

1. THRESHING EQUIPMENTS

Arecanut Dehusker



1. Function	:	To dehusk the dired arecanut fruits
2. Specification		
(a) Overall dimension	:	1660 x 600 x 1615
(b) Capacity	:	Black polythene sheet 100 micron thickness (0.1mm)
(c) Power required	:	1 hp electric motor
3. General Information	:	It consists of a mainframe on which a rotary shelling drum having 8 Nos. of solid rubbers on its periphery is mounted (like rasp bar threshing cylinder). Below this, a concave is placed to aid shelling and to pass the dehusked material down. After dehusking kernels and husk flow to the duct and reach the air stream, produced by a blower. The husk is thrown out and the kernels / nuts are collected at the bottom. Depending upon the size of fruits, the concave has to be changed for higher efficiency and minimum breakage. Grading the dried fruits before dehusking will also help to increase the dehusking efficiency and reduce the breakage.
4. Cost of the unit	:	Rs.37, 500/-
5. Cost of the operation	:	Rs.15/h
6. Salient features	:	<ul style="list-style-type: none"> i. The unit is portable ii. Depending upon the size of the fruit, the concave has to be changed. iii. Initial grading of fruits will increase the dehusking efficiency iv. Suitable for continuous dehusking

Groundnut Decorticator (Power Operated)

1. Function	:	To shell groundnut pods and separate kernels
2. Specification		
(a) Overall dimension	:	1130 x 350 x 1345
(b) Capacity	:	400 kg/h
(c) Power required	:	1 hp electric motor
3. General Information	:	It consists of a hopper, double crank lever mechanism, an oscillating sector with sieve bottom and a blower assembly, all fixed on a frame. A number of cast iron peg assemblies are fitted in the oscillating sector unit. The groundnut pods are shelled between the oscillating sector and the fixed perforated concave screen. The decorticated shells and kernels fall down through the perforated concave sieve. The blower helps to separate the kernels from husk and the kernels are collected through the spout at the bottom. The shells are thrown away from the machine
4. Cost of the unit	:	Rs.45,000/-
5. Cost of operation	:	Rs.20/h
6. Salient features	:	<ul style="list-style-type: none"> i. Clearance between the concave and oscillating sector is adjustable to suit the different. ii. Concave sieves are also replaceable depending upon pod size iii. The oscillating sector of the unit decorticates by rubbing action iv. The efficiency of the unit is 92%.

Groundnut Decorticator (Hand Operated)

1. Function	:	To shell groundnut pods and separate kernels
2. Specification		
(a) Overall dimension	:	600 x 350 x 700
(b) Capacity	:	200 kg/h
(c) Power required	:	Manual
3. General Information	:	It consists of an oscillating sector with sieve bottom and a handle. Numbers of cast iron peg assemblies are fitted in the oscillating sector unit. The groundnut pods are shelled between the oscillating sector and the fixed perforated concave screen. The decorticated shells and kernels fall down through the perforated concave sieve. The kernel and husk are collected at the bottom of the unit and separated manually
4. Cost of the unit	:	Rs.9,000/-
5. Cost of operation	:	Rs.5/h
6. Salient features	:	<ul style="list-style-type: none"> i. Clearance between the concave and oscillating sector is adjustable to suit the different varieties. ii. Concave sieves are also replaceable depending upon pod size iii. The oscillating sector of the unit decorticates by rubbing action iv. The efficiency of the unit is 98%

Sunflower Seed Sheller



1. Function	:	To shell the sunflower seeds and to separate husk
2. Specification		
(a) Overall dimension	:	1640 x 680 x 2830
(b) Capacity	:	125 kg/h
(c) Power required	:	3 hp electric motor
3. General Information	:	It consists of a high speed rotor with six curved vanes with two flutes in each, a stator of a tapered wooden surface lined with a thick hard rubber, blower and a sieve assembly. The seeds are poured into the hopper graded by the sieve assembly and fed into the rotor through the elevator. The rotor throws the seeds on the stator at a high velocity and the seeds get shelled by the impact force. The shelled material is subjected to an air blast in a chute and the husk is separated. The shelled kernels are separated in the sieve assembly
4. Cost of the unit	:	Rs. 50,000/-
5. Cost of operation	:	Rs.25/h
6. Salient features	:	(i) Power operated centrifugal type sheller (ii) The Quality oil and cake from shelled seeds is superior (iii) Efficiency of the unit is 89%

Cotton Seed Delinting Machine

1. Function	:	To delint the fuzzy cotton seed for seed purpose
2. Specification		
(a) Overall dimension	:	660 x 490 x 1410
(b) Capacity	:	50 kg/h
(c) Power required	:	1 hp electric motor
3. General Information	:	This machine consists of a stainless steel container, agitator, slurry outlet, delinted seed outlet and a power drive. Five kg of cotton seeds are fed into the stainless steel drum. The agitator is rotated. Half a litre of commercial sulphuric acid is poured slowly into the container having the cotton seeds through its periphery. Due to the churning action, the cotton fuzz is uniformly subjected to the acid reaction. At the end of 90 seconds, the acid treated seed and the slurry are washed with the water. The process of washing with water is repeated three to four times Then, the seeds are collected and dried
4. Cost of the unit	:	Rs. 30,000/-
5. Cost of operation	:	Rs. 15/h
6. Salient features	:	<ul style="list-style-type: none"> (i) Batch type operation (ii) Delinting of the seeds by acid (iii) The efficiency of the unit is 95% (iv) Seed born diseases are minimized (v) Acid treated seeds are free to flow

