DESIGN AND DEVELOPMENT OF SIMAROUBA SEED EXTRACTING MACHINE

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INTRODUCTION: Simarouba belongs to the family Simaroubaceae Quasia. Simarouba (Simarouba glauca DC) is commonly known as paradise tree. It is also known as Simaba, Maruba, Lakshmitaru, Accientuno, Dysentery bark, Pitomba etc, in different country. It is an evergreen multi-utility tree that grows up to 150 cm height with tap root system and cylindrical stem. Its native is North America & introduced in India in 1960s. The Simarouba is being promoted in the country as the latest wonder tree which is a source of edible oil that has wide utility. At the village level the plant is cost effective as its farming is nearly zero budget and completely organic, yielding good harvest for almost 70 years the average life span of a full ground tree.

OBJECTIVE AND SCOPE OF THE PROJECT

Decortication is the act of separating seed husk or seed shell from the actual seed of kernel. Decortication is an essential step prior to extracting oil from the kernel or seeds.

The main motto of the project is to reduce the usage of the petroleum products in industries by combining the bio-diesel products into the petroleum products and which increases the efficiency of the engine and it also used for domestic purposes.

Extracting machine is compact in size and it can be easily purchased by the farmer. This Simarouba oil is also used in industrial manufacture of soap, lubricant, paint, polishes and pharmaceutical, cosmetics, etc. After oil extraction, the left over Simarouba meal is reported to have high nutritional indices and digestibility which can be used in the production of food supplements to broilers, fish etc.

METHODOLOGY:

Literature summary: By serving into the agriculture department we came to know that Simarouba seed having more content of bio-diesel so that we chose this seed, after choosing this seed we realized that there is no machine for extracting that particular seed. We got confirmation from other sources that there is no machine for that extracting seed again.

Problem definition:
In this scenario we have developing for the extracting of all seeds but we don’t have extracting machine for the particular their own seeds, for example Honge, Neem and Simarouba seed so we chose Simarouba seed for this project.

**Design and model:**
Designing of machine model is prepared on the paper work and then developed by the software’s namely AutoCad-2D (2016) and C-reo.

![Simarouba seed extracting machine](image1)

**Fabrication:**
Fabrication of the extracting machine is done by the help of workshops.

**Extraction of seeds:**
Extraction of seed is done by the model that we designed and fabricated by trial and error methods.

**Hardware and software:**
Using the software’s of AutoCAD and C-reo model is prepared.
Fabrication is done by using different types of workshop tools.

The each color indicates the each part of the machine,
- Blue ---- Hopper with casing cover
- Red-----Pulleys
- Green---Frame
- Grey----Fasteners

![Simarouba seed extracting machine](image2)

**Result:**
Simarouba seeds are very essential additives in bio-diesel, but seed extraction process requires an automated design configuration. In this design majorly concerted on shaft, pulley, motor, V-belt, etc. By design consideration, the shaft used as 20mm diameter, motor 1HP, maximum speed of 1440 rpm, 230 V of supply, 1 V-belt were used. The modelling has been carried by AutoCad 2016, Cre-o 2.0 softwares. In machine performance machine productivity (P_m) = 200kg/hr, cleaning efficiency (Ƞ_cl) = 94.73 %, seed losses (Ƞ_loss) = 0.238 %, threshing efficiency (Ƞ_th) = 99 % and specific energy consumption (SEC) = 3.73 kw.h/ton. For fabrication all design aspect has been considered and also performance test has been carried after the fabrication of machine. Results revels accepted of design configuration primarily the performance machine is satisfactory.

**Future scope of the project:**
- It plays very important role in the fuel crisis in the future.
- Used as alternate fuel for petrol and diesel.
- Can able to develop automation process for the machine.
- The machine can also be extended to expeller process.
- It indirectly helps the Agro based industries.
- It helpful for the Pharmaceutical industries.