procedure that are followed in the edible cutlery concept and to know the concept of Use of edible cutlery in hotels and street food. Consequently, the research is designed to achieve the objectives set out by researcher.

Data Collection: The primary data required for the research was collected using the following techniques:

Personal interviews: The researcher conducted personal interview with respondents. The respondents were

provided with samples of edible cutlery before obtaining their responses.

Questionnaire: A questionnaire bearing straight forward and relevant questions was drafted and handed over to the

sample to obtain their responses.

Sample Technique: This study was conducted with responses of more than 20 respondents between the age

group of above 25 to 50 years.

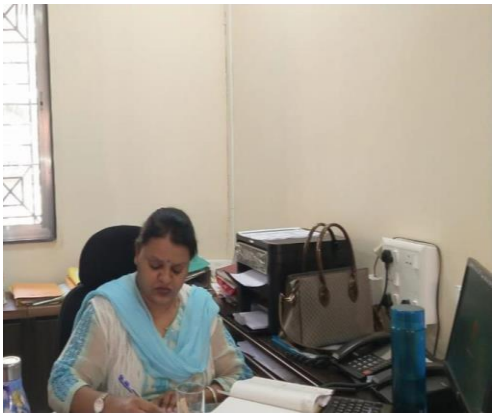
All the samples were selected randomly from the various areas of Nagpur city.

Apart from the above mentioned tools the relevant secondary data for the research was collected from

journals, books and internet.

4.1 ANALYSIS OF DATA

The collected data was tabulated, and organized segment-wise. The data was analysed and interpreted suitably by using ANOVA single factor test.



(Mr. Aarti meshram,(principal) Govt. college of hotel management, Nagpur)

Researcher presenting his cutlery to panelist

RESULTS AND DISCUSSION

These chapters will briefly summaries the results and on the basis of results further discussion will be carried out.

Table no.4.1 Appearance of the edible cutlery.

Summary of Data					
	Treatments				
	plain	Mint	garlic	Chocolate	Total
Count	8	8	8	8	32
Sum	32	28	34	29	123
Mean	4	3.5	4.25	3.625	3.844
Variance	0.5345	0.9258	0.7071	0.9161	0.8076
Result Details					
Source		***SS***	***df***	***MS***	
Between-treatments		2.843 8	3	0.9479	F = 1.52758
Within-treatments		17.375	28	0.6205	
Total		20.2188	31		

Table No.4.1 shows the result of one way ANOVA single factor test conducted to determine the appearance of edible cutlery. As per the result there was no statistically significant variance found in the appearance of the edible cutlery (F = 1.52758). So it is clearly shows that all the panellist liked the appearance of edible cutlery equally.

Table no. 4.2 Texture of the edible cutlery

Summary of Data					
	Treatments				
	Plain	Mint	garlic	chocolate	Total
Count	8	8	8	8	32
Sum	27	28	30	26	111
Mean	3.375	3.5	3.75	3.25	3.469
Variance	0.5175	0.5345	0.4629	0.7071	0.5671
Result Details					
Source	***SS***	***df***	***MS***		
Between-treatments	1.0938	3	0.3646	F = 1.15024	
Within-treatments	8.875	28	0.317		
Total	9.9688	31			

The data presented in table 4.2 shows the outcome of ANOVA single factor test used to determine the texture of edible cutlery by the panellist. As per the result there is no statistically significant difference found in the texture of edible cutlery (F = 1.15024). That means the texture of edible cutlery is equally preferred by the panellist.

Table no 4.3 Taste of the edible cutlery

Summary of Data

	Treatments				
	Plain	Mint	garlic	chocolate	Total
Count	8	8	8	8	32
Sum	26	24	29	32	111
Mean	3.25	3	3.625	4	3.469
Variance	0.7071	1.069	1.1877	0.5345	0.9499

Result Details

Source	***SS***	***df***	***MS***	
Between-treatments	4.5938	3	1.5313	$F = 1.83423$
Within-treatments	23.375	28	0.8348	
Total	27.9688	31		

Table 4.3 depicts the result of one-way ANOVA style factor test conducted to determine the taste of all edible cutlery. As per result there was no statistically significant different in all cutlery ($F = 1.83423$). It is evenly preferred by the panel of the expert.