Sorghum Pearler



1. Function	:	To remove the hull/seed coat from sorghum and other millets
2. Specification		
(a) Overall dimension	:	740 x 330 x 1140
(b) Capacity	:	25 kg/h
(c) Power required	:	1 hp electric motor
3. General Information	:	The pearler consists of a cylindrical abrasion rotor made up of a series of abrasion stone discs mounted on a horizontal shaft without any gap between them. The rotor so formed is mounted in a metal case with a clearance of 1.5 cm at the sides and around the bottom of the roller. Two screws of pitch length 1.5 cm each are provided at the inlet end. An aspirator is provided at the outlet end to suck and remove husk. Grains are fed at one end of the pearling unit at a uniform rate and collected at the other end. The level of grain inside the unit is adjusted during operation for efficient operation. This cycle of operation has to be repeated depending upon the extent of hull/seed coat to be removed
4. Cost of the unit	:	Rs. 22,500/-
5. Cost of operation	:	Rs. Rs.20/h
6. Salient features	:	(i) Dry milling system to remove the seed coat (ii) It has cylindrical abrasion disc type stones (iii) Pearling efficiency is 80 - 85%

Hand Operated Thresher for Black Pepper (*Piper nigrum* L.)



1. Function	:	To separate the pepper berries from the pepper vines
2. Specification		
(a) Overall dimension	:	500 x 500 x 1500
(b) Capacity	:	60 kg/h
(c) Power required	:	Manually operated
3. General Information	:	This pepper thresher consists of a metallic drum provided with rasp bars, concave, power drive with a handle and a sieve for separating the empty spikes. Through the handle provided, the unit is operated. The unit has provision to adjust the clearance between the rotor and the concave to minimize damage to the berries. The empty spikes need to be fed second time for threshing depending on the berries present in the vines.
4. Cost of the unit	:	Rs. 7, 500/-
5. Cost of operation	:	Rs. 175/tonne of pepper
6. Salient features	:	(i) Suitable for threshing black pepper from the pepper vine. (ii) Manually operated (iii) Efficiency-96% (iv) Suitable for small and marginal holdings

Mechanical Thresher for Black Pepper (*Piper nigrum* L.)



1. Function	:	To separate the pepper berries from the pepper vines
2. Specification		
(a) Overall dimension	:	750 x 600 x 500
(b) Capacity	:	320 kg/h
(c) Power required	:	2 hp electric motor
3. General Information	:	This pepper thresher consists of a metallic drum provided with rasp bars, concave, power drive and oscillating sieve. The pepper spikes fed through the hopper reaches the threshing drum and undergoes threshing. The empty spikes and berries reach the oscillating sieve mechanism and the empty spikes are separated. The clearance between the drum and rotor can be adjusted to minimize the breakage
4. Cost of the unit	:	Rs.30,000/-
5. Cost of operation	:	Rs. 125/tonnes of pepper
6. Salient features	:	(i) Suitable for threshing black pepper from the pepper vine. (ii) Efficiency-95% (iii) Suitable for small and marginal holdings

Paddy Winnower

1. Function	:	Cleaning of paddy by winnowing
2. Specification		
(a) Type	:	750 x 600 x 500
(b) Overall dimension	:	1,210 mm x 960 mm x 1,430 mm
Test Result		
Suitability of crops	:	Paddy
Capacity	:	7.5 q/h
Power requirement	:	1 ha electric motor
Labour requirement	:	Two
Winnowing efficiency	:	97%
Cost of equipment	:	Rs. 7,000
Salient Features	:	The machine winnows paddy already threshed by the paddy thresher or by other means. It has a feeding hopper at the top to receive the threshed paddy, chaff and straw bits. A blower provided at the bottom sends a stream of air which separates the straw, chaff and other impurities. The dust, chaff and straw come out through an opening and cleaned paddy is taken out through another spout

Maize Husker-cum-Sheller



1. Function	: Dehusking and shelling of maize cobs
2. Specification	
(a) Type	: Power operated, drum rotar type husker-cum-sheller
(b) Overall dimension	: 1,210 mm x 960 mm x 1,430 mm
Test Result	
Suitability of crops	: Maize
Capacity	: 6.5q(kernels)/h
Power requirement	: 7.5 hp electric motor
Labour requirement	: Seven
Cost of equipment	: Rs 16,000
Salient Features	: The machine winnows paddy already threshed by the paddy thresher or by other means. It has a feeding hopper at the top to receive the threshed paddy, chaff and straw bits. A blower provided at the bottom sends a stream of air which separates the straw, chaff and other impurities. The dust, chaff and straw come out through an opening and cleaned paddy is taken out through another spout

2. CLEANING & GRADING

Grain Winnower



1. Function	:	To dehusk the dired arecanut fruits
2. Specification		
(a) Overall dimension	:	2130 x 600 x 1320
(b) Capacity	:	500 - 750 kg/h
(c) Power required	:	1 hp electric motor
3. General Information	:	This machine winnows and cleans the paddy and other grains after threshing. It consists of a feed hopper to hold the grain for cleaning. It discharges the grain over a scalper and removes bigger size impurities. A blower provided at the bottom passes air against the grain falling through the scalper which separates the straw, chaff and other impurities. The dust, chaff and straw are collected separately and cleaned paddy is taken out through another outlet near the bottom of the unit.
4.cost of the unit	:	Rs.30, 000/-
5. Cost of operation	:	Rs.25/h
6. Salient features	:	(i) It is a continuous type. (ii) It is suitable for other grains also (iii) The efficiency of the unit is 97%

