

AAKRUTI2022

Shaping Imagination

Team-ID: A22-51528

Ahveyta

Theme: **Responsible and Consumption & Production**

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Teamkarna



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Wastage of Wheat Straws

PROBLEM DESCRIPTION

After harvesting wheat crop many straws go into waste and is burned later which leads to increase in air pollution.

Background:

In many parts of India **wheat** is a major crop. After harvest **large amounts** of **waste** is produced. This waste is generally **burned** by local farmers. The burning process is **easy**, and it acts as **manure** for the **soil**, thus rejuvenating the soil. But this burning leads to a great **increase in air pollution**. From many years **Delhi** is suffering from **smog** due to this burning of waste wheat straws.



Significance

WHY IS IT AN URGENT PROBLEM?

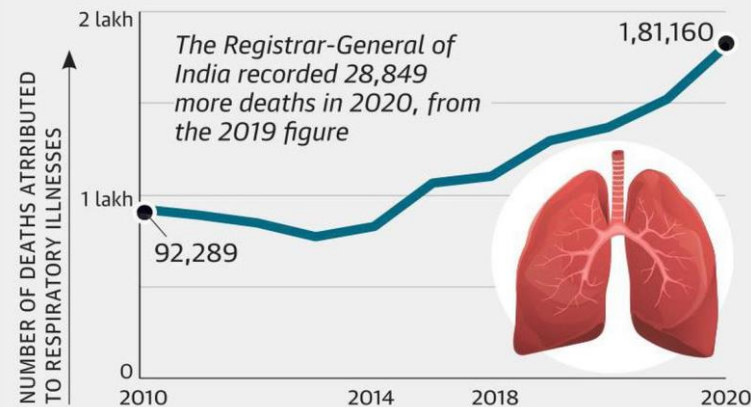
As motioned earlier **Delhi** suffers from the problem of smog every year. Although the air quality of the city is already very bad this additional pollution leaves a great decrease in air quality index. Such bad air is very harmful and is very unsafe for breathing. This also may lead to lung cancer and other deadly problems. The city have recorded at least **25%** increase in respiratory diseases as compared to last year. **Stubble** (the cut stalks of cereal plants left sticking out of the ground after the grain is harvested) burning can contribute between **20% to 70%** of Delhi's air pollution woes during October and November.

In **2020**, as many as **1,81,160 deaths** occurred due to respiratory diseases such as **pneumonia, asthma** and **bronchitis**, higher than **1,52,311** such deaths reported in **2019**.

9,872 people in Delhi died of major respiratory diseases in **2017**, which amounts to around **27 deaths per day** in 2017. While in **2016**, the number of deaths was **11,900** in 2016 due to respiratory ailments and diseases, which is about **33 deaths per day**.



Short of breath | In 2020, India recorded a 10-year high in the number of deaths caused by respiratory diseases. The chart shows the number of deaths linked to respiratory diseases in the past decade



Research findings

What are important findings in the research?

India generates about **350 million tones** of agricultural waste every year. Demonstrated that **wastepaper** and **stubble** or their **mixtures** can be **compressed** to a relative density greater than unity and then **stabilized**. The outcome of research reveals that high quality **product** with **competitive price** can be made from leftover stalk. The investigation represents the correlation among waste from agriculture to useful goods. The increasing demands for use and throw products at times of wood shortage. Although there is active research, biomass recycling processes are yet little installed on industrial scale. Due to political measures, useful product production from **biomass** is currently in the **center of attraction**. Wood waste helps us to **reduce** our **dependence** on **fossil fuels** and curtail the demand for purchased electricity.



Product Specifications

Components required

- Moulding machines with proper shaped moulds are required.

Technical requirements

- Some knowledge of chemical field to understand how to change the waste into something useful.
- Knowledge of hydraulic press.

Human factors requirements

- An operator to operate the hydraulic press.
- A chemist to maintain properties of the mixture and the final products.
- An engineer to maintain proper condition of the press.
- Few workers.
- Logistics manager.
- A manager to keep track on all of them.

Constraints

- Limited shapes and sizes as strength is a factor.
- All year round supply of raw materials.

Final solution and innovation

HOW DOES YOUR SOLUTION ADDRESS THE PROBLEM IDENTIFIED?

