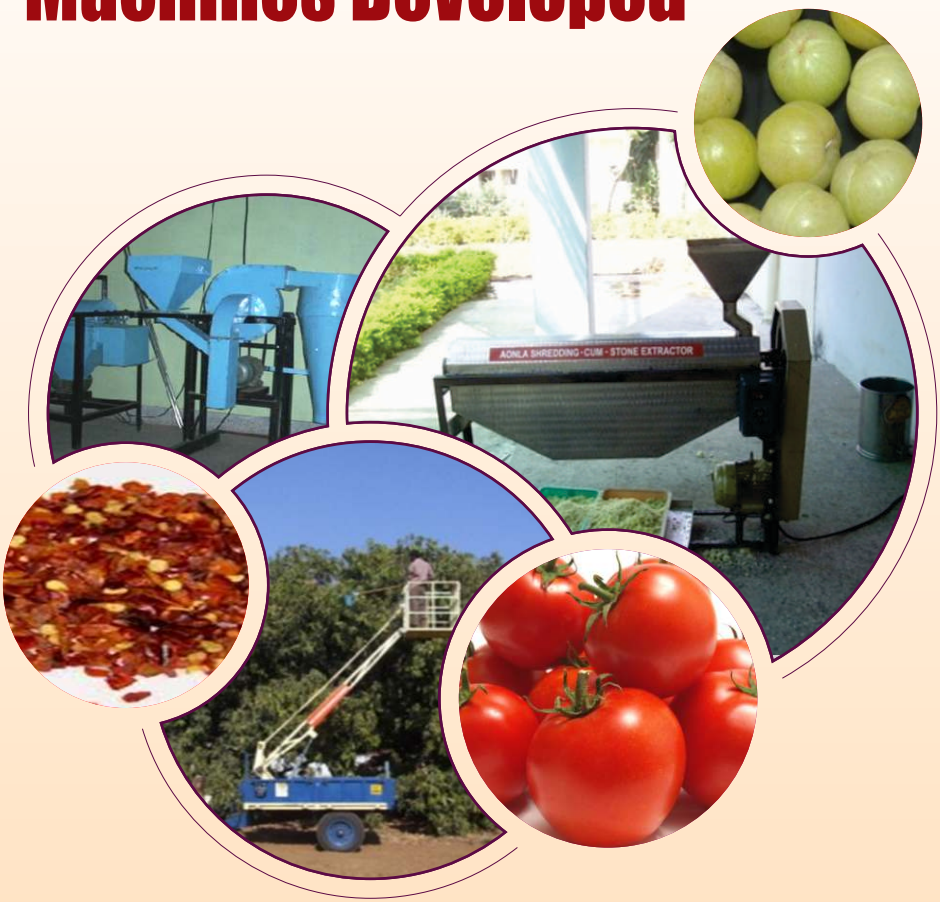
Publication Series No. EDU-6:6:2016:500

AAU
कृण्वन्तो राष्ट्रं कृषिसंपन्नम्

An Overview of Machines Developed



College of Food Processing
Technology and Bio-Energy
Anand Agricultural University, Anand-388 110

June 2019

Introduction:

The College of Food Processing Technology & Bio-Energy is a modern institute established exclusively for imparting education and conducting research in the area of Food Processing Technology & Bio-Energy. The College offers various academic programs leading to the degrees of B. Tech., M. Tech. and Ph. D. The college has state-of-art laboratory and pilot plant facilities for conducting high-end scientific research. Research in different disciplines is being implemented through highly trained and qualified scientists and engineers. The college has handled various research projects sponsored by World Bank, GoI, ICAR, GoG and other agencies.

Vision:

The College of Food Processing Technology & Bio-Energy works with the aim to create strong human resource for the Indian Food Industries.

Mission and Mandates:

- To bring into being highly skilled and motivated Food Processing Professionals.
- Educate and train the students in the field of Food Processing Technology and Bio-Energy for producing highly skilled and competent manpower in the Food Processing sector.
- Basic, applied and adoptive research and development in the area of Agro-Processing, Food Technology, Food Engineering, Food Quality Assurance, Bio-energy and other relevant subjects.
- First line transfer of technologies and consultancy in different aspects related to Food Processing Industry.

Technologies Developed:

The college to its credit has good number of innovative processes, technologies & machines in the area of agro and food processing, bio-energy and other related disciplines. Many of the technologies have been licensed for commercialization to the industry and entrepreneurs. The complete technical know-how including the manufacturing drawings are supplied on payment of a nominal fee. A brief of the technologies, processes and machines developed by the college is given here under.