Rotary Sieve Multi Crop Cleaner cum Grader



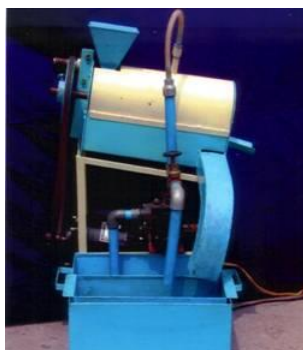
1. Function	:	To clean and grade grains, spices, etc.
2. Specification		
(a) Overall dimension	:	2130 x 600 x 1100
(b) Capacity	:	100 - 250 kg/h
(c) Power required	:	Hand operated
3. General Information	:	This cleaner cum grader consists of a rotor provided with three numbers of sieves and the sieves can be changed according to the crop to be cleaned and graded. A handle is provided to operate the rotor at 15 to 30 rpm speed. For easy conveying of the material, a screw auger is provided inside the rotor. Below each sieve, outlet is provided to collect the graded output.
4. Cost of the unit	:	Rs. 8,000/-
5. Cost of operation	:	Rs.15/h
6. Salient features	:	<ul style="list-style-type: none"> (i) It is a continuous type. (ii) The sieves can be changed according to the CROP (iii) Suitable for grains, spices and etc (iv) Efficiency of the unit is 96%

Hand Operated Rotary type Garbling Unit for Cardamom



1. Function	:	For garbling dried cardamom
2. Type	:	Manually operated
(a) Capacity	:	100 kg/hr
(b) Efficiency of garbling is	:	98%
(c) Cost of equipment (approx)	:	Rs.4,000/-
3. Salient Features	:	<ul style="list-style-type: none"> (i) Hand operated unit. (ii) Capacity 5 kg of cardamom per batch and time taken is 2- 5 minutes per batch (iii) Percentage broken is less than 5% (iv) Reduces drudgery to the labourers (v) Savings in time : 50% (vi) Savings in cost: 66%
4. Cost of the unit	:	Rs. 8,000/-
5. Cost of operation	:	Rs.15/h
6. Salient features	:	<ul style="list-style-type: none"> (i) It is a continuous type. (ii) The sieves can be changed according to the crop (iii) Suitable for grains, spices and etc (iv) Efficiency of the unit is 96%

Peeler cum Washer for Production of White Pepper



1. Function	:	For the production of white pepper hygienically from ripe pepper berries.
2. Capacity		
(a) Power operated unit	:	125 kg/hr
(b) Hand operated unit	:	15 kg/ha
3. Cost of unit (approximate)	:	Rs.22,000
4. Cost of production		
(a) Power operated unit	:	Rs.65/quintal
(b) Hand operated unit	:	Rs.460/quintal
(c) Manual method	:	Rs.850/quintal
5. Efficiency of the unit	:	91%
6. Salient Features	:	<ul style="list-style-type: none"> i. 1 hp power is required for power operated unit ii. Water fed inside the peeling chamber helps easy peeling and removal of skin after iii. Water requirement is 50% less because it is recirculated during washing iv. The same unit can be operated manually during electricity failure

Pulper cum Washer for Coffee

1. Function	:	To pulp and wash the coffee parchments
2. Specification		
(a) Overall dimension	:	600 x 450 x 650
(b) Capacity	:	500 kg/h
(c) Power required	:	3 hp electric motor
3. General Information	:	Pulping and washing are the two estate level important operations in the processing of coffee parchments. This unit consists of a pulping unit and a washing unit. Compared to the traditional pulpers and washers, which are operated separately with two different power units, this unit is operated by a single power source. Besides the water requirement for pulping and washing is reduced considerably.
4. Cost of the unit	:	Rs. 75,000
5. Cost of operation	:	Rs. 25/h
6. Salient features	:	<ul style="list-style-type: none"> (i) Suitable for both pulping and washing (ii) Requires less water (4 litres per kg of parchments) compared to 14 litres by the conventional pulpers (iii) Breakage is minimum

Seed Cleaner cum Grader

Function Specifications	:	Cleaning and grading of all seeds
Type	:	Power operated, continuous crippen model
Overall dimensions	:	1,800 mm x 1, 200 mm x 1, 800 mm
Test Results	:	Paddy, Maize, Cholam (Jowar), Sunflower and Cumbu (Bajra)
Capacity	:	
Power requirement	:	1 hap electric motor
Labour requirement	:	Two
Cleaning efficiency	:	92%
Labour requirement	:	Two
Cost of equipment	:	Rs.30,000
Salient Features	:	This machine is suitable for processing and upgrading of all kinds of seeds by using the sieves of required size. Screen suitable for almost all crops like; jowar, bajra, paddy and sunflower are available. The machine can be operated with electric motor or oil engine