Table no. 4.4 Durability of edible cutlery

Summary of Data					
	Treatments				
	Plain	Mint	garlic	chocolate	Total
Count	8	8	8	8	32
Sum	29	25	28	26	108
Mean	3.625	3.125	3.5	3.25	3.375
Variance	0.9161	0.6409	0.9258	0.7071	0.7931
Result Details					
Source		***SS***	***df***	***MS***	
Between-treatments		1.25	3	0.4167	$F = 0.63927$
Within-treatments		18.25	28	0.6518	
Total		19.5	31		

Table 4.4 shows the result of one-way ANOVA single factor test to know the durability of edible cutlery. As per the result there was no statically significant difference found in the durability of the all edible cutlery is liked equally.

Recipe of edible cutlery

Ingredients

Wheat flour – 3 cups Salt – 1 tsp

Hot water – 1.5 cups Recipe

1) Preheat the oven at 170℃.
2) Take a bowl, add wheat flour & salt into it.
3) Make a well, start adding hot water into bowl.
4) And kneed it properly to make a hard dough.
5) Roll the dough into a sheet having a width of 0.4 cm and cut it into the desire shape of spoon & fork.
6) Place it into the spoon & fork mold.
7) Then bake it for 12-15 min.

Note: for the different flavors (chocolate, garlic & ginger) mix the powder form of ingredient into dry ingredients.

Fig no2 – Plain Edible spoons

Fig no3- wheat base plan edible spoon/ fork/knife & stick

Summary and Conclusion

Base on the finding the research will be summaries the whole study will come to the conclusion.

In this chapter the findings from the score card that was collected from the judges on 12th February 2019 has been presented. All the judges like the concept of edible cutlery after the survey based on its characteristics. The researcher was informed to use the technical and comprehensive knowledge in food product development and demonstrate the ability to adapt to professional situations using his creativity, analysis, synthesis, evaluation and interaction. Four unique products were created by the researcher. Panel included 08 judges from Hotels and reputed Hotel Management and Catering Technology Colleges of Nagpur city. People who are experts in food production department were selected as panel members. The researcher developed the pertinent Score card in which he wanted the answer and used this to identify the most suitable that should be used. After the data was collected, the appropriate statistical analyses were done to make conclusions and decisions with respect to the product development. In this chapter the findings from the score card that was collected from the judges. For the present study a total number of 8 judges were included, out of which 5 were from Hotel Industry and 3 were from Hotel Management and Catering Technology College, Nagpur city. All the judges like the appearance, taste, texture & durability of the edible cutlery. It is health beneficial for human body and environmental friendly

Suggestion And Recommendation

In this chapter the researcher will be suggest or recommend certain things which will be base on conclusion.

1. Consider the ingredients for its shelf life & lab testing should be considered.
2. Some more flavouring agents should be add to get flavour in the cutlery.
3. Need to improve taste & finishing.
4. Durability of fork is more important knowing the function of the fork.
5. Nice effort but should have used some other flour to make the product.
6. Improve the finishing of product.
7. While having soup with this edible cutlery, it gets soggy after 10-12 min.
8. If we are trying to give the coating by gelatine or agar-agar, it sticks to our tounge & melts while using with hot beverages

REFERENCE

1)bakeys wikipedia. (2010). Retrieved from www.bakeys.com: https://en.wikipedia.org/wiki/Bakeys

2) D'Alessandro, N. (2014, april 07). *eco watch*. Retrieved from www.ecowatch.com: https://www.ecowatch.com/22-facts-about-plastic-pollution-and-10-things-we-can-do- about-it-1881885971.html

3) Flynn, V. (2016, april 13). *theguardian*. Retrieved from www.theguardian.com: https://www.theguardian.com/sustainable-business/2016/apr/13/edible-cutlery-company- eat-plastic-pollution-oceans