INDEX

Sr. No.	Particulars	Page No.
	Post Harvest Processing Machinery	
1.	*Aonla* Shredding-Cum-Stone Extracting Machine	1
2.	*Aonla* Pricking Machine	2
3.	Tomato Seed Extractor	3
4.	Chilly Seed Extractor	4
5.	Brinjal Seed Extractor	5
6.	Seed Pelletizing Machine	6
7.	Multi-Utility Elevator Platform	7
8.	Roughage Block Making Machine	8
9.	Jatropha Seed Dehuller	9

Aonla Shredding-cum-Stone Extracting Machine

Utility of Machine :

To extract stone from mature *aonla* fruits and simultaneously obtain *aonla* shreds at relatively lower costs and without health hazards.

Salient Features :

Size of machine	1370 x 330 x 650 mm
Capacity of machine	60-70 kg. *aonla* / hour
Recovery	Shred 97-98%, Stone 93-94%
Power	1hp, 3 phase electric motor
Man power	1 worker
Cost	Approx. Rs.60,000/-

Machine Description :

- A continuous flow power operated machine has been designed for extracting stone from *aonla* fruits and simultaneously obtain thin *aonla* shreds.
- *Aonla* is fed into hopper from where it enters the drum chamber and goes into the space between roller and concave.
- *Aonla* gets scraped continuously by the rotating roller, against the concave and shreds are obtained.
- *Aonla* stones are conveyed forward along with roller being scrapped and are finally discharged separately at the other end.

Aonla Pricking Machine

Utility of Machine :

Pricking is the first step in processing of whole *aonla* fruit. Pricking facilitates the sugar uptake inside the whole *aonla*, thus reduces the astringency in taste when dipped in sugar solution. Manual process of pricking is highly tedious and time consuming. It also lacks the feasibility of pricking of large quantities and leads to uneven pricking depth & uneven number of pricks. Therefore, a simple and low cost *aonla* pricking machine has been developed.

Salient Features :

Size of machine	1100 X 400 X 1150 mm
Capacity of machine	30-65 kg aonla / hour
No. of pricks	25-30
Depth of pricks	8-10 mm
Power	1hp, single phase electric motor
Man power	1 worker
Cost	Approx. Rs.30,000/-

Machine Description :

- It is a continuous type pricking machine in which fruits are fed from top. Fruit rotates between the belt and the needle shoes and gets pricked.
- The pricked fruit is discharged from the lower end of the machine and collected at bottom.
- The depth of prick and the capacity can be varied as per requirement.

Tomato Seed Extractor

Function of Machine :

To obtain quality seeds from ripe tomato with minimum seed loss, high efficiency and reduced cost.

An indigenous technology has been developed to extract seeds from tomato.

Salient Features :

Size of machine	1580 X 1000 X 900 mm
Capacity of machine	45-60 kg/ hour
Seed recovery	98%
Juice recovery	80%
Power	1.5 hp, single phase electric motor
Man power	2 workers
Cost	Approx. Rs. 50,000/-

Machine Description :

- Tomato fruits are crushed in a crushing assembly and goes in to a separator where the seeds and juices are further separated using vibratory sieve mechanism and collected separately.
- The seed, juice and skin are obtained separately at three separate outlets.
- The mechanical process is quite cheaper and convenient than the manual method.

Chilly Seed Extractor

Function of Machine :

To extract seeds from dry chilies with minimum seed loss, high rate of seed production at reduced cost and least health hazard.

Salient Features :

Size of machine	**1450 X 920 X 600 mm**
Capacity of machine	**60-70 kg dry chilies/hour**
Seed recovery	**98%**
Power	**1 hp, 3 phase electric motor**
Man power	**2 workers**
Cost	**Approx. Rs. 70,000/**

The machine is very useful as the manual seed extraction is very tedious, causing health hazard to the workers and create unhygienic environment. The quality of the end products is also superior.

Machine Description :

- Dry chilies are crushed in a crushing assembly and goes to the drum separator assembly where the seeds and fines are separated from dry skin shell.
- The collected seeds and fines are fed to the cleaning unit to obtain clean seeds. Small pieces of skin and powder are obtained at the end of a cyclone separator. The skin shell also has high market value.

Brinjal Seed Extractor

Utility of Machine :

To conveniently extract quality seeds from whole ripe brinjal fruit with minimum seed loss, higher capacity and at lower cost.

Salient Features :

Size of machine	**1000 x 610 x 1640 mm**
Capacity of machine	**200 kg brinjal / hour**
Seed recovery	**97%**
Power	**1.5 hp, 3 phase electric motor**
Man power	**2 workers**
Cost	**Approx. Rs. 60,000/-**

Machine Description :

- Whole brinjal fruits are fed into hopper to cut by a cutting device and then crushed in a crushing assembly.
- It goes into a separator that separates the seed skin.
- The seed and brinjal pieces are separated by use of water spray jet inside the separating chamber.
- Seeds with water go into separating tank, from where seeds are collected at the bottom outlet of the tank while brinjal pieces are collected at separate outlet.

Seed Pelletizing Machine

Utility of Machine :

- To produce pellets (coated seeds) from very small, irregular shaped and costly seeds by appropriately coating them.
- To increase their size for making them suitable for sowing with help of machine.

