

A Study on Industrial Usage of Sugarcane in Different States of India

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Abstract

Sugarcane includes many species of perennial grass, Sugarcane is cultivated in various parts of the country, and every state has specific demand of Sugarcane and according to that specific demand a particular state demands for relatively much greater quantity of Sugarcane for that specific industrial use. But which state demands for more Sugarcane for a specific industrial demand in India is a matter of research. By studying the relative demand of sugarcane for industrial production of specific products, it will become more convenient to improve the crop yield according to the industrial demand in that state. Thus, current research puts light on finding the demand of Sugarcane for various purpose in state of Uttar Pradesh, Gujarat, Maharashtra, and Tamil Nadu and opens the future perspective to conduct more research on the connection of different varieties of cereals and pulses and average consumption of that specific variety in a particular state

Keywords: Alcohol, Bio-Plastic, Cane, Fertilizer, Skin Care.

Introduction

The cane sugar involves many specie and hybrid of grass that are big perennial included in the tribe Andropogoneae, genus *Saccharum*, that are consumed for the production of sugar. The plant is 6 to 20 feet (2-6 metre) in height having connected stout, stalk that are fibrous which are sucrose rich, collects in the internodes of stalk. Sugarcane come from Poaceae, grass family, the flowering plant which is economically significant involves wheat, maize, sorghum and rice, and several plants. It belongs to tropical region of India having high temperature, New Guinea and Southeast Asia. Globally, Sugarcane is highly cultivated, in 2017 a total 1.8 billion ton, 40% of total global cultivation was achieved by Brazil. The FAO (Food and Agriculture Organization) in 2012, calculated that sugarcane is grown on 64 million acres about (26 million hectare of land), in 90 countries or more.

Out of the 70% of the total manufactured sugar around the world is obtained from sugarcane species termed as *Saccharum officinarum* and the hybrid of the particular specie. Interbreed of all sugarcane specie may also be done, and the important industrial breeders are obtained from complex hybrids. 79% of the manufactured sugar counts for Sugarcane, sugar beet provide the most of the remaining sugarcane. In subtropical and tropical area sugarcane is cultivated, cold temperate area is required for sugar beet [1], [2]

Table sugar or sucrose is obtained out of sugarcane in special mills are either utilised in food sector as a raw material or to manufacture ethanol it is fermented. Figure 1: Shows the process of synthesis of raw sugar from sugarcane [3]

Products obtained out of sugarcane involve molasses, falernum, cachaca, bagasse and rum. In few areas, reed of sugarcane are used by population to manufacture mats, pens, thatch and screen. The shrunken young head of flower *Saccharum edule* (*duruka*) is edible in unripe state, toasted or steamed, & made in different methods in Asia's Southeast area, involving Fiji and island community particularly of Indonesia[4]–[6]

