



Edible Cutlery: A Sustainable Alternative to Plastic Cutlery for a Better Future

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ABSTRACT: *Edible cutlery is an excellent concept to reduce the use of plastic cutlery and to save human health from the harmful effects of plastic utensils. Surveys revealed that only a negligible portion of the total plastic waste is recycled. The rest is added to the environment and contribute to pollution. Each year tonnes of plastic cutleries are dumped in the oceans and other water bodies which is affecting the life in water. Humans eat food in plastic utensils and pollute environment by burning too. The unsafe high levels of the plastic waste are not good for both environment and living organisms, either humans or animals. To cut down the usage of plastic products to the safe levels, some safe alternatives are needed. Edible cutlery can serve as a sustainable alternative to the plastic cutlery because it's biodegradable and edible. Edible cutlery is made of safe-to-eat ingredients like wheat, rice and sorghum. Edible cutlery may be vegan-friendly with natural spices and flavors. It requires no additives or preservatives. Environmental pollution in Pakistan can be controlled significantly by promoting the use of edible cutlery like the other countries. Edible cutlery is the best solution to spread awareness regarding environmental issues due to plastic use. This review entailed the benefits of edible cutlery usage for the betterment of human health.*

Keyword: Edible, Cutlery, Pollution control, Plastic replacement, Waste management

INTRODUCTION

At present, the major issue that the world is facing is disposal of solid waste. With the rapid increase in

urbanization and population all around the world, many countries are undergoing waste management crises (Abdulrasoul and Bakari, 2016). The

progress of industries is highly affected by the issue of waste management. Most of the wastes are disposed in open dumps and pits at many places. Due to the deposited wastes, many health issues arise for different organisms. Moreover, the quality of land is also affected over time (Al-Khatib et al., 2007).

The developed countries of the world have been successful in designing regulated ways for the disposal of solid wastes. But the undeveloped countries are still relying on the unsuitable ways including dumping in open landfills (Berkun et al., 2005). To get rid of this rapidly increasing problem, many scientists worldwide are working on an environment friendly alternative, known as edible cutlery. Edible cutlery is becoming popular all around the world. The factors behind its rapid popularity are increase of environmental pollution and a decline in people's health by consuming plastic. Thus, many researchers are in favour of edible cutlery that is biodegradable and can be eaten (Chester, 1996).

According to stats, at least 85% of the market sectors utilize plastic in different forms (Law, 2017). Although, plastic is considered an important part of lives today, it's high time to give up their use and find ways to contribute towards a clean, sustainable and green

environment (Patil and Sinhal, 2018). The excessive use of plastic cutlery and disposable food boxes leads to the contamination of the ecosystem when they are disposed as garbage (Sazeli et al., 2021).

To combat the plastic waste crises worldwide and in Pakistan, this review aims to provide a detailed information on edible cutlery, including its history, different types, benefits and a lot more.

A Brief History of Edible Cutlery

Edible cutlery is not a recent discovery. It's might seem a new thing for many people, but it's being used since 1400s. In 1427, a bread bowl was made to get the praises of British Duke. The Duke was so glad and impressed with the innovation that he awarded the inventor, who was an Irish nobleman, money to start his bread-bowl shop at the place that is known as Dublin (Natarajan et al., 2019).

In 1980s, Sourdough bowl was invented with the perspective of marketing the calm chowder of San Fransisco. It became extremely popular in the Bay area and USA restaurants use it as a way to get more money for selling regular soup. The concept of edible cutlery was refreshed in recent times in 2010 by Bakeys (Reddy, 2016).

Since then, different countries are seeing edible cutlery as a healthy future

prospect to get rid of the waste produced due to the plastic and other products.

Types of Edible Cutlery

There are different types of edible cutlery that has been introduced and used till yet to replace conventional plastic cutleries (Kabir et al., 2022). These include:

- Edible cookie cups
- Edible cups
- Chocolate kettle
- Wheat bowl
- Edible spoons
- Bio bottle

Environment Issues Due to Use of Plastic Products

Plastic is more than a century old invention and served as an easy solution for to make way for an industry, that was established in 1950, to make a revenue of about 9.2 billion tonnes till present (Parker, 2018). It has now become an essential part of everyone's routine life and is present everywhere. It's a well-established industry with a market value of 611.9 US million dollars worldwide in 2017. Plastics are a part of the clothes, houses, toys, vehicles, computers, televisions, shopping bags and cutleries (The Business Research Company, 2018).