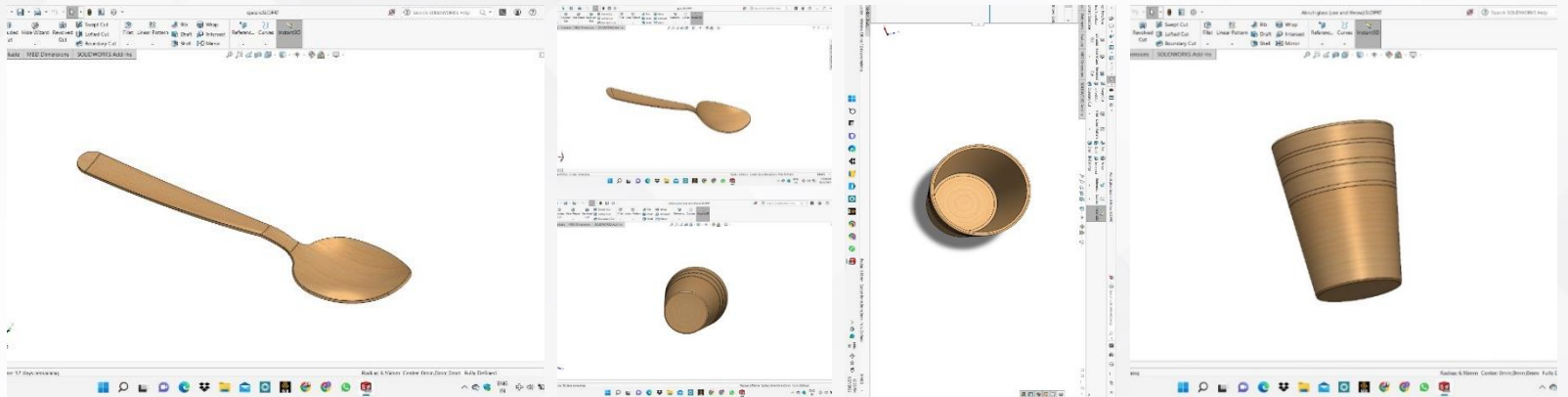
Ahveyta helps in **reducing pollution** by putting stubble and wastepaper to a **good use**. Like the saying goes “Best from Waste”, we have created a process that creates a **usable** product from **waste**. The product (use and throw crockery) is made **entirely** from **natural materials** i.e., stubble and wastepaper.

HOW IS IT INNOVATIVE?

Since, the product is made **entirely** from **natural materials**, it is **bio-degradable**. But it is also **sturdy** since different **adhesives** are added with the mixture. Like the paper use and throw crockery, it is very **frail**, and it gets **floppy** when something wet is kept in it. But crockery created using **Ahveyta** would be **firm** even after something wet is kept in it. So, when you eat your favorite pani-puri, you could eat it without worrying that if it will spill on your clothes. The same goes for chutneys. You cannot serve ragda in a disposable paper plate as it won't hold such a weight, you will have to go with plastic. But that is not the case with our crockery, you can serve ragda in it and it will hold is nicely.



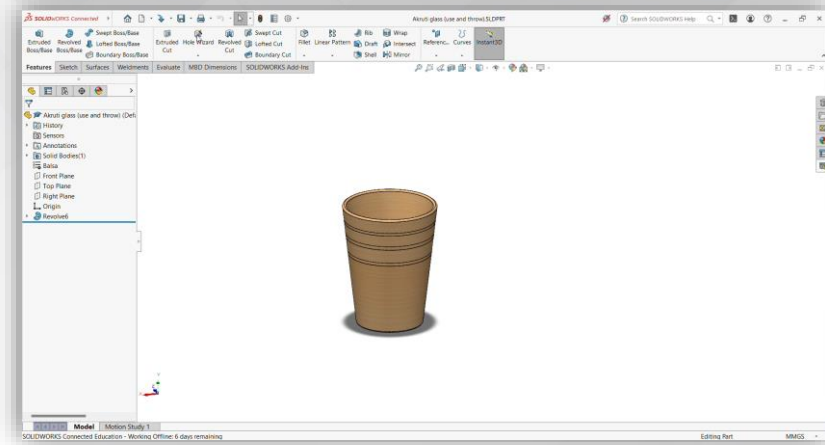
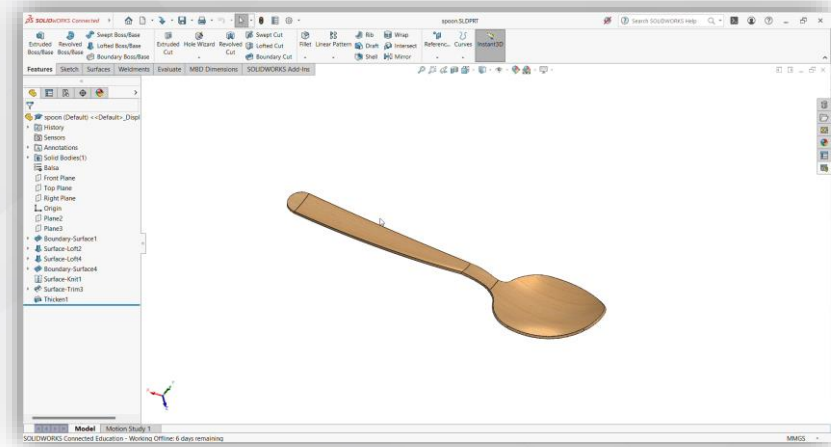
Final CAD Product Images