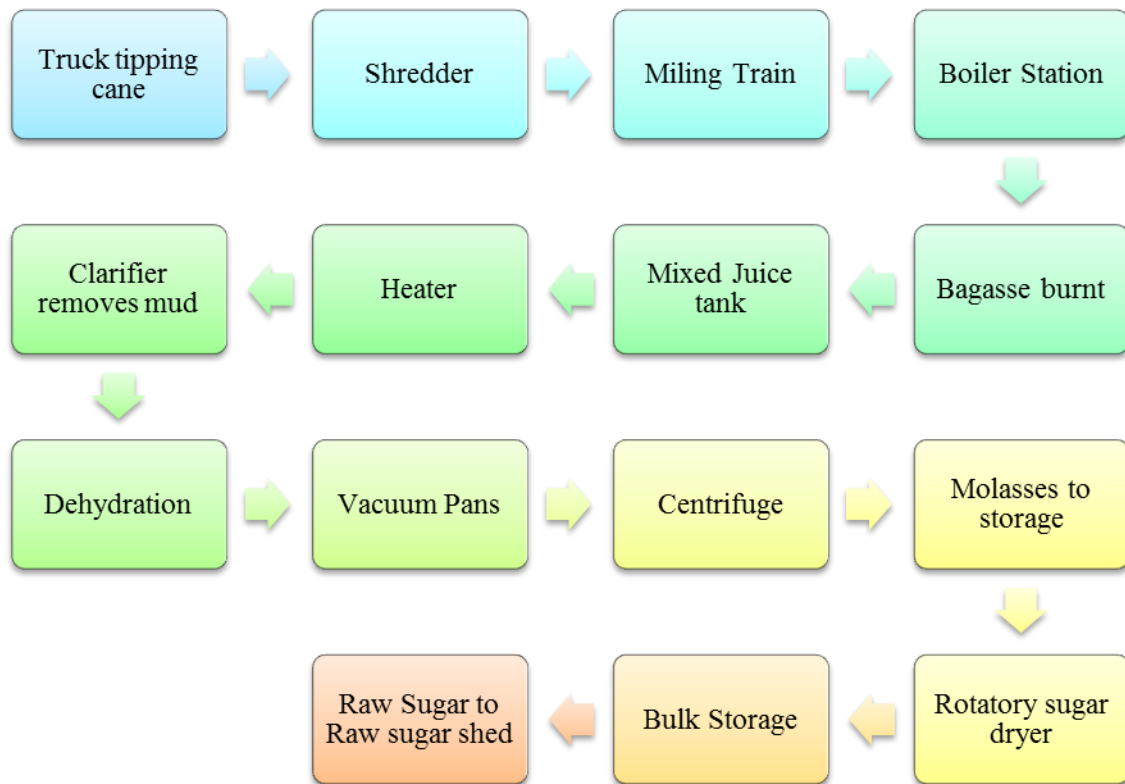


Figure 1: Shows the process of synthesis of raw sugar from sugarcane

1. Skin Care:

Sugarcane that is refined is the usual component in exfoliating items and body scrubs useful for scrubbing out dead skin cell because of the grainy texture used to make it. Sugarcane is merged with other components and lemon juice to make an organic wax used to remove body hair which is natural.

2. Alcohol:

A component obtained from sugarcane manufacturing, molasses, is an important ingredient in alcohol, rum. In the West Indies, sugarcane was initially used to manufacture rum in 17th century. Pure form of alcohol is also made by utilising molasses, Figure 2: Shows the steps involved in the manufacturing process of the synthesis of Ethanol from Sugarcane.

