



Screw Conveyor

tune of 4,000 to 5,000 liters per tonne fruits (with water recycling mechanism) or 20,000 to 25,000 liter water per tonne fruits (without water recycling mechanism). Thus, ecopulper save water to the extent of 70% to 80%.

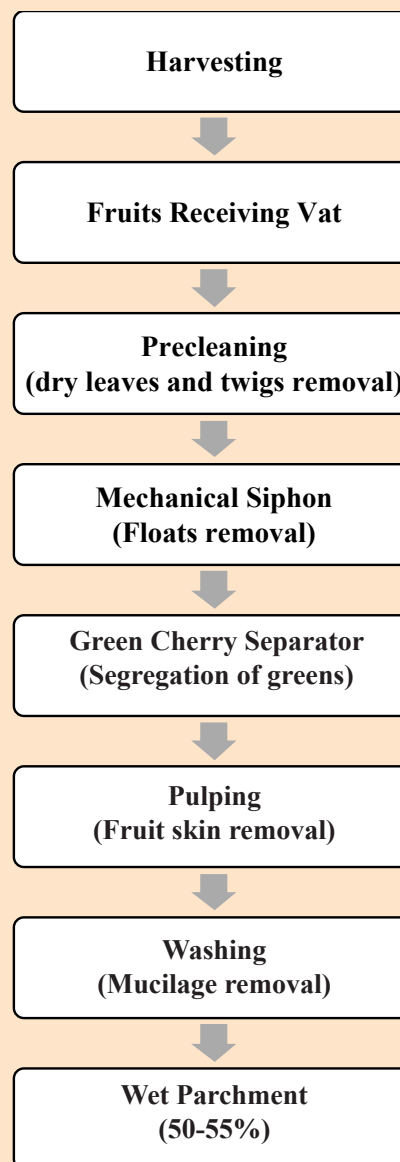


Compost Pit

As effluent generation is almost nil in case of ecopulper, there is no need for the construction of effluent treatment plant (ETP). One or two solar evaporation lagoons (depending the production level) are sufficient to store and treat the recycled water.

Cost of eco pulpers and installation: The capacity of ecopulper ranges from 2,000 to 10,000 kg of fruits/hour. Arabica cherries are easier to pulp than Robusta as a result the capacity of pulper's decreases when pulping Robusta coffee. The total cost of the pulpers, accessories and civil work of 1 tonne per hour capacity ranges from Rs. 10 to 12 lakhs. The higher cost of ecopulper, accessories and

civil works establishments is the major barrier for adoption by small and medium growers. Co-operative approach by the small growers would help in overcoming the barrier. To encourage coffee planters to install eco-pulpers, the Coffee Board is providing subsidy to the tune of 40% (coffee holdings upto 25 Ha), 25% (coffee holdings above 25 Ha) and 75% for Farmer Producer Organizations (FPOs).



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ECOPULPER



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Coffee is processed by two methods: wet and dry method. Wet processing of coffee consumes relatively large amount of water at various stages of processing (conveying & separation of sound fruits from floats/lights; pulping of sound fruits; washing of depulped fruits; post-wash soaking of wet parchment). Thus, coffee processing by wet method generates huge quantity of effluent which if not properly treated would lead to environmental pollution. The problem of water pollution will be aggravated in coffee tracts as the period coincides with the dry season when the flow in natural water bodies will be at minimum level. The constant increase in coffee production and urban development around the processing units are the two factors that considerably aggravate the problem.

The unceasing effort and constant evolution of coffee processing technology led to the development of “**Ecological Processing Methods/Ecopulper**”. The concept of ecopulper emerged as a solution to the pollution problem caused by wet processing. This new method includes ecological handling of pulp, mucilage and effluent. In recent years, coffee growers are installing ecopulper and processing coffee with very little quantity of water.

The literature survey indicated that various companies manufacture ecopulper worldwide. The imported ecopulpers installed by coffee growers in Karnataka state are from M/s. PENAGOS (Colombia), M/s.PINHALENSE (Brazil). Similar type of ecopulper is also manufactured locally by few companies viz., M/s. Supreme Engineers, Chikkamagaluru, M/s. Sagar Industries, Chikkamagaluru and M/s.Abrar Engineering, Madikeri.

The basic units of ecopulper includes fruits receiving vat, cleat belt conveyer, mechanical winnower, metallic mechanical siphon tank, recycling water tank, water drainer, green cherry separator, vertical pulper and vertical washer.

