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Innovative Edible and Natural Packaging in the Food Industry

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Introduction

Packaging is an inevitable and most relevant part of food industry. The packaging has multiple functions such as increasing shelf life of the produce, facilitates storage, maintaining quality of the produce by protecting the food from all hazards etc. It has also been used by the companies for efficient marketing as consumers also get attracted towards packages and that way adds value to the product. Presently, petroleum based plastics are the commonly used packaging materials. But, plastic raised numerous concerns all around the world and became a global threat as it degraded the earth and contaminated both land and water. Till recent past, the plastic in use were not biodegradable. Around 78 million metric tons of plastic are used annually and only 14 percent is recycled and 9 million tons are reached into soil as waste, which eventually enters into food chain. This makes plastic as the most dangerous thing in the world. Realizing this global threat of plastic, many novel and innovative packaging techniques are introduced including active packaging, intelligent packs, Modified Atmospheric Packaging (MAP), Controlled Atmospheric Packaging (CAP), edible packaging etc.

Considering the background, this article concentrates on edible and natural packaging. Edible packaging is a packaging technique in which the packaging material can also be consumed along with the food. Many companies across the globe contributed to this packaging revolution. One of the prominent brands KFC, as a part of this innovation, introduced a wrapper made out of rice for double down sandwich. Through a campaign, they proved that it is 200 percent edible wrapper, makes possible to eat both sides, inside and outside. During the year 2016, when the Government banned plastic, KFC introduced an

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edible bowl, which is made with Mexican corn tortillas, which is named as "Rice bowlZ". For serving instant coffee, they started using Scoffee cups. These cups are made up of biscuits and white chocolates are lined within it to persist the heat. The cups can be consumed after having coffee.

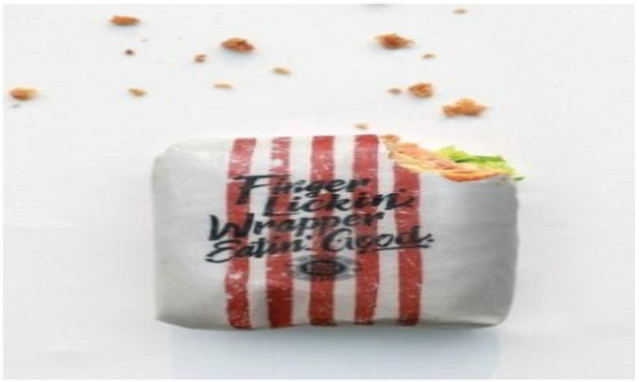

Fig 1. Rice bowlz

Wikicell:

It is invented by Harvard professor Dr. David Edwards and his team at Wikifoods. Wikicell is an edible film like membrane package, which is used to protect liquid foam and solid food stuffs. Wikicell provides two layers, the inner layer and the outer layer. The inner layer, which is very soft like a skin contains calcium, chitosan and the food particles like fruits, nuts and chocolate etc. These particles are mixed together to form a gel like membrane containing water that holds the food inside. The outer layer is of protective nature, which is of two kinds, biodegradable and edible shell. The biodegradable shell is made out of baggase or tapioca and edible shell is made out of isomalt. The Wikicell ball, decides upon the type of outer layer to be used.