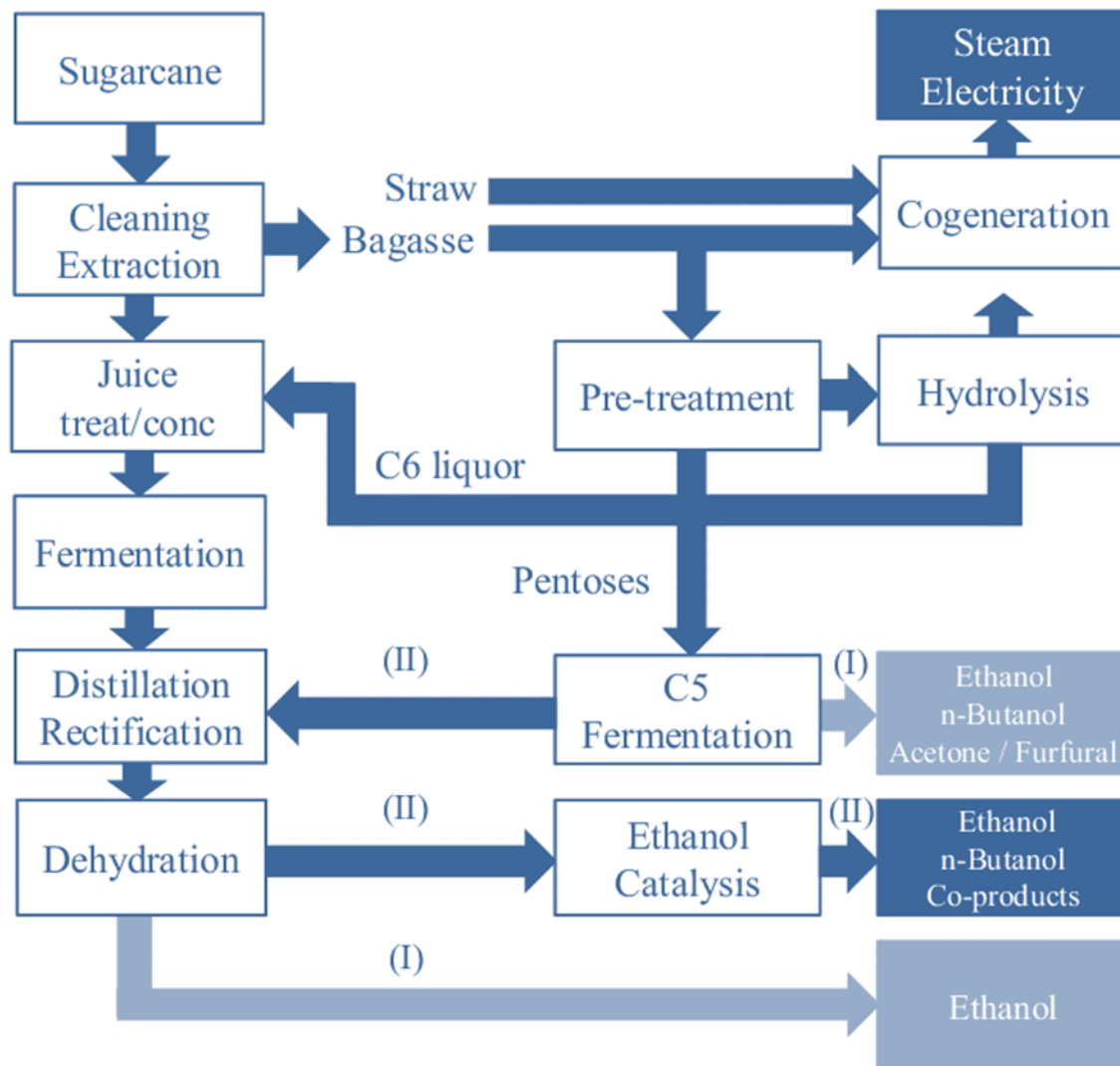


Figure 2: Shows the process of manufacturing and the steps involved in the synthesis of Ethanol from Sugarcane

3. Bio-Plastics:

Plastic that were traditionally used are not biodegradable, but, with the advancement of technology in today's times scientists have made bio-plastic, that are "compostable", in which sugarcane is used as an important raw material.

4. Tobacco:

Pure sugar and molasses are usually added to tobacco, and make a sweet flavour conventionally smoke by means of a hookah. The tobacco utilised for hookah, known as "shisha," is obtained in a range of blend, involving flavour of fruit.

5. Cane Ethanol:

An environment friendly bio-fuel gasoline is similar to ethanol which is manufactured from sugarcane. This is more reliable, renewable resource in comparison to conventional gasoline, as manufacturing of sugarcane occurs at a very high speed & puts low effects on environment.

6. Fertilizer:

In combination with rest components, such as sugarcane, lime may be utilised for making fertilizers that are organic. Use of fertilizer from sugarcane supports in improving the soil quality, thus enhancing food quality of the raw material that is cultivated in the soil [8], [9].