Product details

Studies demonstrated that **wastepaper** and **stubble** or their **mixtures** can be **compressed** to a relative **density** greater than unity and **stabilized** at that density **without binder** material. A **reduction** in the **volume** of the material also provides its **technological benefit**, i.e., the material could be **transported** and **stored** more **economically** than is possible at present. The effects of the **briquetting** pressure on the density, **moisture content** and **compressive strength** of the briquettes were examined at **six** different pressures (300, 400, 500, 600, 700 and 800 MPa). The **optimum** moisture contents and briquetting pressures were **found to be**, respectively, 18% and 780 MPa for wastepaper, 22% and 710 MPa for **stubble** and 18% and 750 MPa for a 20%(w) **wastepaper–stubble** mixture. The effect of the temperature on the briquette density of stubble was determined. The best stubble briquettes were obtained at 385 K.

Product simulation

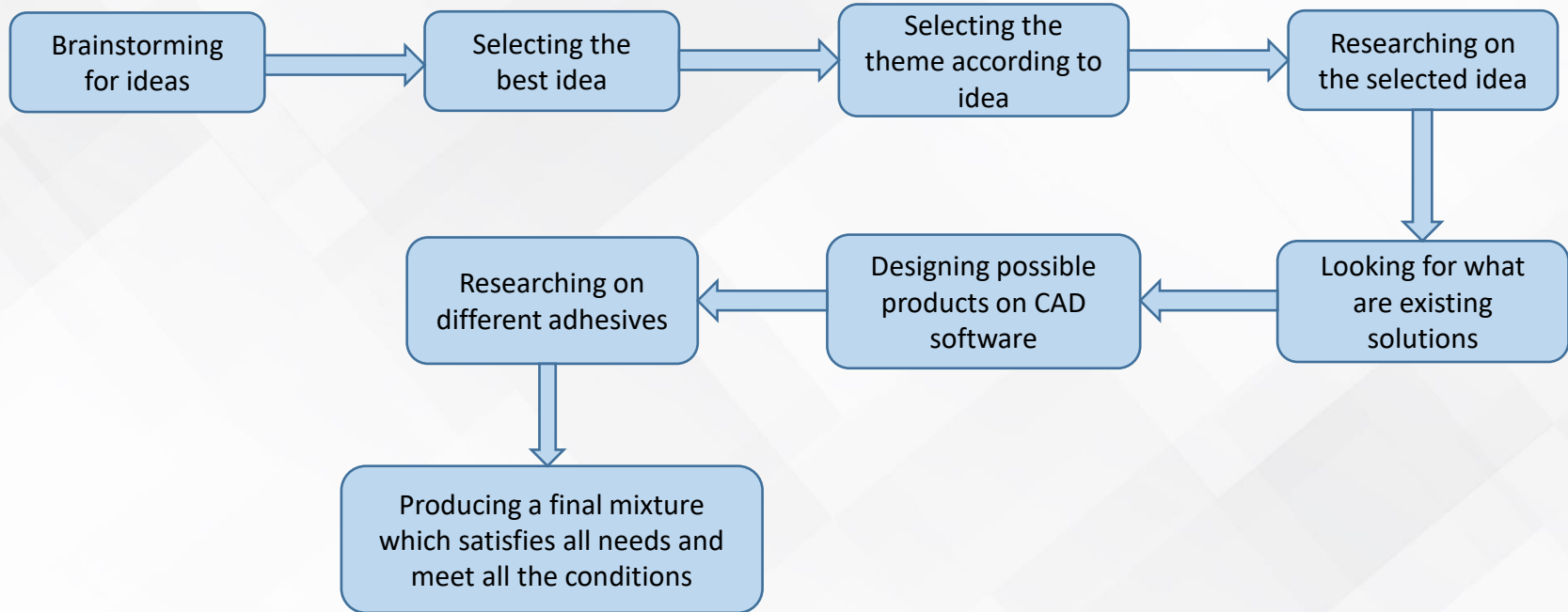


Product reflection

- **Benefits of your product-overcoming drawback of existing solutions.**
 - There are some solutions out there, one of them is the use of stubble in making animal feed. However, only a few percentage of waste stubble is used in this process rest goes in waste or is burned. And same case with wastepaper, in India out of 100 kilos only 30% of it goes for recycling rest end up in landfill. The aim of our team is to reach out to the farmers how burn the stubble or let it waste, collect it from them and then out it to good use. And for wastepaper we could reach out to raddhi/kabadhiwalas.
- **Drawbacks of your products that can be optimize in future study.**
 - We are only considering wastepaper and stubble for time being. And the data shown for stubble is only for Northern India. But there are other regions where massive amounts of stubble goes into waste. And we can move further to waste banana leftovers after harvest. A banana tree gives fruits for approx. 1-1.5 years. Then is cut down and goes to waste. We aim to improve Ahveyta to be able to process waste from other crops or plants as well.