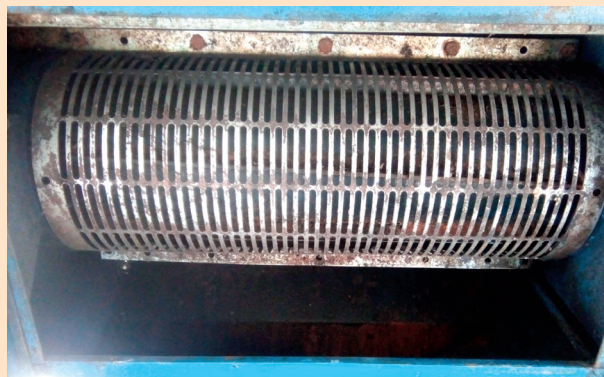
i) Fruit Receiving Vat: In conventional pulpers, water is used for conveying the fruits from fruit vat to siphon tanks and then to the pulper. In contrast, in ecopulper, fruits are lifted from fruit vat to the mechanical siphon tank by means of cleat belt conveyer which saves water and also labour.

ii) Mechanical Winnower: Mechanical winnower is used to remove light impurities (dried leaves/twigs). This unit is very useful while processing the Robusta as the Robusta harvesting is done mainly by stripping and invariably contains leaves & twigs of shade trees (especially silver oak

leaves). Separation of these crop residues enables smooth functioning of pulper and washer.

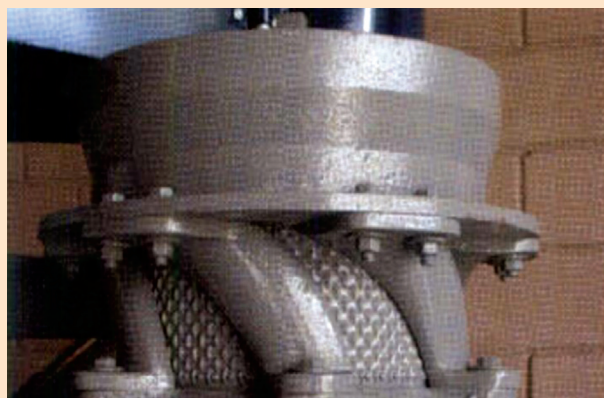
iii) Metallic Mechanical Siphon Tank: A metallic siphon tank (usually 1,000 to 1,200 liter capacity) is used for the separation of floats/lights. The water used for separation of floats is recycled for three to four days depending on the quantity of fruits processed.

iv) Green Cherry Separator (GCS): GCS is an important unit in ecopulper which segregate the greens/unripe fruits from the ripe fruits based on the firmness of the fruits. Greens are very relatively firm as compared to ripe fruits. The unripe and ripe cherries fed into the GCS (also called as screen pulper). While the fruits pass through the screen pulper, the ripe fruits squeezed and pass through the longitudinal slits and fall into the vertical pulper. In GCS, the ripe fruits get squeezed and this makes further pulping easier. The greens cannot pass through the longitudinal slit due to firmness and carried away to the other end of the screen pulper. Then they are collected through a screw conveyer and converted into cherry coffee through dry processing.



Green Cherry Separator

v) Vertical Pulper: Pulping refer removal of fruit skin along with some portion of mucilage. The squeezed ripe fruits discharged from the GCS gets pulped into vertical pulper consuming very little water as it is already partly pulped.



Vertical Pulper

Ecopulper invariably equipped with vertical drum pulper which pulp all sized berries without much bean damage.

vi) Mucilage Remover (Aqua-washer): This operation aims to remove the mucilage adhering the bean after pulping. Ecopulper usually have an upward flow mucilage remover. The mucilage is removed by rubbing the parchment beans against each other and against the mobile & static parts of the machineries.



Vertical Washer

The pulped beans discharged from the vertical pulper are fed from the bottom of the mucilage remover and the washed beans comes out at the top of the machine. Very little quantity of water is injected with high pressure at various points of the mechanical mucilage remover. The mucilage flows through the holes of the screen in the form of a very viscous liquid that is discharged at the bottom of the machine. The mucilage discharged from the washer get mixed with the pulp (sippae) emanated from the vertical pulper and both get mixed. This mixture of pulp and mucilage is transported to the compost pit through screw conveyer and used for composting purpose.

Water Consumption: Ecopulper consume little water about 500 liters (Arabica) to 1,500 liters (Robusta) per tonne of fruits. Whereas conventional pulper consume water to the

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