Groundnut Grader

1. Function	:	Grading of groundnut pods
2. Specification		
(a) Type	:	Power operated, slotted oscillating sieve
(b) Overall dimensions	:	2,250mm x 1,050mm x 1.350mm
3. Test Results		
(a) Suitability for crops	:	Groundnut
(b) Capacity	:	6q/h
(b) Power requirement	:	Rs.460/quintal
(c) Labour requirement	:	Rs.850/quintal
(d). Cost of equipment	:	91%
3. Salient Features	:	<ul style="list-style-type: none"> i. 1 hp power is required for power operated unit ii. Water fed inside the peeling chamber helps easy peeling and removal of skin after iii. Water requirement is 50% less because it is recirculated during washing iv. The same unit can be operated manually during electricity failure

3. DRYING EQUIPMENTS

Agricultural Waste Fired Mechanical Dryer

1. Function	:	To burn agricultural wastes and to produce hot air
2. Specification		
(a) Overall dimension	:	3100 x 890 x 200
(b) Capacity	:	1 tone/day
(c) Power required	:	2 hp electric motor
3. General Information	:	This unit consists of an agricultural waste fuelled furnace, blower and rectangular metal bin for keeping the grains, etc. The fire tube type furnace can generate heat by burning any agricultural waste. The unit can produce hot air upto 80°C by suitably mixing the hot air with ambient air through an adjustable butterfly valve. Through a flexible duct, the hot air is supplied to the drying bin.
4. Cost of the unit (approx)	:	Rs.1,50,000/-
5. Cost of operation	:	Rs.20/h
6. Salient features	:	<ul style="list-style-type: none">i. All types of agricultural wastes and crop residues can be used as fuelii. Suitable for drying pods, grains, coconut kernel, etciii. Air temperature and flow rate can be adjusted and controlled

Fluidized Bed Dryer for Mushroom



1. Function	:	To dry the oyster and milky mushroom
2. Specification		
(a) Overall dimension	:	2500 x 450 x 1500
(b) Capacity	:	6 kg/batch
(c) Power required	:	3 hp electric motor; 2000 W for heaters
3. General Information	:	The fluidized bed dryer consists of a centrifugal blower, holding bin, heating coils, motor and thermostat control. The blower is run by a 3 hp, three phase motor. The delivery of the blower is connected to the heater drum, provided four numbers of fin type electrical heaters of each 500 watts and controlled through a stem type thermostat. At the other end of the heater drum, the drying chamber is placed. Hot air of 50 to 90°C temperature at a flow rate of 9 to 32 m ³ / minute can be obtained in this dryer. The whole assembly is placed on a suitable frame made of mild steel
4. Cost of the unit (approx)	:	Rs.45,500/-
5. Cost of operation	:	Rs.50/kg of dry mushroom
6. Salient features	:	<ul style="list-style-type: none"> i. Suitable for drying oyster and milky mushroom. ii. Dries oyster mushroom in 2 hours and milky mushroom in 6 hours iii. The dried mushroom useful for the production of mushroom based ready to use mix and products.

Continuous Flow Heated Sand Medium Drier

1. Function	:	Drying-cum-roasting of food grains
2. Specification		
(a) Overall dimension	:	2500 x 450 x 1500
(b) Capacity	:	6 kg/batch
(c) Power required	:	3 hp electric motor; 2000 W for heaters
3. General Information	:	The fluidized bed dryer consists of a centrifugal blower, holding bin, heating coils, motor and thermostat control. The blower is run by a 3 hp, three phase motor. The delivery of the blower is connected to the heater drum, provided four numbers of fin type electrical heaters of each 500 watts and controlled through a stem type thermostat. At the other end of the heater drum, the drying chamber is placed. Hot air of 50 to 90°C temperature at a flow rate of 9 to 32 m ³ / minute can be obtained in this dryer. The whole assembly is placed on a suitable frame made of mild steel
4. Cost of the unit (approx)	:	Rs.45,500/-
5. Cost of operation	:	Rs.50/kg of dry mushroom
6. Salient features	:	<ul style="list-style-type: none"> i. Suitable for drying oyster and milky mushroom. ii. Dries oyster mushroom in 2 hours and milky mushroom in 6 hours iii. The dried mushroom useful for the production of mushroom based ready to use mix and products.

4. MILLING & EXTRACTING

Mini Dhal Mill

1. Function	:	To split the grain legumes into dhal
2. Specification		
(a) Overall dimension	:	385 x 365 x 865
(b) Capacity	:	20 kg/h
(c) Power required	:	1 hp electric motor
3. General Information	:	The dhal mill split all kinds of legumes into dhal. For making dhal all pulses have to undergo pre-milling treatments such as soaking in water, mixing with oil, drying, etc. It consists of a hopper to hold the pulse, an auger to feed the pulse to the dehusking chamber. In the dehusking chamber pulses are sent in between a rotating cast iron disc and a stationary rubber pad and get dehusked. Depending upon the size of the pulse, the clearance between the rotating disc and the rubber disc can be adjusted with the help of a hand wheel provided outside the dehusking chamber. By replacing the rubber disc with cast iron serrated disc, this can be used for pulverizing the dry grains into flour
4. Cost of the unit (approx)	:	Rs.15,000/-
5. Cost of operation	:	Rs.5/h
6. Salient features	:	<ul style="list-style-type: none"> (i) It is a suitable for splitting all types of pulses. (ii) Pre treatment of pulses before milling is essential (iii) The efficiency of the unit is 90%. (iv) The pulse grower can process at farm level and get more revenue