The Great Britain's Royal Statistical Society made an astonishing

announcement to the world in December 2018. According to it, only 9% of the plastic produced till date has been recycled. Shockingly, 6.3 billion tonnes of plastic never returned to the recycling unit and was disposed or ended up being a part of the landfills and huge oceans. This high number of the unrecycled plastic has confused scientists worldwide (Royal Statistical Society, 2018). According to a recent study conducted by National Geographic, about 18 billion pounds of the plastic waste enters the ocean each year (Parker, 2018).

Plastics are inedible and harmful. When in oceans, marine life consumes them and this way they make a way back to the human population worldwide because they eat marine life. Plastics that enter the human bodies is first converted to micro plastic. Some scientists also reveal the presence of harmful compounds in plastics like bisphenol A (BPA) and polyvinyl chloride (PVC) which can cause cancer (DeMatteo et al., 2013).

In addition, plastic products are not highly biodegradable compounds. They need hundreds or thousands of years to degrade completely, making the availability of natural resources hard for the upcoming generations. So, reducing the usage of plastic for daily life

activities should be a top concern, especially the plastic items and utensils that are directly used for the food consumption (Rashid, 2019).

Ingredients of Edible Cutlery

The ingredients used for making edible cutlery considered environment friendly alternatives to the currently used plastic utensils. The ingredients of edible cutlery are edible; thus, it gets the name edible cutlery (Rashid, 2019; Devanand et al., 2021).

The main ingredients of edible cutlery are:

- Sorghum (millet or jowar)

- Rice
- Wheat

In one study different edible commodities were used to make edible spoons for human consumption i.e. wheat, poroso millet, xanthan, grapes, water and palm oil. The spoons made of these ingredients showed excellent strength and antioxidant activity (Dordevic et al., 2021). Different types of edible cutlery made of different ingredients are given in Figure 1.



Fig. 1. Different types of edible cutleries
(<https://www.tastemade.co.uk/videos/edible-cookie-utensils/>)

Manufacturing Process of Edible Cutlery

The process of making edible cutlery includes the following steps:

Step 1

All the ingredients (rice, wheat and sorghum) are mixed together to create a

dough. Then, the dough placed in the sheets for pressing and flattening.

Step 2

Steel molds are used to press the dough properly. Oven is preheated to 360 degrees Celsius, then mold is placed in it for 10 minutes to bake.

Step 3

The mold is allowed to cool for 10 minutes. After that, the mold is opened the cutlery item is removed from the mold.

When all these steps are completed, the result is a completely dry edible cutlery item. All the moisture is removed during the baking step (Rashid, 2019).

Benefits of Edible Cutlery

Edible cutlery is known as a sustainable future. Some benefits of edible cutlery are below:

- Metal and Plastic Alternative
- Easy to use
- Novel and Durable
- Eco-friendly and Bio-degradable

Use of Edible Cutlery Worldwide

Edible cutlery is being a popular alternative to plastic all over the world. To prevent excessive dumping of the plastic packaging in the ocean, an Indonesian company, 'Evoware' is

studying edible seaweed-based packaging that will be used for burgers, seasoning packets used in noodle packs and coffee sashes (Patel, 2019).

Malaysia is one of the biggest producers of plastic waste particularly in the form of disposable plastic wares. The recent restrictions on the use of plastics items have triggered the need to shift to plastic alternatives especially for the food market.

An experiment was done by Kabir and Hamidon using a mixture of rice, wheat flour and sorghum to produce quick cutleries after molding the mixture. They said that these cutleries could be great to use for soups and frozen desserts (Kabir and Hamidon, 2021).

Seeing this, studies have begun utilizing organic materials including barley, wheat bran, sorghum, jowar, corn, etc. The studies revealed that the dough made using biscuit has a better shelf-life as it can be stored for extended periods of time in comparison to cereal-based dough mixtures. In contrast, dough mixtures or formulations made using fruits and vegetables are usually the most delicate (Sazeli et al., 2021).