Design process



Impact of your solution

Describe positive impact created by your solution in the society.

Using crockery made using **Ahveyta** makes our **air** a little bit **cleaner** and our **soil** a bit **fertile**. You can contribute towards **conserving** our **planet** but using **Ahveyta** which **does not pollute**, and the final products made are too bio-degradable. This will also help in **reducing** the **waste** which ends up in **landfills** which will eventually **free up** some extra **landfill space**.



Sustainability

We are making the project by using stubble that, which is left after harvesting. We are trying to make **biodegradable** product like plate, bowl, spoon etc. by using **adhesives chemicals** and **composition with stubble**. From last few years, there has been day by day **increase** in use of **plastic plates, plastic glass** etc. we call them 'use and throw'. Large amounts of plastic is **wasted** and causes **pollution** on our planet. In order to **decrease** soil pollution, and to decrease air pollution, we are making them **bio-degradable**, we can 'use and throw' this type of crockery but this will **degrade** and will cause a much **lesser pollution**. This helps our **planet** and make it a little **less polluted**. And its purpose to make such idea, has **low production costs** as well as is **eco-friendly** to protect the environment.



Business viability

Describe practicality of your design solution to be implemented. Why it will be successful?

The pricing of one, let's consider a plate, considering the prices of raw materials, cost of operating hydraulic press, labor cost, packing and shipping cost would be roughly around Rs.0.5-1.

The investments would be

- Property on which we can set up the manufacturing
- A hydraulic press, a 75 tons press costs around 3 lacs.

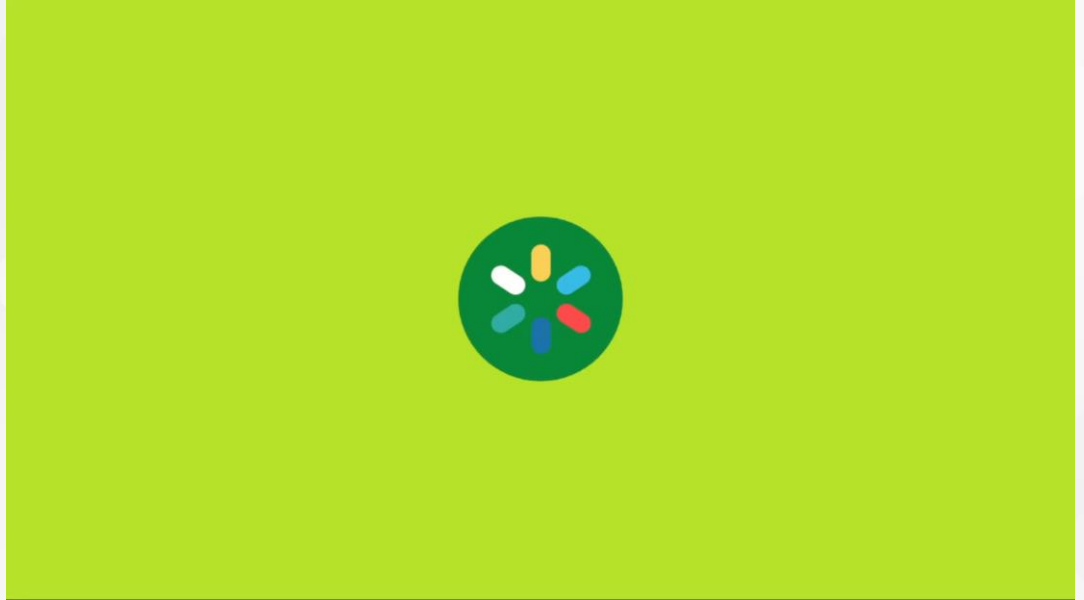
The price will differ on the shape and size of the product, the more complicated the shape the higher the price.

Even if one plate is priced at Rs.2-3, there is a good profit of the company. This will then go in maintenance and salaries of employees.

Our product will cost approximately the same or even less as existing disposable paper crockery, but it is far more effective than them.



Pitch Video



Product Marketing video



Thank you!
