DESIGN AND FABRICATION OF DECORTICATOR FOR JATROPHA CURCAS SEED

INTRODUCTION

Our project is aimed at finding a device (decorticator) for the purpose of decortication of jatropha seeds. A decorticator is a machine for stripping the skin, bark, or rind off nuts, wood, plants stalks, grain, etc., in preparation for further processing. Seeds maybe separated from the shell by any of the following principles

- Hammering
- Attrition
- Grinding
- Impact

Whatever the principle which may be adopted for this purpose should have minimum damage to the shell of the seed. Probably decortication through attrition principle would be most suitable for this purpose and hence a decorticator which works on this principle, we are concentrating on this project work.

Objective:

1. Maximum pods decorticated in shortest time.
2. High performance and easy to maintain.
3. Our decorticator machine that can separate 80% of seed from the pod.
4. The designed decorticator machine that is simple easily maintained and comfortable to work.
5. The single phase electric motor is used to run the machine.
6. Standard quality of bearing blocks will be better efficiency to machine for better decortication.
7. Trouble free operation.

Methodology Adopted For Present Work

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The components of our decorticator:

1. M S FRAME
2. C R SHEET METAL
3. SHAFT
4. HOPPER
5. V-BELT
6. MOTOR
7. PULEY
8. 16mm MESH
9. BEARINGS BLOCKS
10. BLOWER
Design:

Fabrication:

Working Principle:

1. Jatropha decorticatior is operated on the attrition process
2. Firstly, the input i.e., the jatropha are fed to the machine through the hopper, then jatropha come in contact with the two members, one is semi circular mesh and another is rubber mount arranged rotating shaft.
3. Semi-circular net is a stationary member while the rubber mount arranged rotating shaft is rotating member. When the jatropha comes in contact with these two members then the attrition action take place.
4. Due to attrition action the jatropha pods gets shelled and divided into two parts, the jatropha seed and a shell
5. The clearance is provided between the sheet and roll shaft, The clearance provided is depends upon the varies size of the jatropha.
6. After shelling the jatropha, the seeds and shells of the jatropha falls into the conveyer from the semi-circular mesh, in downward direction.
7. Then a centrifugal force is applied by a blower on the seeds and shell of the jatropha.
8. Due to more weight, the seeds gets moved downward and collected in the separator. But due to lighter weight the shell of the jatropha are thrown outside the machine.
Result:
The weight of empty basket = 400g
The weight of basket and pods = 650g
The weight of pods = 650g - 400g = 250g

After decortications:
The weight of seed + basket = 550 g
The weight of seed = 550g - 400g = 150g
The weight of shell + basket = 450g
The weight of shell = 450g - 400g = 50 g
Losses = Total weight of pods - (weight of seed after decortication + weight of shell after decortication)
Losses = 250g - (150g + 50g) = 50 g
Decortications time = 42 sec

Conclusion:
Our project was aimed to reduce the man power and time for separating seeds from the pods, we have used the attrition principle for achieving the aim.
- The seeds are separated from the outer shell with minimum damage to them.
- The seeds and outer shell are completely separated from the blower which is installed below the shelling chamber.
- The overall machining operation is carried by the motor, thus man power is reduced.
- The seeds are collected separately and are ready for further process.

Scope for future work:
- The top of the Hopper should be covered, because there may be chances of spelling out of pods.
- The installation of vibrating mesh at the collecting section of seed helpful for separation of seed with different sizes.