In Taiwan, the idea of 'Edible Cutlery' was introduced by 'Sugu Company' in 1886 as a replacement of the plastic disposable items. In Japan,

two companies ‘Koratt Bakery and Café’ and ‘Orto Café’ made bowls, chopsticks and plates using hardtack – a kind of biscuit dough, which is known as a creative product of the ‘Rice-Design’ company. A company in Yokohama, called ‘Honest’, makes seaweed cups that are famous among the local population. In Poland, a company ‘Bioterm’ is involved in manufacturing wheat bran cutlery and tableware. The company has centers located in UK, Norway, Italy, Denmark, Netherlands, Hungary, Sweden, France and USA (Natarajan et al., 2019).

To prevent the blockage of drains due to plastic cups, a started based in London made ‘Ooho’, which is an edible and waterproof capsule made from the seaweed for being used as edible lime-sized drinking pods (Patel, 2019).

The annual consumption of plastic cutleries in the United States of America is approximately 40 billion (Rashid, 2019). A New York based company, ‘Loliware’, is making flavored straws using seaweed and agar as raw materials. The manufacturing of these straws is quick. They are edible and degradable when these become a part of environment. Marriott Hotels and Pernod Richard, an alcoholic-beverage producer have used these edible straws,

and renewed the production requirement to 30 million units till the end of 2020. Peggy Tomasula, who works in the US Department of Agriculture, has invented an edible milk protein (casein) film. This film is being used as an alternative to the conventional plastic wraps for cheese. In Mexico, ‘E6PR’ works on manufacturing fibrous wheat and barley vessels which are used for keeping the cans of alcoholic beverages. These vessels are recyclable and climate-friendly alternative to reduce plastic contamination in the oceans which creates deadly effects for the marine life (Patel, 2019; Srinath et al., 2020).

In South Africa, a local company ‘Munch Bowls Private Limited’ manufactures a vegan and edible wheat bowl. The primary ingredients of this wheat bowl are bran, wheat flour, oil and sugar. A French patisserie ‘Poilane’ produces edible tools, which are known as cracker cookies (Natarajan et al., 2019).

These are some of the initiatives that are being carried out around the world to reduce the use of plastic cutlery and tools. In fast-developing countries such as India, plastic is used frequently and is often disposed without care. India is responsible for throwing away of approximately 120 million items of

plastic cutlery every year (Rashid, 2019).

Plastic cutleries are still being used frequently and edible cutlery manufacturers are still trying to get sustainability. The concept of 'Edible Cutlery' was initiated and promoted again in recent times by an organization known by the name 'Bakey's', which first advertised its products in 2010. Since that time, the organization is completing the orders of ~50,000 units/day from all across the world, with 25 million items manufactured as of 2016 (Reddy, 2016).

The research to make more nutritious and recyclable 'Edible Cutlery' is still at the initial stages. But there are many noticeable and valuable researches that have become popular as a solution to prevent the environment from the issues that arise due to plastic usage.

Edible Cutlery in Pakistan

In 2019, plastic cutlery was banned in the international flights in Pakistan. The step was initiated to stop the excessive use of plastic products due to their hazardous effects for both the environment and human population (Staff, 2019).

In Pakistan, banana and almond leaves are used as raw materials to manufacture bowls and plates. These bowls and

plates are helpful for improving digestive and heart health. They are also used for weight loss.

These little initiatives can easily convert to big edible cutlery markets in the future if proper awareness about the harmful effects of the plastic and the benefits of edible cutlery is provided. It's crucial to replace plastic cutlery with biodegradable food contains, edible cutlery, to conserve the natural resources for the future generations. With more information and research on edible cutlery in Pakistan, the time isn't far when Pakistan will hold a position of reputable edible cutlery manufacturer on the globe.

CONCLUSION

From the above literature it is concluded that the use of plastic cutlery is very harmful for human health and causing lots of diseases. The rapid industrialization and urbanization has also added huge quantities of harmful plastic wastes in environment. To tackle with issues due to plastic cutlery, edible cutlery made of useful food source is found beneficial. Edible cutlery is the best solution for sustainable development and to get rid of harmful plastic use. Ecopreneurs are searching for new edible materials for replacement of plastic. So, it is direly needed in all

over the world to replace plastic utensils with the novel edible cutlery.

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