

## Initiatives by CHARUSAT towards Zero Plastic Waste

### 1. Pilot Project on Bamboo Bottle Manufacturing to Replace PET/ Single Use Plastic Bottles

The Workshop department of Charotar University of Science & Technology has taken up the challenging project of manufacturing the Bamboo bottles on pilot scale which shall be replacing the PET/ single use plastic bottles.

Few bottles from locally available resources has been produced and are studied for its suitability for drinking water storage. The Bottles are subjected to drinking water for 4, 8, 12, 24, 48 hours are studies for the change in water quality along with microbiological properties.

Following are sample results for the same:

Sr. No.	Parameters	Units	Test Method	Results @ 00 Hrs	Results @ 24 Hrs
1	pH	--	APHA 23 <sup>rd</sup> Ed., 2017, 4500-H+ B	8.31	7.38
2	Temperature	°C	APHA 23 <sup>rd</sup> Ed., 2017, 2550 B	26.0	32.1
3	TDS	mg/L	APHA 23 <sup>rd</sup> Ed. 2017 2540 C	823	897
4	Chlorides	mg/L	APHA 23 <sup>rd</sup> Ed. 2017 4500 Cl- B	57.48	64.97
5	Electric conductivity	µS/cm	APHA 23 <sup>rd</sup> Ed., 2017, 2510 B	1158	1262
6	Total Hardness	mg/L	APHA 23 <sup>rd</sup> Ed 2017, 2340 C	175	180

It was observed that the microbiological properties of bamboo bottles are changing drastically when subjected to the water. Following are the observations from microbiological analysis:

Sample No.	Microbial Growth at time (h)					
	0 Hrs.		4 Hrs.		24 Hrs.	
	Bacterial	Fungal	Bacterial	Fungal	Bacterial	Fungal
<b>Control</b>	+	-	+	-	+	-
Bottle kept in sunlight for 5 days (top terrace)	+	+	++	+	++	+
kept in normal condition for 10 days (in a cabin)	+	+	++	++	++	++
Dried in smithy shop(open hearth furnace)	+		+	+	+	+



**Fig. 1 Bamboo Bottles manufactures in CHARUSAT Workshop**

**Way Ahead:** The change in Water quality both in terms of Chemical and Microbiological properties are correlated to the raw bamboo mass which contains lignin.

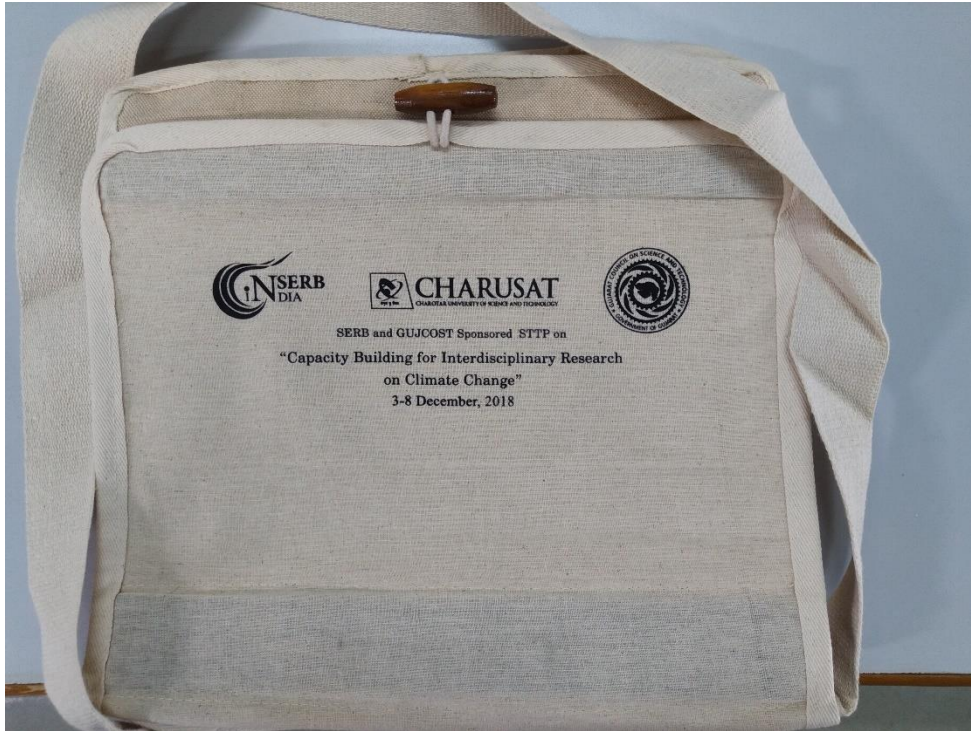
Following are the measures which will be taken in order to make bottle suitable for drinking purpose:

1. Boiling Bamboo in hot water bath in order to oxidize the biodegradable organics
2. Smoking the bamboo bottles to close all the tiny apertures and to make bottle resistant to microbiological growth.

## **2. Replacement of Plastic Folders and Conference Bags with Jute Bags**

In order to promote its action plan on Zero Plastic Waste, CHARUSAT is replacing the Plastic Bags and Folders used in various workshops, STTPs, Conferences with ecofriendly Jute Bags.

The Jute products are kind on the environment with the minimum emissions during the manufacturing process. Jute bags are eco-friendly and safeguard our future.



**Fig. 2 Jute Bag used in STPP Programs**



**Fig. 1 Jute Bag and Folder used in Workshops/ training programs**