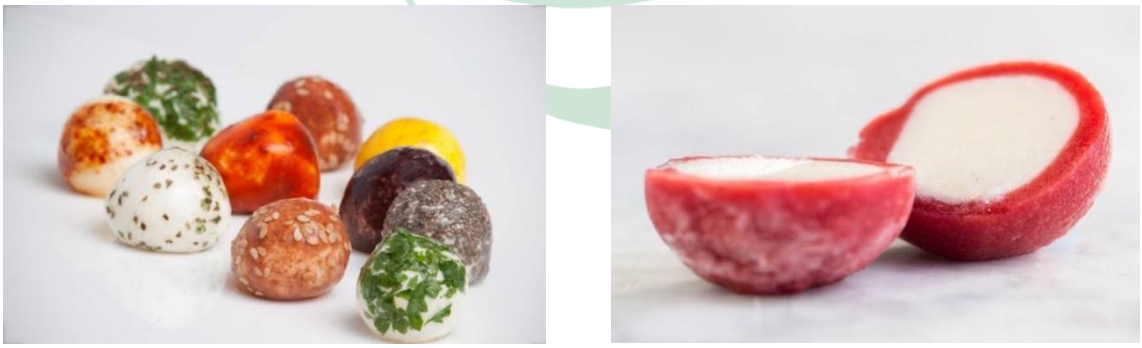

Fig 2. Wikicell ball

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Wikicell liquids are also available in the shape of a pear. In order to open up the package of drink, the consumer has to eat the tip of it and drink the liquid/ juice filled inside. Further improvements are also made in Wikicell by adding nuts and fruits, which in turn provides better taste and upgrades quality of packaging.

Seaweed packaging

It is another major breakthrough in the domain of packaging by David Christian of the company "Evoware". This packaging is biodegradable as well as edible. Initially, they attempted to produce edible cups with flavours of peppermint and lychee and later moved toward food wraps and edible sachet. They have used seaweed packaging largely for packaging instant coffee powder and noodles seasonings sachet. These can be directly added into the water without opening sachet as they the packages are also edible. By using seaweed as packaging material, its cultivation has also increased in the area and benefitted seaweed farmers. The greatest advantage of seaweed is, it absorbs carbon dioxide and releases oxygen, thus purifies air. As seaweed is rich in fiber and nutrients, health benefits comes way of consuming the same.

Fig 3. Evoware coffee powder and seasoning sachet

Ohoo water ball

London based Skipping Rock Lab has come up with an exciting and innovative product called as "Ohoo". The interesting part of this product is, instead of drinking, consumers can experience eating water! Ohoo is a water ball which contains a double membrane shell. Inner membrane is made out of the brown seaweed and calcium chloride, which makes the water safe at inside. The inner membrane is edible whereas outer membrane is only for hygienic purpose. Though it is biodegradable, it is not edible in nature. A

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technique called "Spherification" is used to convert water into the form of sphere. The major raw material is extracted from plants, which is cheaper compared to plastic as well as ecofriendly. The sources say there are billions of plastic bottles we human beings throw onto the earth and gradually affect human health. Thus, the innovation on drinking water helps to reduce the pollution caused by plastic bottles drastically. This also reduces the leaching of chemicals from plastic bottles to the food particles.

Fig 4. Ohoo water ball

Loliware edible straw and cups

Loliware is considered as world's first company started producing edible cups in the year 2015. They have been producing 100 percent natural, edible and biodegradable cups made out of seaweed. When they introduced edible cups for the first time in the market, consumers didn't accept it because of hardness of the texture. Considering the feedback from the consumers, the company modified the product and reintroduced into the market after 2 years in 2017. The product became a hit in the market. Presently, the edible cups are making out of many natural fruit extract. Upon the success of Loliware cups, they have also introduced Loliware straws, which became world's first edible, hyper compostable straws.

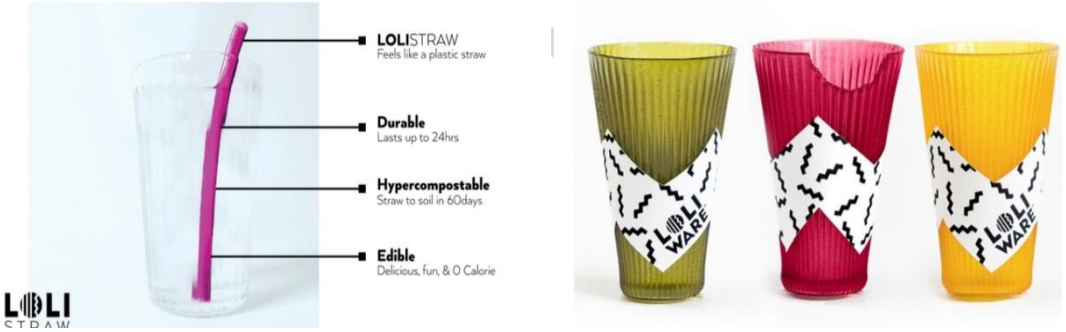

Fig 5. Loliware edible straw and cups

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The company aims to replace the 500 million plastic straws used a year in the United States. The basic raw material used for producing straws is also seaweed. The straws are also available in different flavours such as mango, vanilla, rose etc.