Dhal Mill cum Wet Grinder



1. Function	:	Wet grinding, splitting of pulses into dhal and dry grinding
2. Specification		
(a) Overall dimension	:	760 x 425 x 880
(b) Capacity	:	2 kg of dry grinding /h; 2 -3 kg of wet material/ h
(c) Power required	:	1 hp electric motor
3. General Information	:	The unit comprises of two components. One dhal milling unit and the other wet grinder unit. Both the equipments are mounted over a laminated wooden box and each can be operated separately by a dog clutch mechanism
4. Cost of the unit (approx)	:	Rs.18,000/-
5. Cost of operation	:	Rs.5/h
6. Salient features	:	<ul style="list-style-type: none"> i. Suitable for splitting of pulses and grinding all kinds of cereals and pulses. ii. Also Pre suitable for wet grinding of cereals and pulses iii. With a single prime mover any one can be operated using a clutch

Chilli Seed Extractor



1. Function	:	To extract seeds from dried chilli
2. Specification		
(a) Overall dimension	:	925 x 630 x 1040
(b) Capacity	:	4 quintals/ day
(c) Power required	:	0.5 hp electric motor
3. General Information	:	It consists of a hopper, extraction chamber; rotating beater assembly on bearings with suitable drive connects. The dried chilly fruits are macerated into small pieces without cell rupture and thereby the seeds are separated from the unit
4. Cost of the unit (approx)	:	Rs.22, 500/-
5. Cost of operation	:	Rs.6/h
6. Salient features	:	(i) Continuous type (ii) Minima scorching and pungent smell to labourers (iii) Separated chilli can be ground and suitable for food purpose

Tomato Seed Extractor



1. Function	: To extract seeds from tomato fruits
2. Specification	
(a) Overall dimension	: 500 x 450 x 1000
(b) Capacity	: 180 kg of fruit (1.8 kg of seed) per hour
(c) Power required	: 1 hp for electric motor and 0.5 hp for pump
3. General Information	: The unit consists of a feed hopper, fruit crushing chamber, seed separation unit, water recycling system and seed collecting trough. In the crushing chamber the tomato fruits are crushed and squeezed by the rotating screw auger. In the seed separation unit, water separates the seed from the flesh and collected in a container placed at the bottom of seed separation unit. The water collected in the trough is recycled by means of a pump. The flesh coming out of the seed separation unit is collected separately
4. Cost of the unit (approx)	: Rs.22, 500/-
5. Cost of operation	: 10 per hour
6. Salient features	: (i) Seed extraction is faster compared to the manual method (ii) Less water requirement (3 litre per minute)

Brinjal Seed Extractor



1. Function	:	To extract seed from well ripe brinjal
2. Specification		
(a) Overall dimension	:	500 x 450 x 1000
(b) Capacity	:	120 kg of fruits per hour
(c) Power required	:	1 hp electric motor
3. General Information	:	The brinjal seed extractor consists of a fruit crushing chamber and a seed separation unit. In the fruit crushing chamber, radially arranged crushing rods crush the fruit into pulp with the addition of water. The pulp is conveyed to the bottom of the seed separation unit. The seed separation unit houses a sieve placed horizontally, seed outlet, agitator, pulp outlet and drain. In the agitator, a radial arm are fixed to separate good seeds from the pulp and helps to move the pulp to move to top of the seed separation unit. The good seeds settle on the sieve and collected along with water by opening the valve.
4. Cost of the unit (approx)	:	Rs.22, 500/-
5. Cost of operation	:	Rs.10/h
6. Salient features	:	(i) The extraction of seed of faster than the manual method (ii) Water requirement is reduced (3 litre per minute)

Improved Four Roller Sugarcane Crusher



1. Function	: To extract the juice by crushing sugarcane
2. Specification	
(a) Overall dimension	: 1210 x 510 x 1100
(b) Capacity	: 250 kg/h
(c) Power required	: 7.5 hp electric motor
3. General Information	: There are four rollers provided in this crusher compared to the three rollers in the conventional crushers. Through the shafts and gear wheels, power is transmitted to the rollers and extracts the juice by crushing the cane.
4. Cost of the unit (approx)	: Rs.75,000/-
5. Cost of operation	: Rs.15/h
6. Salient features	: (i) Four roller horizontal crusher (ii) 60 - 70% of the available juice can be extracted (iii) 8-10% additional juice is recovered than the conventional crushers

Hand Operated Aonla Seed Remover



1. Function	: To remove seeds from aonla
2. Specification	
(a) Type	: Hand operated
(b) Power requirement	: One male/female
(c) Overall dimensions	
(d) Capacity	: 20 kg/hr (or) 530 fruits / hr
3. General Information	
4. Cost of the unit (approx)	: Rs.1600/-
5. Cost of operation	: Rs.10/hr
6. Salient features	: <ul style="list-style-type: none"> i. The seed remover is simple and easy to handle ii. Deseeded fruits with punch hole increases the osmosis of syrup iii. Mechanical pulping of fresh aonla is feasible without seeds crushers iv. Saving cost:90%

