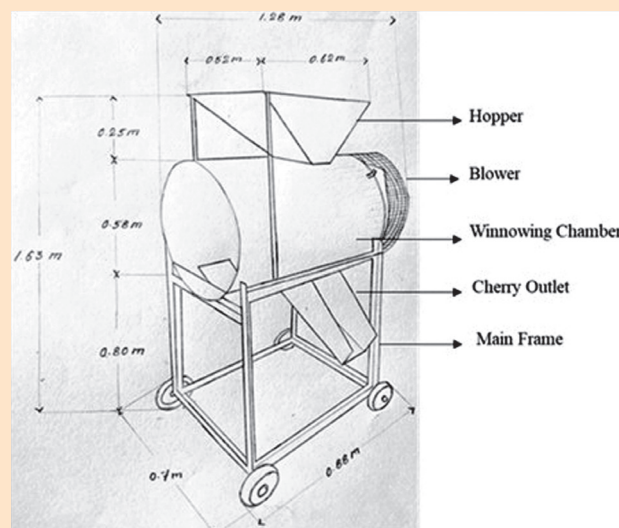


velocity of 4 ms^{-1} through the exit. This constant air speed was adjusted using a digital anemometer and either by decreasing or increasing the speed of the blower using a speed regulator. An on/off switch (16A) was provided to start or stop the supply of power. Rubber wheels (4 nos.) of 200 mm diameter were provided for easy movement of the winnower. The approximate cost of the winnower is twenty-five thousand (Rs.25,000/-).

The power operated cherry winnower is recommended to operate at feed rate of 20 kg min^{-1} to obtain a maximum cleaning efficiency (99%) and output capacity (1,200 kg per hour). The operating cost of the dry cherry winnower was Rs.105 per hour.

The power operated winnower had a lower operating cost than manual winnowing (Rs.265 h^{-1}). The performance of the power operated dry cherry winnower is economically feasible. The cost and time of winnowing can be reduced by 67% and 72%, respectively by using the dry cherry winnower when compared to conventional winnowing.



Particulars	Specifications
Dimensions (L x W x H)	1.63 x 0.7 x 1.63 m
Blower	18" dia, 359 W
Hopper size	0.62 x 0.52 x 0.34 m
Rubber wheel	8" dia (4 Nos.)
Approx. Cost	Rs.25000/- per unit
Capacity (kg h^{-1})	1200

* * *

MECHANICAL CHERRY COFFEE WINNOWER



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In India, about 20% of Arabica fruit and 85% of Robusta fruits are dry processed which result in the production of cherry coffee. In case of dry processing, the harvested fruits are sorted out to remove the unripe/greens, overripe and tree dried fruits from the harvested coffee lot. Then, the ripe fruits, unripe/greens, over ripe and tree dried fruits are dried separately under the sun until the moisture level attains to 11%. Then, the resulting dry cherry coffee will be bagged for safe storage.

Before bagging the dry cherries, it should be cleaned to remove the dried leaves, twigs, dust & other chaffy materials which results in a more homogenous dry cherry coffee lot and attracts a better price to planters.

At estate level, the standard practice followed for cleaning the dry cherry is to pour the dry cherry from a higher elevation to the ground along the wind direction so that the draft of air will blow away all foreign materials. The clean dry

cherry can be collected from the ground. But this method is time consuming, laborious and depends on wind conditions. Considering these limitations, a low-cost power operated dry cherry winnower was developed and evaluated at Central Coffee Research Institute.

The dry cherry winnower consisted of a hopper, blower unit, cherry outlet and frame. The whole unit including the blower, speed regulator, on/off switch, cylindrical barrel and hopper was mounted on a metallic frame. The main frame was fabricated using a mild steel angle of size 38 x 38 mm to support the components. The overall dimension of the frame was 643 (L) x 610 (W) x 610 (H) mm. The cylindrical winnowing chamber of 930 mm length and 585 mm diameter was mounted on the top of the winnower frame.

The hopper was designed based on the angle of repose of dry cherry coffee. The angle of inclination of the hopper walls was kept at $>40^\circ$ to ensure proper flow. The hopper was made of mild steel (16 SWG). The location of the hopper was 948 mm above the ground. The feed rate was controlled by a sliding

gate provided at the bottom of the hopper. The hopper capacity was calculated using the hopper volume and bulk density of dry cherry coffee.

The winnowing chamber was designed so that the dry cherry along with the lighter material and chaff would fall from the hopper at a distance of 0.205 m from the fan blades. As the mixture falls into the air current, the lighter material and chaff are blown out of the winnowing chamber by air blast, while the heavier dry cherry with a lesser drag coefficient falls and is guided out by the cherry outlet. Immature cherry (floats) that are relatively lighter will be carried by the air blast a little away from the sound cherry outlet and collected by the immature cherry outlet.

A 359 W industrial exhaust fan with 1400 rpm was used as a blower for the operation of the winnower. The speed of the blower was controlled by using a speed regulator. The blower discharged an air blast under the hopper with a constant

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