REVIEW OF LITERATURE

B.A Keating et. al conducted the study on 35 separate treatment or crops present for testing work of model. The crop's prime angle growth analysed with reference to model work in which the time-course of LAI, stalk mass, green mass, N uptake, and stalk sugar in the biomass, millable stalk and leaf. LAI opted as an accurate in the analysis shows an important effect over the activation of biomass segregation and rays interception. Stalk mass and stalk sugar are cultivatable and cost effective sugarcane products manufacturing, and thus of prime interest in analysis of performance of model. Millable stalk's Nitrogen uptake was analysed due to the area of crop which holds N that is transported at harvest from the field. Nitrogen present in leaf N is a significant angle of physiological working of the shoot. Hence, both leaf N and millable stalk N are significant parts of the N cycle of the crop[10]

M.L Dotania conducted a study on Sugarcane sector that are traditional industrial applications in India which give an important level of residues as wastage. Management and controlling of these residues is a big work, as they need a huge storage and space. But, it gives a chance to use such residues in crop manufacturing in agriculture manufacturing as a nutrient source which is organic. Thus, efforts are made to see the impact of industries of sugar residues, availability of these industries, and utilization in production of agriculture[11]

Preria S conducted a study on energy usage, natural resource usage and related pollution impact is the indicator of manufacturing process severity. On the contrary, population rise & requirement for high amount of safe food with hygiene resulted in motivating producer to inspire the efficacy and energy at the peak. Aim of the analysis is to study input energy in every hectare area of manufacturing of sugarcane in planted system and ratooning of Iran. It is concluded that reducing machinery working by applying no tillage or zero system, new irrigation system and energy that is the renewable source eventually improve energy efficacy and eventually reduce the GHG emissions[12]

S.Solomon Sugarcane is the most efficient transformer of energy obtained from Sun and converts it into sugar and biomass. The biomass constitutes lignin, fiber, pentosans and pith can also be transformed into significant product by effective biochemical, microbial technologies and chemical technologies. The sugarcane process makes molasses, press mud and bagasse having high cost. Other than them prime residues, there involves some another residue manufactured from sugarcane and are low commercially important such as fly ash, green tops, trash, spent wash and wax. Sugar sector of India is making these residues in order to create bio-generated electricity, bioethanol, and a variety of products in Sugar-Agro-industrial Complex[13]

Research Question:

Which is the most common use of Sugarcane in Uttar Pradesh, Gujarat, Maharashtra, and Tamil Nadu?

METHODOLOGY

Design:

A Questionnaire form is distributed in wholesale market of different cities of Uttar Pradesh, Gujarat, Maharashtra, and Tamil Nadu. The questionnaire form shown in Table 1 was distributed amongst various wholesale grain dealers and questionnaire form filled by various wholesale Sugarcane dealers was considered for further analysis and depending upon the data entered by the wholesale dealer's further study was conducted.

Table 1: Shows the questionnaire form distributed amongst the wholesale dealers of grains in different cities of Uttar Pradesh, Gujarat, Maharashtra, and Tamil Nadu

NAME:	
AGE:	
OCCUPATION:	
How long you are doing wholesale dealing of grains? :	2 to 6 years: 6 years or more:
What all cereals you sell? :	Wheat: Maize: Sorghum: Sugarcane:
What quantity of Sugarcane you sell monthly? :	1,000 lakh Kg: More than 1,000 lakh Kg:
For what purpose Sugarcane is demanded the most? :	Skin care: Alcohol: Bioplastics: Cane Sugar: Fertilizer:

The questionnaire form distributed amongst the wholesale dealers of different locations of, Uttar Pradesh, Gujarat, Maharashtra and Tamil Nadu and an average result of different locations of a state is considered as a result.

Data Collection:

Table 2: Shows the average demand of different locations for different purpose i.e. Skin Care, Alcohol, Bioplastics, Cane Sugar, and Fertilizer in Uttar Pradesh, Gujarat, Maharashtra, and Tamil Nadu according to the data collected by the survey

State	Average demand of Sugarcane for Skin Care	Average demand of Sugarcane for Alcohol Production	Average demand of Sugarcane for Bioplastics Production	Average demand of Sugarcane for Cane Production	Average demand of Sugarcane for Fertilizer Production
Uttar Pradesh	5%	47%	12%	15%	21%
Gujarat	8%	39%	12%	16%	25%
Maharashtra	5%	46%	10%	17%	22%
Tamil Nadu	8%	48%	12%	10%	22%

Data Analysis:

Figure 3,4,5, and 6 Shows use of sugarcane cultivated in manufacturing alcohol, fertilizer, cane, bioplastics, skin care in Uttar Pradesh, Gujarat, Maharashtra and Tamil Nadu

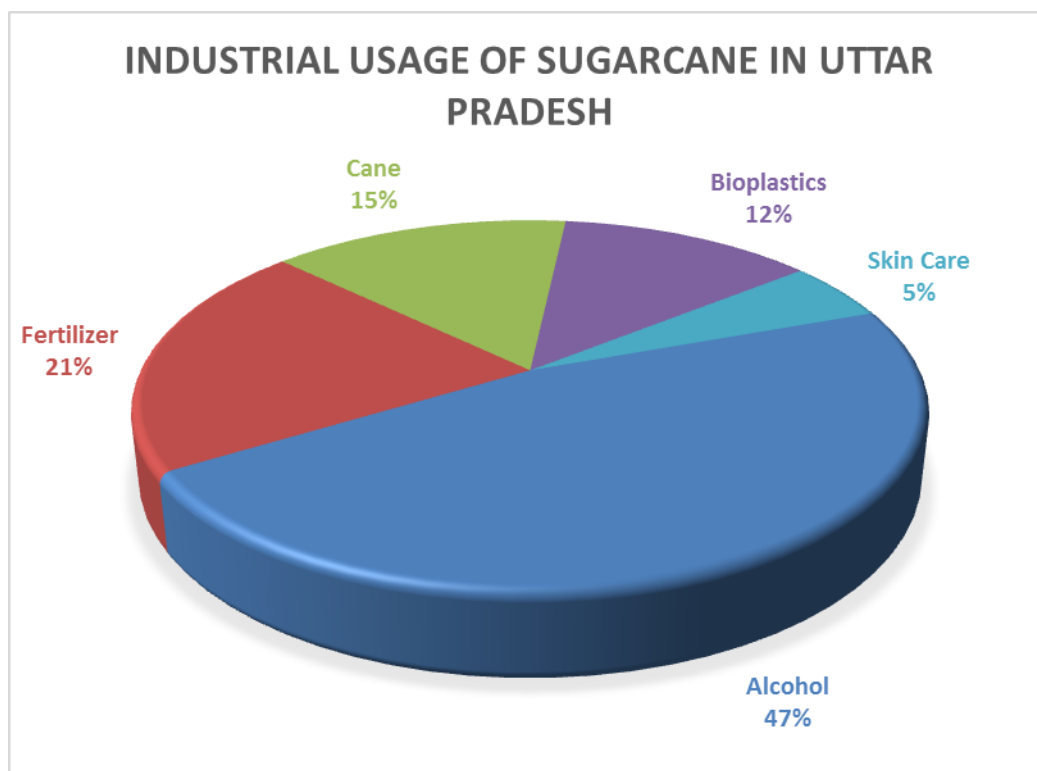


Figure 3: Shows use of sugarcane cultivated in manufacturing alcohol, fertilizer, cane, bioplastics, skin care in Uttar Pradesh

