

Custard Apple

Custard Apple is a sweet, creamy fruit commonly consumed as dessert. It is a seasonal fruit that is available from September to December in Maharashtra. It consumed both as fresh fruit or as processed products such as ice creams and shakes.

S. No.	Business Opportunity	Brief description
1	Fresh custard apple – Direct to market	Fresh custard apple with basic value, add such as washing, sorting, and packaging
2	Custard apple pulp – Store and sell	Custard apple is deseeded, deep freeze and sold during off season for further processing
3	Custard apple powder	Custard apple pulp can be further processed into powder through different drying methods
3	Custard apple seed oil	Oil from custard apple seeds can be extracted and used for cosmetic and pesticidal use

Custard apple pulp can be further processed to products such as custard apple powder, custard apple ice cream and custard apple ready-to-serve drinks. Freeze dried custard apple is also a potential business opportunity. The business opportunities for these products are not elaborated in this documents as they might not be feasible business ventures to FPOs due to limited market potential and high investments required.

1 Fresh custard apple – Direct to market

Custard Apple can be sold directly to market with basic post-harvest value addition such as washing, sorting, and packaging in corrugated fibre boxes. Custard apples have very low shelf life of 4-5 days, and hence must be sold immediately after harvesting.

Technology	Type	Eligible for Matching Grant
Plastic crates	Implement	Yes
Foam / bubble sheets	Consumables	No
Packhouse	Civil construction	Yes
Bubble washer	Equipment	Yes
Conveyor lines	Equipment	Yes
Packaging:	Consumables	No

Technology	Type	Eligible for Matching Grant
<ul style="list-style-type: none"> - Small, corrugated fibre board boxes (Jota) lined with paper (strips) or bubble sheets OR - 250 gauge poly film (2% vents) wrapping of individual fruits 		

Process:

- Custard apples should be arranged in plastic crates on harvesting to minimize physical damage to the fruit. Foam or bubbles sheet lining can be provided as additional safety measure
- It can be washed through a bubble washer to remove field dirt
- To increase shelf life, custard apple can be treated with wax emulsion (10% to 12%)
- Washed fruits are sorted manually. Since the fruits are highly fragile, using mechanical sorters may damage the fruit
- Custard apple fruits are then packed in small, corrugated fibre board boxes called Jotas (4-8 fruits in a box). These boxes keep the fruit safe from damage during transit
- Conveyor lines can be used for sorting process and packaging process
- Individual fruits (A Grade) can be packed in 250 gauge poly film (2% vents) wrapping. This helps in increasing the shelf life and provides premium appeal

Advantages:

- Custard apple can be taken to market at the earliest without any storage to realize maximum value
- No significant investment is required to sell custard apples immediately after harvest

Disadvantages / Challenges:

- Since custard apple is a seasonal fruit, selling it during off-season can fetch significantly high prices
- If there are no processing infrastructure available, then custard apple should be sold at spot market prices even if they are very low

Additional process:

- Custard apples require reefer storage for transportation to distant markets, due to its high perishability. Before loading it into reefer containers, they should be pre-cooled through forced air cooling. Setting up of pre-cooling facility only for the purpose of custard apple may not be feasible due to low utilization (limited season of 3 months)

Advanced process:

- Optical sorters are available that can sort custard apple based on size, weight, and physical appearance. But optical sorters are expensive machines, and it may not be feasible to be employed only for sorting of custard apple

2 Custard apple pulp – Store and sell

Custard apple, being a seasonal fruit is available only for 3-4 months (September to December) in a year. In addition, it not suitable for even short-term storage, both dry and cold storage. Hence, converting the fruit into pulp is the only way to make the fruit available during offseason.

Technology	Type	Eligible for Matching Grant
Shed for unit	Civil construction	Yes
Manual scooper	Implement	Yes
Custard apple de-seeder	Equipment	Yes
Pulp collection tank – Stainless steel tank	Equipment	Yes
Pulp cleaning table – Stainless steel table	Equipment	Yes
Continuous band sealer	Equipment	Yes
Blast freezer	Equipment	Yes
Deep freezer	Equipment	Yes

Custard apple of A Grade may be marketed as fresh fruit as it fetches premium pricing. Lower grade fruits can be processed into pulp.