Salient Features :

Size of machine	**1400 X 1000 X 600 mm**
Capacity of machine	**250-500gm/batch/3hours**
Size of pellets	**3 to 5 mm diameter**
Power	**3 kWh, single phase electric motor**
Man power	**1 worker**
Cost	**Approx. Rs. 85,000/-**

Machine Description :

- The machine consists of a hemispherical coating pan which rotates in an inclined plane with the help of a motor and a gear box.
- Cleaned and graded seeds, fed to the pan, assume rotation on inside surface of the pan and coating slurry is sprayed intermittently on to seeds by hand pump, drying them simultaneously by hot air supplied through a blower.
- The seed pellets so obtained gives better seediling growth, lower mortality, better plant stand and hence higher yield. It is also possible to do the various treatments to seeds during coating process.

Multi-Utility Elevator Platform

Functions:

- Worker can work efficiently at elevated height for different tasks.
- For safe and efficient harvesting of fruits.
- For efficient spraying and pruning of orchard.

Salient Features :

Capacity of fruit harvesting	70-150 kg /hour
Maximum height of harvesting	25 ft
Load bearing capacity	200 kg
Power requirement	Hydraulic system of a tractor
Labor requirement	2 including tractor driver
Capacity of operation	Higher capacity of harvesting than the traditional techniques
Cost	Approx. Rs. 2,50,000/- (without tractor)

Salient Findings:

- The tractor operated elevator attachment is a versatile and reliable worker-positioning platform from which the delicate fruits can be picked up or harvested very safely and efficiently from the trees.
- The positioning is adjustable by the operator himself both vertically and horizontally. Hence, selective picking of superior quality fruits is possible with negligible fruits drop.
- By adopting this technology, farmers need almost one-fourth labour for harvesting of crop per unit area, which reflects saving in cost of operation as well as time of operation and less damage to fruits and trees.

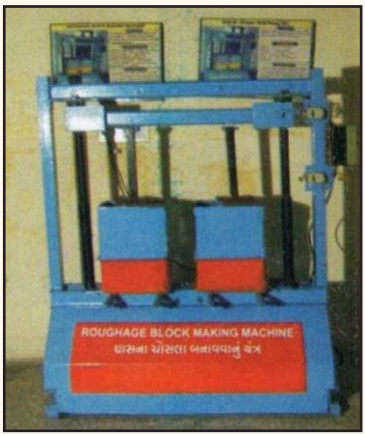
Roughage Block Making Machine

Function:

To prepare animal feed blocks from grass, crop residues, straws, leaves and other conventional/non conventional feed materials for easy and economic handling, storage, distribution, transportation and fodder for animal.

Salient Features :

Size of machine	1750 X 1450 X 750 mm
Power	3hp, 3 phase electric motor
Man power	3-4 workers
Size of feed block	300 X 300 X 200 mm
Weight of block	5-6 kg/ block
Capacity of machine	48-50 blocks /hour
Cost	Approx. Rs. 1,00,000/-



Machine Description :

- Machine is made up of MS frame fitted with a motor. The rotary motion of the motor is converted to give a linear vertical motion to a crosshead mounted on screw shaft. Suitable switch gears have been provided to monitor the direction of movement.
- The raw animal feed materials are loaded in die block and pressed to make a suitable cattle feed block.
- The machine is useful to farmers for preparing blocks from surplus grass, crop residues, straws etc. to easily store them in less space or get more price by selling them with ease in transportation.

Jatropha Seed Dehuller

Function:

To dehull the Jatropha seeds which aids in efficient expelling of oil from the Jatropha seeds and it also increases the capacity of processing unit.

Salient Features :

Size of machine	1800 X 780 X 780 mm
Power	2 hp, 3 phase electric motor
Man power	1 worker
Capacity of machine	100 kg seeds/hour
Approx. cost of dehulling	Re 1/ kg of seeds

Machine Description :

- The machine uses the centrifugal force for seed dehulling.
- The dehuller consists of a fast rotating impeller inside a fixed housing. The seed moves onwards with very high velocity and get impacted on stationary surface of housing. Due to impact at a certain angle, the hull gets opened and the seed slides along stationary surface.
- From the bottom of the dehuller, the mixture of unhulled seed, kernel, hull and brokens are obtained.
- The developed machine has high capacity as compared to manual dehulling and is efficient and economical for dehulling the Jatropha seeds.


COLLEGE OF FOOD PROCESSING TECHNOLOGY & BIO ENERGY


EXPERIENTIAL LEARNING UNITS
College of Food Processing Technology & Bio Energy
Anand Agricultural University, Anand

Contact us at:

College of Food Processing Technology and Bio-Energy
Anand Agricultural University
Anand-388 110
Tel./FAX. (02692) 261302

Email: deanfpt@aau.in