5. WASTE UTILIZATION

Compost Pelletizer



1. Function	: To make pellets from compost
2. Specification	
(a) Overall dimension	: 1000 x 900 x 900
(b) Capacity	: 100 kg/h
(c) Power required	: 5 hp electric motor
3. General Information	: The compost mixture is fed into the barrel housing the screw auger. The screw conveys the compost against the die assembly and extrudes it as pellets. A rotating knife cuts the pellets into small pieces. The pellets are passed over an oscillating tray and collected at the bottom as globules
4. Cost of the unit (approx)	: Rs.37, 000/-
5. Cost of operation	: Rs.15/h
6. Salient features	: (i) Pellets of uniform size can be obtained (ii) Pellets can be easily distributed in the field as soil manure (iii) More suitable for soil application at specific locations

Briquetting Machine



1. Function	:	To make briquettes from coir pith
2. Specification		
(a) Overall dimension	:	765 x 350 x 990
(b) Capacity	:	125 kg/h
(c) Power required	:	5 hp electric motor
3. General Information	:	The machine consists of a feed hopper, an overhanging screw shaft, barrel housing and an extruder die pipe. The screw shaft is mounted at one end by ball bearings and the other end is over hanging freely. The barrel assembly has been housed over the screw shaft and mounted on a stand. The free end of the screw shaft is tapered to a length of 30 cm and housed inside an extruder pipe of same length. The screw shaft is coupled directly to a reduction gear unit (10:1) and is driven by a 5 hp electric motor. Fibre free coir pith and cow dung are mixed at 6:1 ratio with required quantity of water so that it will form briquettes during operation
4. Cost of the unit (approx)	:	Rs.45,000/-
5. Cost of operation	:	Rs.20/h
6. Salient features	:	(i) Continuous horizontal type extrusion machine (ii) Briquettes are formed by compression (iii) Produces hollow briquettes with a calorific value of 3000 K.cal/kg

Adhesive from Tamarind Kernel Powder (TKP)

1. Function adhesive	:	5 hp electric motor
2. General Information	:	The tamarind kernel is extracted during the pulping process of tamarind. The kernels are not finding utilisation in the industry level, rather used as adulterants in the foods. The rich content of carbohydrate and protein makes it suitable for the production of adhesives. In the process of manufacture, the tamarind kernel powder is mixed with hot water 200%, glucose 5%, formalin 4% and sodium carbonate 12% by weight. The adhesive prepared by the above said process have good strength qualities as that of the commercially available product
3. Cost of the unit (approx)	:	An investment of about Rs. 75,000 will be required for cottage level production
5. Cost of operation	:	Rs.20 per kg of adhesive
6. Salient features	:	(i) Suitable for the production of adhesive from tamarind kernel powder (ii) Suitable for production at cottage industry level (iii) Suitable for application in wood works, paper industries, etc

Production of Particle Board from Coir pith



1. Function	:	To utilize coir pith for the production of particle board
2. General Information	:	Coir pith being a waste disposed from the coir industries; pose the danger of pollution and health hazard. Being a lingo-cellulosic material, coir pith can be utilized for the production of particle board. The process of production of coir pith particle board involves drying of the coir pith and resination using phenol formaldehyde (16%) or urea formaldehyde (20%). The resinated pith is formed into a mat of desired thickness and hot pressed at 120°C for 15-20 minutes. This board after the formation is trimmed along the sides and suitable for use as table top and providing partition and other light works. The laminated boards will be suitable for exterior use, as the water absorption and swelling character are more for the coir pith boards
3. Cost of operation)	:	Rs. 60 and per sq. ft. of the board
4. Salient features	:	(i) Finds utilization for the coir pith (ii) The boards are suitable for interior use as table top and for providing partition

Production of Paper Boards Form Agricultural waste Materials

1.Function	:	To utilize agricultural wasters and farm residues for the production of paper boards
(a) Capacity	:	5000 pads per month
(b) Power required	:	Minimum 25 hp
2. General Information	:	The agricultural waste materials like, banana stem, peduncle, cotton stalk are rich in lignin and cellulose. They are suitable for the production of paper and paper boards. In this technology, agricultural waste materials are digested and pulped with the addition of waste paper in the proportion of 3:1. The pulp is spread on the autovot for the required thickness of the paper and taken. This is dried and the surface is made smooth and utilized for the production of files and other products
4. Cost of the unit	:	Minimum investment of rs.5 lakhs for cottage level
5. Cost of operation	:	Rs.2 per file
6. Salient features	:	(i) Finds utilization for the agricultural waste materials (ii) The paper boards produced are eco friendly

6. VALUE ADDITION

(i) Equipments for Value Addition

Household Paddy Parboiling Unit



1. Function	:	To parboil paddy uniformly
2. Specification		
(a) Overall dimension	:	650*900
(b) Capacity	:	125 kg/batch
(c) Power required	:	5 kg of firewood/batch
3. General Information	:	The parboiling drum is made of galvanized iron sheet of 20 gauge thickness with a lid. The drum is divided into three equal portions. The top two-third portion retains paddy for parboiling and bottom one-third portion holds water to produce steam for parboiling. A perforated slanting sheet with perforated pipes separates the steam chamber from parboiling chamber. The lateral perforated pipes attached to the main steam pipe divides the entire parboiling chamber into a number of small compartments and helps for uniform and simultaneous parboiling of paddy. Perforated sloping floor helps for natural unloading of parboiled paddy. The water in the drum can be heated by burning firewood or any agricultural waste. After the completion of parboiling, the remaining hot water can be used for next batch
4. Cost of the unit (approx)	:	Rs.4,500/-
5. Cost of operation	:	Rs.7/h
6. Salient features	:	(i) Uniform parboiling and increased head rice recovery is possible (ii) Times 45 minutes for parboiling the first batch of soaked paddy and 25 minutes for the subsequent batches (iii) It can also be used as a storage bin, when not used for parboiling

