

# A Review Paper on Biodegradable Tableware Using Sugarcane Bagasse

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**Abstract---** *Biodegradable tableware offers alternatives to plastic tableware. We are on mission to phase out the uses of plastic disposal by offering alternative made from natural materials we wish to replace the plastic disposable with compostable options. When talking about sustainable natural tableware there are few terms that reoccur renewable resources, biodegradable and composite.*

**Keywords---** *Biodegradable, Bagasse, Starch, Composite, Food Grade, Calorific Value.*

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## I. INTRODUCTION

Bagasse is remolded to a kind of process that is used to make plates, cups etc. degradable, Light weight and other physical attributes of disposable cups will continue to make them the foremost choice of packaging food products. Disposable cups are designed to hold both, hot and cold substances, the further propels their applicability in Global food of beverage industry. However a majority of disposable cups are made from plastic materials to reduce chance of food contamination.

Today the market is growing a conscience with plastic bans in various cities and an increasing in awareness of the dangers of plastic people are more accepting of biodegradable materials.

## II. NEED OF SUGARCANE BAGASSE

Sugarcane is a very fast Renewable resources for which no tress have to cut down. As a by product of the sugar production, bagasse does not require additional cultivation areas and has no impact on the area of forest on the country. It is actually a sustainable and eco friendly alternative to conventional tableware product because the bagasse tableware production wastes much less energy than the tableware production.

## III. CHARACTERISTICS OF BAGASSE PRODUCTS

Very stable, sturdy and not very flexible

- Good thermal property
- Suitable for temperature from -25°C to 220°C
- Water repellent and grease proof and also suitable for hot and very oily of greasy dishes.
- Completely bio degradable of compostable

## IV. PRODUCTION

Sugarcane which is grown on approximately 24 million hectares in 102 countries in tropical and subtropical zones of both Northern and southern hemisphere countries.

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The rest of the world's sugar supply is produced from sugar beet, which is grown in the temperature zones of the northern hemisphere.

Brazil is the world's Largest sugarcane producer, having produced around 670 million tones in 2009 (FAOSTAT) other major sugarcane producers are India, China, Thailand, Maxico, Pakistan, Colombia, Australia, Aregentina, United states and other countries as listed in Table 1 Brazil. India, China account for 50% of the world's sugar productions and 59% of the worlds sugar exports (USDA 2009)

Table 1: Main Sugarcane producing Countreis

<i>Country</i>	<i>Production in 2009 (Million Metric Tones MMT)</i>
Brazil	671.4
India	285.0
China	116.2
Thailand	66.8
Mexico	49.5
Pakistan	50.0
Colombia	38.5 a
Australia	31.4
Argentina	29.9 a
United states	27.5
Philippines	22.9
Indonesia	26.5 a
South Africa	20.5 a
Guatemala	18.0
Egypt	17.0 a
Vietna,	15.2
Cuba	14.9
Peru	10.1
World	1661.3 b

Source: FAOSTA

T (2009)

A FAO estimate

B Mayinclude official semi official or estimated data

## Processing

The processing of sugarcane yields about 70% water, 15% bagasse, 10% sugar, 3% Molasses and If produced 2% filter cake (Fuller 2004)

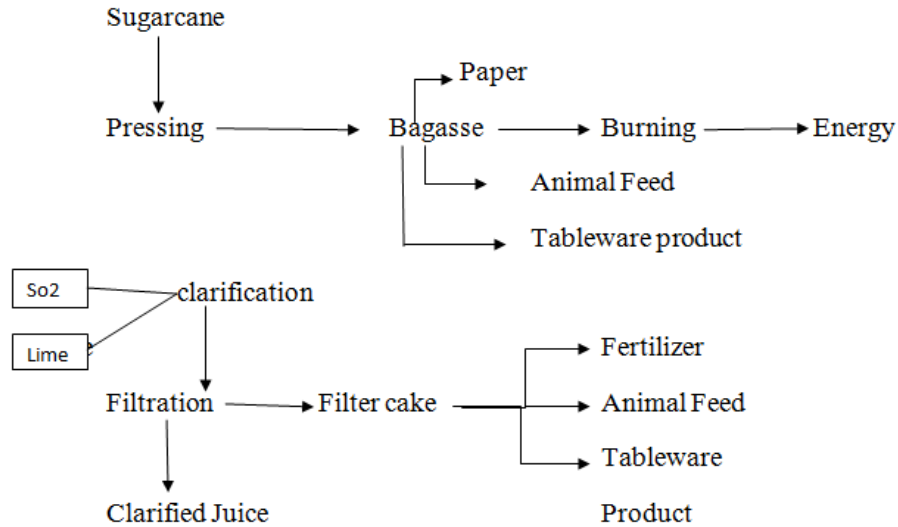


Fig. 1: Sugarcane Industrial Processing

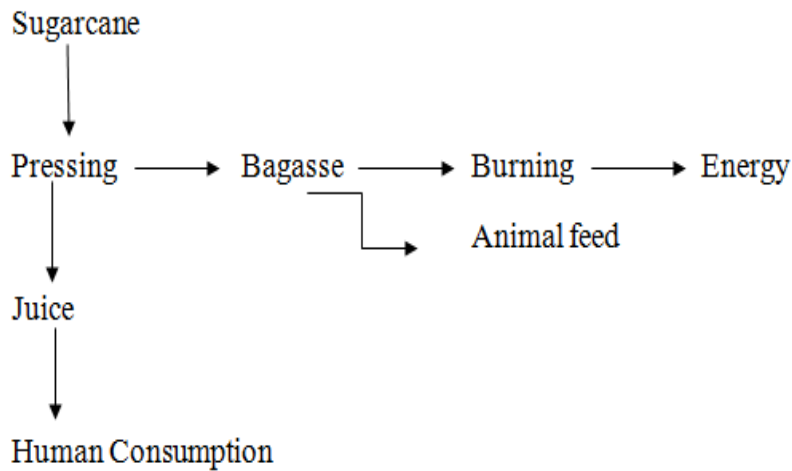


Fig.2: Sugarcane Artisanal processing

## V. REVIEW

Review is the most Important methodology as it provides the guideline and evident supports for research work by extracting information on the relevant topic and work done.

