

# Shredder for Agricultural Waste Management

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Shredder is a machine, a system that is used to reduce the size of the material. Volume reduction of bulky materials and items is all done using the shredder machine. The shredded waste can be spread on the field as organic manure to increase the moisture content, and fertility of the soil, simultaneously reducing the usage of chemical fertilizers. This machine is also suitable for preparing vermicompost. A shredder machine is a hydraulic system that propels the material to be processed onto a rotating rotor equipped with blades. The size of the fraction depends on the screen (sieve) installed under the cutting unit. The waste shredder machine aims to reduce the agro waste and convert it into useful nourishing fertilizer. Recent studies on coconut sheath/shells reveals that it can also be



**Fig. 1: Coconut sheaths/shells before shredding by Shredder**

used in the preparation of vermicompost. To make use of sheaths/shells in vermi composting by cutting into small pieces is a laborious, cost and time-consuming operation. Commercially available sheath shredders have promising results to cut coconut sheath/shells in to small pieces involving less labour, cost and time. Keeping all this in view,

performance evaluation of shredder for shredding coconut nut shells and sheaths are carried out in the region to create awareness among the farmers.

## Treatment details:

T1: Shredding by manual method

T2: Shredding by frond shredder



**Fig. 2: Coconut sheaths/shells after shredding by Shredder**

## Results and Discussion

The performance of the shredder at research station, V.C. Farm, Mandya and farmers fields are as given below:

**Table 1: Performance of coconut sheath shredder at research farm and farmers field**

Sl No	Parameters	Details
1	Moisture content, % db	10-14%

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2	Labour requirement, men hour/100 kg sheath	2
3	No. of knives	4
4	Size of the chaff, mm	10-15
5	Output of the machine, kg/h	250-260
6	Cost of the operation, Rs/h	231
7	Fuel consumption, l/h	0.95

### Inference

Performance evaluation of shredder was carried out for 50 hrs at research station (5 ha) and 85 hrs at farmer's fields (10 ha) of Mandya district. Performance of coconut sheath shredder found satisfactory for dried sheaths/shells of 10-14% db moisture content. Preliminary field tests indicate average fuel consumption of 0.95 l/h with effective output capacity of 260-270 kg/h and 200-210 kg/h of coconut sheaths and coconut shells, respectively. Further, the chopped sheaths were added / mixed to

vermicompost pits which enhance the yield, fertility and organic matter of the vermicompost. The cost of operation of shredding coconut sheaths/shells by shredder was found to be Rs.231 per hour.

**Table 2: Comparative performance of coconut sheath shredder**

Sl No	Parameters	Shredding by shredder	Shredding manually
1	Moisture content, % db	10-14%	10-14%
2	Labour equipment men hour/100 kg sheath	2	6
3	Size of the chaff, mm	10-15	250-350
4	Output of the machine, kg/h	260	50
5	Cost of the operation, Rs/h	231	188

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