Cassava Chipper

1. Function	:	To cut / slice the cassava into chips
2. Specification		
(a) Overall dimension	:	660 x 350 x 450
(b) Capacity	:	270 kg/h
(c) Power required	:	0.5 hp electric motor
3. General Information	:	The chipper mainly consists of a feed hopper with guides, chipping disc with knives and chips outlet. The feed hopper is provided with vertical guides made up of pipes of diameter varying from 25 to 80 mm for 100 mm length to facilitate feeding of tubers of different diameters. There are three numbers of sharp chipping blades fixed radially on the circular chipping disc. The chipping disc is mounted at the top of the vertical shaft and rotates at 300 rpm. The clearance between the disc and the chipping blade can be varied to obtain desired thickness of the chips. The tubers fed through the guides of the feed hopper reach the chipping disc and get sliced by the knives. The chips are discharged through the inclined chips outlet
4. Cost of the unit (approx)	:	Rs.15,000/-
5. Cost of operation	:	Rs.5/h
6. Salient features	:	(i) Power operated vertical feed type chipper (ii) The rotating blades of the unit slice the tuber (iii) Suitable for other tuber crops like carrot, potato, etc

Turmeric Boiler



1. Function	:	To cut / slice the cassava into chips
2. Specification		
(a) Overall dimension	:	660 x 350 x 450
(b) Capacity	:	270 kg/h
(c) Power required	:	0.5 hp electric motor
3. General Information	:	The chipper mainly consists of a feed hopper with guides, chipping disc with knives and chips outlet. The feed hopper is provided with vertical guides made up of pipes of diameter varying from 25 to 80 mm for 100 mm length to facilitate feeding of tubers of different diameters. There are three numbers of sharp chipping blades fixed radially on the circular chipping disc. The chipping disc is mounted at the top of the vertical shaft and rotates at 300 rpm. The clearance between the disc and the chipping blade can be varied to obtain desired thickness of the chips. The tubers fed through the guides of the feed hopper reach the chipping disc and get sliced by the knives. The chips are discharged through the inclined chips outlet
4. Cost of the unit (approx)	:	Rs.15,000/-
5. Cost of operation	:	Rs.5/h
6. Salient features	:	(i) Power operated vertical feed type chipper (ii) The rotating blades of the unit slice the tuber (iii) Suitable for other tuber crops like carrot, potato, etc

Fish Feed Pelletizer

1. Function	:	To produce water stable pellets
2. Specification		
(a) Overall dimension	:	385 x 380 x 465
(b) Capacity	:	10 kg of fish feed/h
(c) Power required	:	0.5 hp electric motor
3. General Information	:	The pelletizer consists of a feed hopper, barrel assembly with screw auger and die. The cooked material is pressed through the die by the screw auger and pellets are formed. The pellets obtained from this unit are to be dried before feeding to the fishes. The various ingredients of the fish feed, like, Rice bran (6%) by weight, groundnut oil cake (20%), Tapioca flour (10%), Silk worm pupae (5%) and Fish waste (5%) are mixed well and cooked for a short time before it is fed into the pelletizer
4. Cost of the unit (approx)	:	Rs.37,500/-
5. Cost of operation	:	Rs.5/h
6. Salient features	:	(i) Pellets of varying sizes can be produced (ii) The pellets are water stable (iii) Feeds of various ingredients can be extruded as pellets

Value Addition Technologies

Vacuum Packaging of Banana



1. Function	:	To pack and store the banana to delay ripening
(a) Power required	:	0.5 hp for the vacuum packaging machine
2. General Information	:	Banana ripens in three to five days after harvesting. Ripening during the long distance transport and export, results in huge post harvest losses. To delay ripening of fruits, vacuum packaging is one of the methods, where the matured banana hands are packaged and prevented from contact with air/ oxygen. Using a simple gadget for vacuum packaging, banana can be stored under vacuum. This delays ripening upto 21 days and further ripening is completed within one week after opening the package
4. Cost of the unit	:	Rs.1,50,000 (cost of the vacuum packaging machine)
5. Cost of operation	:	Rs.15/h
6. Salient features	:	(i) The vacuum packaged banana can be stored without ripening upto 21 days (ii) No residues of chemicals are found (iii) The quality is not affected

Technology of Production of Tomato Paste



1. Function	:	To process tomato into concentrate form
2. Specification	:	
(a) Capacity	:	Depending on the production capacity
(b) Power required	:	Based on capacity
3. General Information	:	This technology aims at processing and preservation of glut season tomato for use during the off-season. Hybrid tomatoes, suitable for the production of tomato concentrate/ paste, are made into pulp in a pulper. The pulp is concentrated to paste (25° Brix) in an open steel vessel/ a steam kettle. Sodium benzoate is added as preservative @ 250 ppm and packed for storage
4. Cost of the unit (approx)	:	Rs. 3 lakhs is the investment for a minimum capacity
5. Cost of operation	:	Rs.35 per kg of paste (including cost of raw material)
6. Salient features	:	<ul style="list-style-type: none"> (i) The paste recovery is 14% (ii) Can be stored upto six months in bottles and pouches and upto one year in cans (iii) Most suited during the market glut, when the process go down (iv) Tomato paste can be used during off-season (v) Paste is suitable for the manufacture of other products from tomato