Alpro vegan

"Alpro" is a Europe based brand famous for its dairy products. They have introduced a Vegan Fired Chicken with potato fries and garlic dip. Mushroom and Alpro's unsweetened almond milk is the main component used for the making vegan fried chicken. Alrpo is mainly aiming to improve the consumer acceptance of vegan foods in the food industry. Along with the fried items, it's possible to eat the buckets too! This is called as plant based buckets or PBB, which is produced by using combination of the plant based seeds including fennel, nigella, sesame, and pumpkin seeds, making it more crispy and crunchy.

Fig 6. Alpro vegan fried chicken and edible bucket

Apart from edible packaging, there are several success stories of natural and eco-friendly packaging, mushroom packaging is among them. Magical Mushroom Company based at England, uses mushroom as the packaging material.

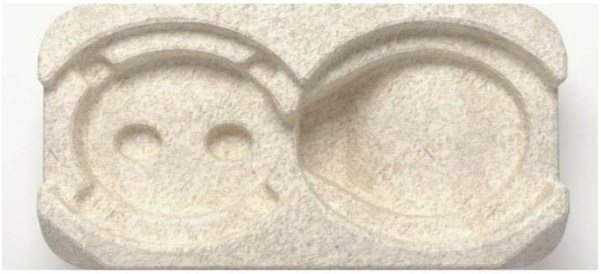

Fig 7. Packaging material made up of mushroom

The agricultural waste, which cannot be used for consumption by humans and animals, is mixed with the mycelium (mushroom roots) for preparing packaging material.

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This can be used as a raw material for packing alternative to the polystyrene packaging. This is highly recommended type of packaging because as it is sustainable, eco-friendly, natural and compostable in nature.

Likewise food wastes can also be utilized as serving material to replace plastics bowls, cups etc. After taking out the useful/ edible part of fruits such as pineapple, orange etc its thick outer layer can be used for serving fresh juices, ice creams and salads. This provides a nature friendly feel to the customers and comes up as a novel trend in the food sector in the country.

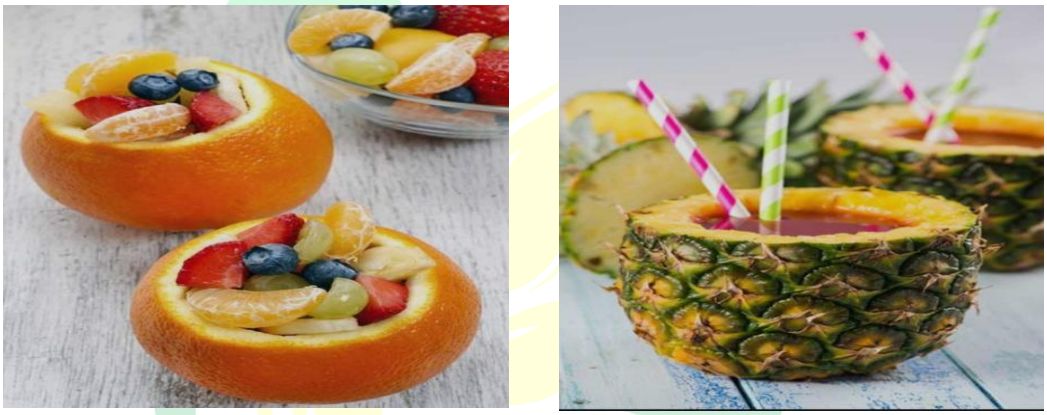

Fig 8. Natural serving cups