## VI. PROPERTIES NEEM GUM

The Gum from *Azadirachata indica* (Neem Gum). It is a tasteless, soluble natural exudate of bright yellow to amber – coloured material. It belongs to the family of galactan gum and was a complex of heteropolysaccharide and protein.

Neem is the antibacterial Agent. The Neem is used for medicinal purpose also.

a) Resin: An exudate can be tapped from the trunk by wounding the bark. This high protein material is not a substitute for polysaccharide gum such as gum Arabic. It may, however, have a potential as a food additive and it is widely used in South Asia as “neem glue”

## VII. PROPERTIES OF SUGARCANE BAGASSE

Bagasse is a vegetable fibre mainly composed of cellulose which has relatively high modulus. The dimension of the fibre affects its reinforcing properties.

The average composition of sugarcane is 65-75% water, 11-18% Sugars, 8-14% fibres and 12-23% soluble solids. The cane basically consists of Juice and fibre. The sugarcane bagasse has the following composition (by weight): cellulose, 41.8%, hemicelluloses 28.0% lignin

## VIII. PROPERTIES OF FENUGREEK SEEDS

Fenugreek (*Trigonella foenum graecum*) is commonly known as methi is an annual herb belonging to family Fabaceae.

The methi has 20.0% of Gum so it is very useful for the adhesive purpose.

Composition of fenugreek seed in percentage Classification of fenugreek.

Domain	Eukarya
Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Fabales
Family	Fabaceae
Sub Family	Trifoliae
Genus	Trigonella
Sub genus	Foenumgraecom
Species	Trigonella foenum - graecum

## IX. PROPERTIES OF MAIDA FLOUR

Maida is white flour from Indian subcontinent. Maida is made from the endosperm and it is developed from starchy white part of the grain. A common misconception is that maida contains aflatoxin. There is no evidence that trace amounts of aflatoxin formed comprise a health risk. The Maida Flour is also used as the adhesive agent.

## **X. PROPERTIES OF CELLOPHANE WRAP**

Cellophane is transparent, odour resistant tough, grease proof and impermeable to gases. It can be made moisture – proof and heat sealing. As society is moving towards being more environmentally friendly true cellophane (cellulose) has had a resurgence. This is largely due to it being 100% biodegradable and regarded as a more Eco friendly packaging film than Bopp.

BOPP → Biaxially – Oriented polypropylene

## **XI. EXPERIMENT METHODOLOGY**

The sugarcane bagasse is well powdered and take the four parts of the powdered sugarcane bagasse and one part of the 1.5 part of the maida Flour is added with the sugarcane bagasse powder. Maida is one of the best adhesive substance in the food product. Take maida Flour and mix with the water and heat in and we have taken a part of preparation of give Neem gum. The calorific value of the neem gum is very low. That's mean the gum very suitable to used as the food additives. The Neem is the Antibacterial agent also. The Methy seed is also contains 20.0% of gum particles so it can be used to strengthen the tableware product. The given substance are get well mixed and after mixing the powdered particle take the cellophane wrap Role and keep the mixture on the wrap and it have been get shape as the sheet at 2 mm thickness and it have been get Dried with the help of sunlight. The cellophane wrap is the biodegradable polymer which is used for the waterproof and for the smooth surface finish. It was also the food grade product. Finally the sheet have been get made and whatever the shapes needed we get made through the Dye pressing machine.

## **XII. THERMAL PROPERTIES**

### ***Calorific Value***

Calorific value may be defined as the amount of heat liberated in calories by the complete combustion of unit weight materials with oxygen and the condensation of produce to desired temperature.

The calorific value of a bagasse and other product may be defined as the amount of heat generated by burning one kilogram completely.

#### ***a) Calorimeter***

It is a device used to calculate the calorific value of solid Liquid of Gaseous fuels.

#### ***b) Bomb calorimeter***

A bomb calorimeter is a type of constant – volume calorimeter used in measurement of heat of combustion of particular reaction.

Used to measure the enthalpy changes of combustion reactions at a constant volume.

The calorific value is also used to calculate the food grade

### ***Food Grade***

The Food safety and standards Authority of India (FSSAI) is an autonomous body established under the ministry of health & family welfare, Government of India. The FSSAI has been established under the Food Safety and standard Act 2006 which is a consolidating statute relate to food safety regulation in India. FSSAI is responsible for protecting and promoting public health through regulation and supervision of food safety.

### ***Advantages***

- Tolerates heat up to 200<sup>0</sup>F oven safe
- Made from a renewable resource : sugarcane
- Paper like consistency
- Microwavable
- Freezer safe
- Allergen free
- Biologically degrades in soil 180 days and imposts' in 45-60 days in a commercial composting facility.
- Fully compostable and biodegradable

### ***Uses***

The uses of biodegradable table wares are many they are

- Cheap
- Easy to use
- Easy to disposal
- Hygienic
- Easily available

## **XIII. CONCLUSION**

The biodegradable tableware using sugarcane begasse provides an insight into Biodegradable disposable cups and plates market in India with the focus on uses and applications, Manufacturing process, process flow chart of the biodegradable tableware.

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