

Wheat Straw Pulp

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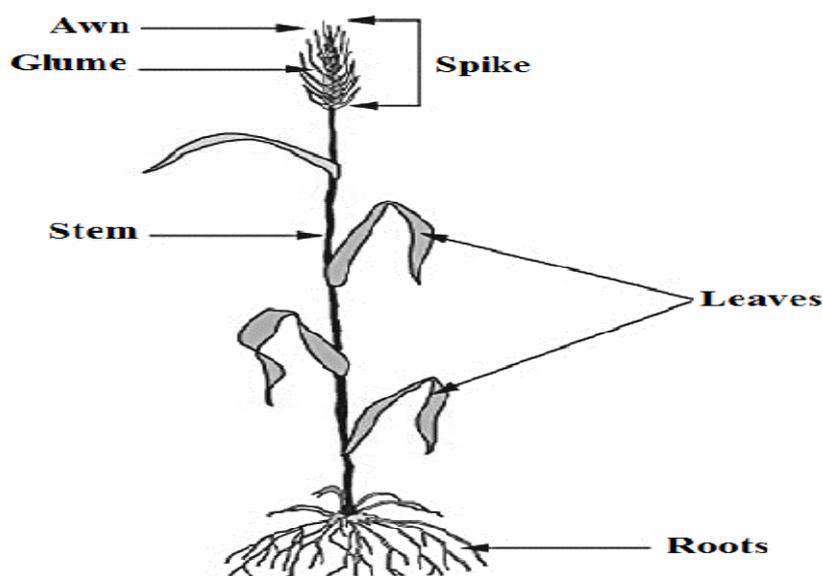
Introduction:

Pandharpur is agriculturally rich by the grace of river Bhima and its left and right bank canals, supported by Nira right bank canal. However, the industrial growth is very poor and is limited to sugar industries only. However, in the rural areas, the available resources are often under-utilized due to lack of knowledge and required technical support. Hence, technology penetration is the need of the hour.

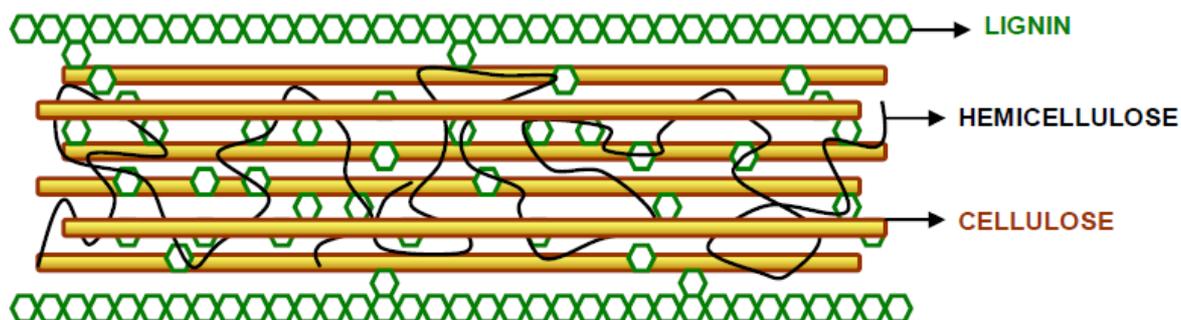
Waste and by-products of agro-food industries such as wheat straw can be used to produce environmental friendly and sustainable products. The current practice in most cases is to burn these materials. However, burning process adds little/no value and may cause some environmental impact. Wheat Straw is a **lignocellulosic** material. Currently over produced and underutilized, the use of these materials can accomplish two very important objectives (a) Reducing the existing dependence on environmentally hazardous products by offering sustainable products (b) Creating alternative sources of income to rural women.

The average productivity of wheat in the re-gion is 1100 Kg. per hectare. There are only four tahsils which have a yield above 1500 Kg per hectare. These four tahsils are namely Karmala, Malshiras, **Pandharpur** and North Solapur.

As wheat straw is an abundant by-product from wheat production, it can serve as best option for low cost raw material for generating constructional, household products. The generated constructional materials will possess the eco friendly properties and will serve as tough, durable and structurally sound material in any conditions.



The major constituents of lignocellulose are cellulose, hemicellulose, and lignin, polymers that are closely associated with each other constituting the cellular complex of the vegetal biomass. Basically, cellulose forms a skeleton which is surrounded by hemicellulose and lignin.



- Cellulose is a high molecular weight linear homopolymer of repeated units of cellobiose (two anhydrous glucose rings joined via a β -1,4 glycosidic linkage).
- Hemicellulose is a linear and branched heterogeneous polymer typically made up of five different sugars - Larabinose, D-galactose, D-glucose, D-mannose, and D-xylose - as well as other components such as acetic, glucuronic, and ferulic acids.
- Lignin is a very complex molecule constructed of phenylpropane units linked in a large three-dimensional structure.

Methodology:

1. To develop suitable binding method for binding agricultural waste to produce low cost rural construction material.



Then Defibration of Wheat Straw is done using chemical pre-treatment:



Process for the formation of Wheat straw pulp and its application:

The main ingredient to generate all forms of fabrication materials is the PULP. The pulp is extracted from dry wheat straw using Chemical process:



- Using the obtained pulps, Wheat straw Panels are to be fabricated which are to be used for rapid housing.
- The panels are of bamboo frame with dimensions 0.75 x 0.75m, 30 x 30cm
- The bamboo frame will be covered with specific material which will help to adhere the pulp when applied on it.
- Then after applying the pulp on the bamboo frame, it will be sundried.
- After generation of Bamboo panel various strength related tests will be taken on the panels such as Compression, flexure, sound proof ness, water absorption, Impact etc.
- Obtained panels are useful for erection of rapid housing.