Process:

- Custard apple is peeled manually and the pulp is removed out through a scooper
- The scooped out pulp is then fed into the de-seeder machine, to separate pulp from seeds
- Pulp collected in the collection tank is laid out on a table for removing seeds, peel, and foreign matter
- Anti-browning agent such as 0.1-0.25% ascorbic acid can be mixed with the pulp. KMS can also be used as anti-browning agent
- Cleaned pulp is then packed in pouches and sealed by a continuous band sealer
- Packed pulp is frozen to -20°C through a blast freezer
- Frozen pulp can be stored at -20°C for up to 6 months
- The process from pulping to freezing should be done in the shortest time possible. Exposure to ambient surroundings can lead to microbial infestation

Advantages:

- Selling custard apple pulp during off-season for further processing, especially ice cream manufacturers can provide FPOs good margins

- Custard apple skin and seeds, byproducts of this business, can be sold at reasonable price as manure and pesticide, respectively

Disadvantages / Challenges:

- Blast freezers require high investment. FPOs should ensure utilization of blast freezers during off-season by renting it out or by utilizing it for processing of other products. Alternatively, FPOs can rent blast freezers as per requirement
- Any microbial infection to pulp can make it unsaleable leading to significant losses

Additional Process:

- Custard apple pulp can be further processed to custard apple powder. This can be done by drying the pulp and powdering the dried pulp. Drying of pulp can either be done by a spray drier or a freeze drier. Custard apple powder has limited market potential as it is not widely consumer. Brand building to market the powder will require additional investments.

3 Custard Apple Powder

Custard apple pulp can be further processed into powder form through various drying process. Custard apple powder’s demand is on increasing trend due to its health benefits. FPO can either market it through their own brand in cities or can supply to established brands as third-party manufacturers.

Technology	Type	Eligible for Matching Grant
Spray dryer	Equipment	Yes
Vibratory Sieve	Equipment	Yes
Packaging: - Vacuum packaging in polyethylene bags (or) - Manual packaging in plastic / glass bottles	Equipment (or) Manual Process and Consumables	Equipment – Yes
Manual induction dealer (in case of packaging in plastic / glass bottles)	Equipment	Yes

The equipment suggested for custard apple powder manufacturing should always be combined with custard apple pulp manufacturing equipment.

Process:

- Custard apple pulp is mixed with maltodextrin in required quantities

- Custard apple pulp is dried through spray dryer to process it into powder
- The obtained powder is then passed through a vibratory sieve to get fine powder. Alternatively, handheld sieve can also be used
- Powder can either be packed in polyethylene bags or bottles (glass / plastic). In case of packaging in polyethylene, vacuum packaging is recommended as it provides higher shelf life of powder
- In case of packaging in bottles, sealing the bottle using an induction sealer is recommended for higher shelf life
- Branding material for packaging can be done through third-party label manufacturers

Advantages:

- Custard apple powder is a premium product that is seeing increasing demand from consumers. Hence, FPOs can get higher margins by selling the powder through online or in cities directly

Disadvantages / Challenges:

- Custard apple powder's market is still small as consumption is limited
- Branding and directly marketing to consumers would require significant investments in marketing

Advanced process:

- Freeze drying process can be adopted in place of spray drying. Freeze drying equipment requires very high investment though the quality of freeze-dried powder is better than spray-dried powder

4 Custard Apple Seed Oil

Custard apple seed is a byproduct of the pulp extraction process. Custard apple seed oil extract can be used as a biopesticide. It is also used for cosmetic purposes – hair and skin application. Custard apple seed oil can be either sold to farmers or sold directly to consumers through e-commerce. FPOs can also act as third-party manufacturers for established cosmetic brands selling custard apple seed oil.

Technology	Type	Eligible for Matching Grant
Washing tank – Stainless steel tank	Equipment	Yes
Sun drying yard	Civil construction	Yes
Cold press machine	Equipment	Yes
Handheld sieve / filter	Implement	Yes

Custard apple seed oil unit should be combined with the equipment suggested in pulp manufacturing process, as the seeds are a byproduct of that process.

Process:

- Custard apple seeds are washed either on flowing water or through a tank
- They are sun-dried to remove moisture from the seeds
- Standard cold press machines can be used to extract oil from the seeds
- Handheld sieve can be used to remove suspended solids and impurities from the extracted oil

- Bottling or bulk packaging (cans, pouches) can be done as per requirement, manually

Advantages:

- Since it is processing of a by-product, the input cost is negligible. This results in high margin
- The oil can be sold to member farmers. This results in significantly less selling expense
- Cold press machines are commonly available on pay per use basis. FPOs can extract oil though pay as per use basis without making any investment

Disadvantages:

- Direct B2C sales through online channels is challenging, as it will require investments for marketing and competing with established brands
- Utilization of cold press machines for this purpose may be low as quantity of seeds available to the FPO would be limited

Alternate Process:

- Drying of the seeds can also be done using a Solar or Electric dryer. But sun drying is cost effective and utilization of the dryers shall be less if it is utilized only for drying custard apple seeds