Technology for Extrusion Cooking of Finger Millets



1. Function	:	To produce value added products from millets
2. Specification		
(a) Overall dimension	:	960 x 750 x 600
(b) Capacity	:	10-20 Kg
(c) Power required	:	7.5 hp electric motor
3. General Information	:	Extrusion cooking is a process of value addition of cereals and other grains for the production of the value added products, the extrudates. For the extrusion cooking of finger millet (ragi) flours, a single screw laboratory model extruder is required. The flour is conditioned to moisture content for about 22% (wb), one hour prior to the extrusion. During conditioning, cassava flour to a level of 20% is added to increase the expansion, crispiness and acceptability. Extrusion is done at barrel temperature and screw speed 115°C and 225 rpm, respectively
4. Cost of the unit (approx)	:	Rs.1,00,000/-
5. Cost of operation	:	Rs.15 per kg
6. Salient features	:	(i) Value addition of finger millets (ii) Finds industrial application for finger millet (iii) Other millets can also be extruded

Packaging of Tomatoes in Corrugated Carton Boxes



1. Function	:	To package the tomatoes suitable for handling
2. Specification		
(a) Overall dimension	:	Sizes depending on the pack size
(b) Capacity	:	10-20 Kg
(c) Power required	:	0.5, 1.0 and 2 kg packs
3. General Information	:	<p>In this system of packaging, compartments are provided in the corrugated carton boxes for each fruit. By this, the load of the tomato from top layers, due to self weight is not transmitted to the tomato in the bottom layers. For packaging of tomatoes using carton boxes, the dimensions of the boxes and the compartment are designed for two grades classified according to diameter, with 50 – 60 mm as first grade, 40 – 50 mm diameter as second grade. These corrugated carton boxes with compartments developed for 0.5, 1 and 2 kg packs were evaluated for losses during handling and transportation. The total losses were only 14 and 18% for the hybrids and improved varieties. This reduction in the total loss is achieved by packing the tomatoes by the farmers in these boxes and not opened in the market network till it reaches the customers</p>
4. Cost of the unit (approx)	:	Rs. 4.00 per kg
5. Salient features	:	<p>(i) Packaging is made of corrugated carton boxes, which are easily degradable and recyclable (ii) Use of carton boxes in place of wooden crates preserves the forest (iii) Handling for sorting and packing is avoided at various stages of market network. (iv) The farmers can grade and pack in the boxes and without opening and further handling in the market network it. (v) can reach the consumers (vi) The post harvest loss is reduced to 18 and 14% for improved varieties and hybrid against 32 and 25% in the traditional method using bamboo baskets (vii) This method of packaging is more suitable during the seasons with higher selling price.</p>

TNAU Insect Trap



1. Function	:	To utilize cir pith for the production of particle board
2. Specification		
(a) Overall dimension	:	27 mm diameter and 150 mm long
(b) Capacity	:	Suitable for a bin holding upto 25-50 kg
3. General Information	:	The basic characteristics of the stored product insects, viz., affinity towards air, tendency to move towards aerated region, wander in the grain and active during dusk and dawn have been exploited in the development of the trap. The stored grain insects, like red flour beetle, saw toothed beetle, rice weevil, paddy moth, turmeric beetle, drug beetle, pulse beetle, groundnut bruchid, dermestid beetles, flat grain beetles, etc with the behaviour of wandering in the bulk grain, reach the insect trap. These insects will enter the trap through the perforations and reach the stem of the trap. In the stem, as the insects cannot move upward and escape, they move towards the bottom and reach the pit fall placed at the bottom
4. Cost of the unit (approx)	:	Rs.75/-
5. Salient features	:	<ul style="list-style-type: none"> (i) Suited only for bin storage (ii) 2 or 3 traps can be placed at 15 to 20 cm depth in a bin of 30 to 45 cm diameter and 25 kg capacity for maximum benefit (iii) No insecticide is used in this trapping technique. (iv) Easy to handle and maintenance free.

Pelletizer for Fish Meal

1. Function	:	Preparation of fish meal pellets
2. Specification		
(a) Type	:	Power operated, extrusion type continuous Pelletizer
(b) Overall dimensions	:	500 mm x 400 mm x 400 mm
Test Results		
Suitability for products	:	Fish meal
Capacity	:	10 kg/h (fish meal)
Power requirement	:	0.5 hp electric motor
Labour requirement	:	One
Cost of equipment	:	Rs 2,800
Cost of pellitisation	:	Rs 36.60/q of fish meal
3. Salient features	:	The pelletizer consists of a feed hopper, a barrel, a screw auger, a perforated disc V belts, chain and frame. The fish meal which is generally a mixture of rice bran (60 %), groundnut oil cake (20%), tapioca flour (10%), silkworm pupa (5%) and fish waste (5%) is cooked for a suitable duration and then fed into the pelletizer. Normally pallets of 3mm diameter and 10mm length are produced by this unit. However, peilrts of varying sizes can also be made by replacing the disc with other one having desir size of holes. The pellets are to be dried before feeding to fishes,