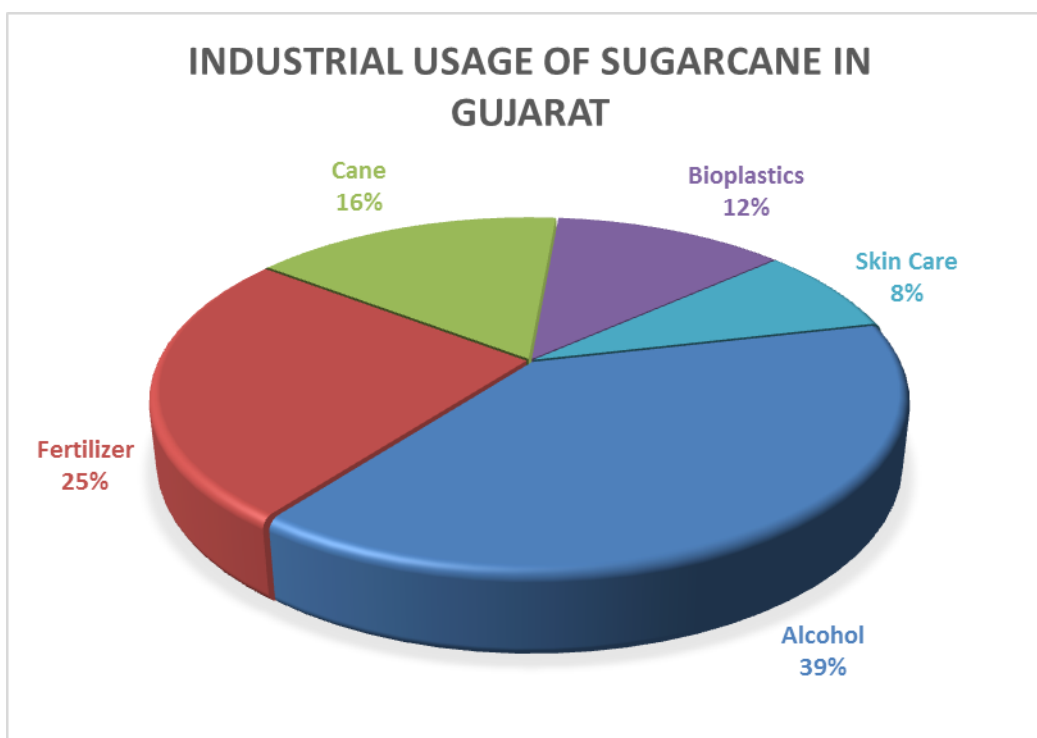


Figure 4: Shows use of sugarcane cultivated in manufacturing alcohol, fertilizer, cane, bioplastics, skin care in Gujarat