4) Jones, T. (2013, 03 10). *gizmodo*. Retrieved from https://gizmodo.com: https://gizmodo.com/the-history-of-knives-forks-and-spoons-1440558371

5) kickstarter. (n.d.). Retrieved from www.kickstarter.com: https://www.kickstarter.com/projects/1240116767/edible-cutlery-the-future-of-eco- friendly-utensils

6)LADHA, N. (2017, july 24). *rancelab*. Retrieved from www.rancelab.com: https://www.rancelab.com/blog/different-types-cutlery-restaurant/

7) munir, s. (n.d.). *edible cutlery the future of eco friendly utensils*. Retrieved from www.kickstar.com: https://www.kickstarter.com/projects/1240116767/edible-cutlery-the-future-of-eco- friendly-utensils

8) plasticsmakeitpossible. (2011, june 11). Retrieved from www.plasticsmakeitpossible.com: https://www.plasticsmakeitpossible.com/about-plastics/types-of-plastics/what-are-plastics/

9) restrofusion. (2017, july 24). Retrieved from www.ranelab.com: https://www.rancelab.com/blog/different-types-cutlery-restaurant/

10)Tanwar, B. (2016, Feb 21). *Research gate* . Retrieved from prepartion and nutritional Quality Evalution of Edible Spoons .

ANNEXURE-1

Sample of scorecard

Scorecard

Name of the judge ..... Contact No..... Occupation ..... Age ..... E mail ..... Address .....

Spoon & Fork	Appearance	Texture	Taste	Durability	Total
Plain					
Mint					
Garlic					
Chocolate					

Scorecard Used for Sample Test

Signature

Score out of 5

5	Like Very Much
4	Like Moderately
3	Neither like or dislike
2	Dislike Moderately
1	Dislike very much

Any Suggestion

_____

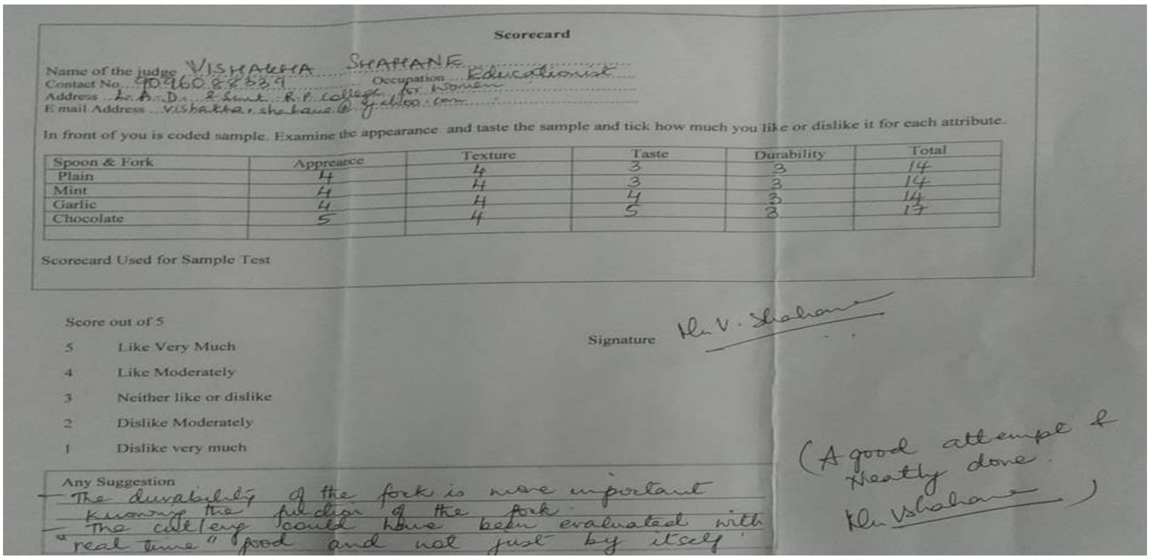
_____

_____

_____

International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 03 | March - 2024 SJIF Rating: 8.176 ISSN: 2582-3930

ANNEXURE-2



Scorecard

Name of the judge VISHAKHA SHAHANE
Contact No. 9096088839 Occupation Educationist
Address L.A.D. & Smt. R.P. college for women
E mail Address vishakha.shahane@yahoo.com

In front of you is coded sample. Examine the appearance and taste the sample and tick how much you like or dislike it for each attribute.