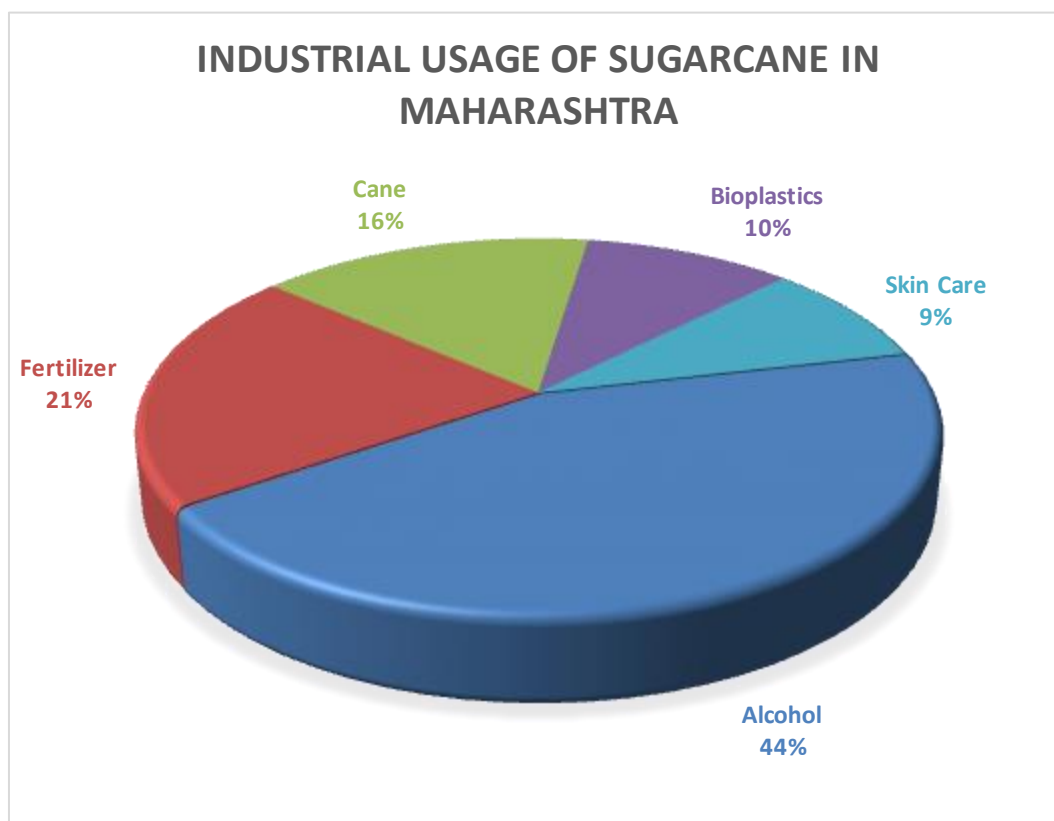


Figure 5: Shows use of sugarcane cultivated in manufacturing alcohol, fertilizer, cane, bioplastics, skin care in Maharashtra

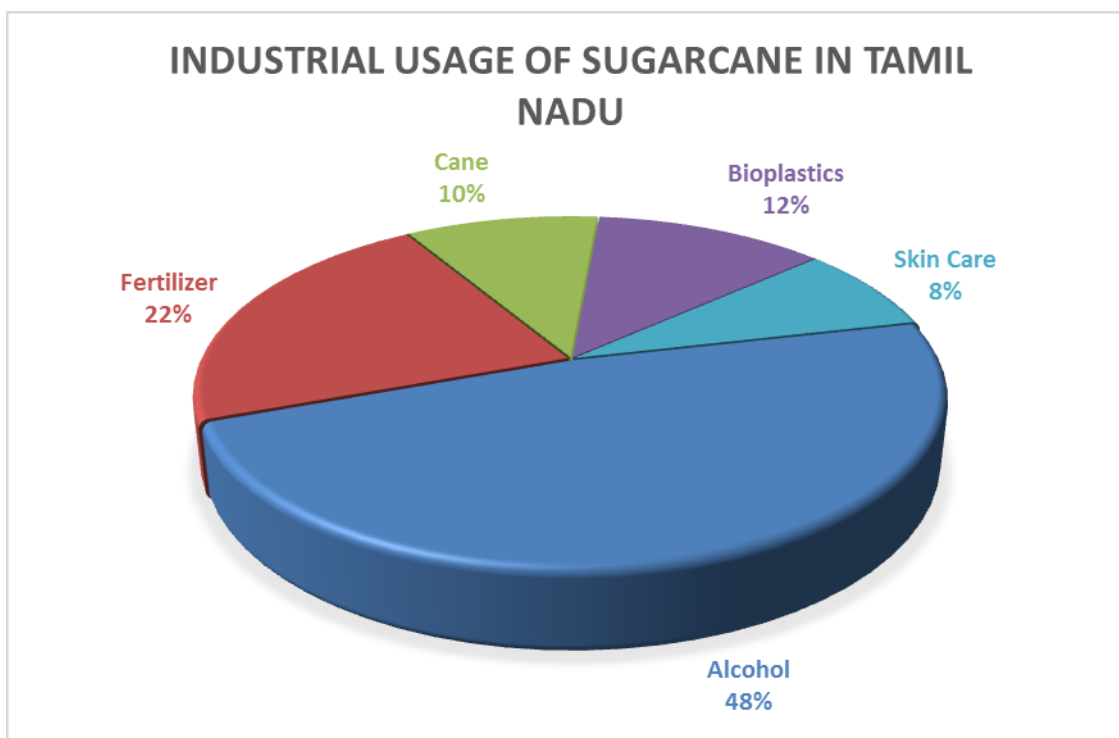


Figure 6: Shows use of sugarcane cultivated in manufacturing alcohol, fertilizer, cane, bioplastics, skin care in Tamil Nadu