Spoon & Fork	Appreance	Texture	Taste	Durability	Total
Plain	4	4	3	3	14
Mint	4	4	3	3	14
Garlic	4	4	4	3	14
Chocolate	5	4	5	3	17

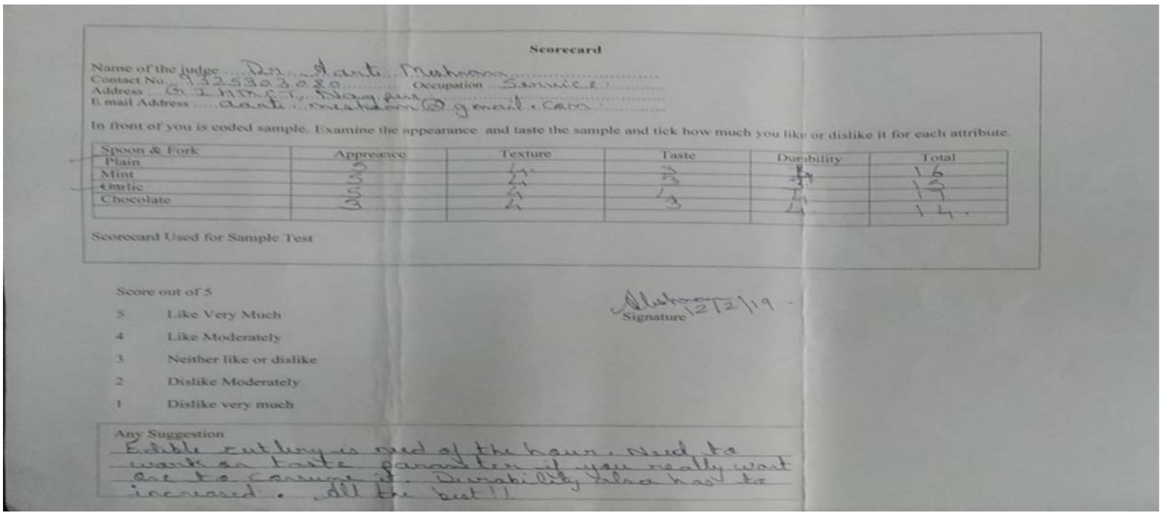
Scorecard Used for Sample Test

Score out of 5
5 Like Very Much
4 Like Moderately
3 Neither like or dislike
2 Dislike Moderately
1 Dislike very much

Signature

Any Suggestion
- The durability of the fork is more important knowing the function of the fork
- The cutlery could have been evaluated with "real time" food and not just by itself

(A good attempt & neatly done.)



Scorecard

Name of the judge Dr. Aarti Mahanan
Contact No. 9325303080 Occupation Service
Address G.I.H.M.C.T., Nagpur
E mail Address aarti.mahanan@gmail.com

In front of you is coded sample. Examine the appearance and taste the sample and tick how much you like or dislike it for each attribute.

Spoon & Fork	Appreance	Texture	Taste	Durability	Total
Plain	3	4	3	4	16
Mint	3	4	3	3	13
Garlic	5	4	4	4	13
Chocolate	3	4	3	4	14

Scorecard Used for Sample Test

Score out of 5
5 Like Very Much
4 Like Moderately
3 Neither like or dislike
2 Dislike Moderately
1 Dislike very much

Signature 12/2/19

Any Suggestion
Edible cutlery is need of the hour. Need to work on taste parameter if you really want one to consume it. Durability also has to be increased. All the best!!