RESULT AND DISCUSSION

Sugarcane comes from Poaceae, the family of grass, a significant plant that flowers and is important economically that involves rice, maize, several forage plants, wheat, and sorghum. In high temperature tropical regions of India, sugarcane is cultivated including New Guinea and Southeast Asia. Globally, in 2017, 1.8 billion ton of sugarcane was manufactured, with 40% of global contribution to Brazil. The results of the study conducted to find out the average usage of Sugarcane for different purpose i.e. skin care, Alcohol, Bioplastics, Cane, and Fertilizer in different states. The average demand of Sugarcane for Skin Care was 5% in Uttar Pradesh, 8% in Gujarat 5% in Maharashtra, 37% in, and 8% in Tamil Nadu. The average demand for alcohol production was 47% in Uttar Pradesh, 39% in Gujarat, 46% in Maharashtra, and 48% in Tamil Nadu. The average demand of Sugarcane for bioplastics production was 12% in Uttar Pradesh, 12% in Gujarat, 10% in Maharashtra, and 12% in Tamil Nadu. The average demand of Sugarcane for Cane production was 15% in Uttar Pradesh, 16% in Gujarat, 17% in Maharashtra, and 10% in Tamil Nadu. The average demand of Sugarcane for the Fertilizer production was 21% in Uttar Pradesh, 25% in Gujarat, 22% in Maharashtra, and 22% in Tamil Nadu. About 70% of the sugar manufactured around the world is obtained from the sugarcane species termed as *Saccharum officinarum* and the hybrid of the particular specie. All species of sugarcane can also interbreed, and the complex hybrids are the important industrial breeders. Out of the total sugar manufactured, seventy nine percent provides sugar and the remaining sugar is obtained from sugar beet. Sub-tropical and tropical areas are suitable for sugarcane cultivation, colder temperate areas are suitable for sugar beets. Table 2: Shows the average demand of different locations for different purpose i.e. Skin Care, Alcohol, Bioplastics, Cane Sugar, and Fertilizer in Uttar Pradesh, Gujarat, Maharashtra, and Tamil Nadu according to the data collected by the survey.

CONCLUSION

The results of the study conducted to find out the average usage of Sugarcane for different purpose i.e. skin care, Alcohol, Bioplastics, Cane, and Fertilizer in different states. The average demand of Sugarcane for Skin Care was 5% in Uttar Pradesh, 8% in Gujarat 5% in Maharashtra, 37% in, and 8% in Tamil Nadu. The average demand for alcohol production was 47% in Uttar Pradesh, 39% in Gujarat, 46% in Maharashtra, and 48% in Tamil Nadu. The average demand of Sugarcane for bioplastics production was 12% in Uttar Pradesh, 12% in Gujarat, 10% in Maharashtra, and 12% in Tamil Nadu. The average demand of Sugarcane for Cane production was 15% in Uttar Pradesh, 16% in Gujarat, 17% in Maharashtra, and 10% in Tamil Nadu. The average demand of Sugarcane for the Fertilizer production was 21% in Uttar Pradesh, 25% in Gujarat, 22% in Maharashtra, and 22% in Tamil Nadu. Sugarcane comes from the grass family, Poaceae, an economically significant plant that flowers and involves wheat, maize, sorghum, rice, and several plants. It belongs to New Guinea, high temperature to tropical regions of India, and Southeast Asia. Global cultivation of sugarcane is very high followed by Brazil and China. The FAO (Food and Agriculture Organization) calculated that sugarcane is cultivated on 64 million acres which is nearly 26 million hectares and the area covers more than 90 countries.

The hybrids of the specie and the specie of sugarcane named *Saccharum officinarum* contributes to about 70% of the total sugar manufactured around the world. All species of sugarcane may also interbreed, and the complex hybrids are the important industrial breeders. Thus in the current survey conducted, according to the data collected it can be concluded that average demand of sugarcane in Uttar Pradesh, Gujarat, Maharashtra, and Tamil Nadu is highest for alcohol production followed by second highest demand for fertilizer production and then for the manufacturing of skin care products, bioplastics, and cane in state of Uttar Pradesh, Gujarat, Maharashtra, and Tamil Nadu of Indian sub-continent.

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