

Natural Grape & Apple Vinegar Line

Complete Turnkey Business Proposal



Supplier reference: real stainless sanitary fermentation and process tanks representative of a small fruit-vinegar plant.

3,000-5,000 L starter cycle volume	1,000 L entry acetator size	4-8% typical final acidity range	5-8 entry operators
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Prepared for investment planning in Afghanistan and regional export markets. Final specifications, pricing, civil works, and utility loads require supplier quotation and site survey.

Executive Summary

This line produces natural fruit vinegar through two biological stages. Yeast first converts fruit sugars into ethanol under controlled conditions; acetic-acid bacteria then oxidize the ethanol into acetic acid with strong, clean aeration. The project is a vinegar plant, not an alcoholic beverage business: intermediate alcohol is contained within the validated process and converted to the final food acid. Sanitation, starter culture, oxygen transfer, temperature and acidity are the decisive controls.

Why this project fits Afghanistan

- Afghan grapes and apples can become a shelf-stable culinary and food-service product.
- Small tanks accommodate seasonal fruit and controlled recipe development.
- Vinegar creates a legal value route for sound fruit that misses premium fresh grades.
- Maturation and packaging can be scaled independently after repeat demand is proven.

Sanaatchi delivery scope

- Factory setup planning, supplier pre-qualification, and technical comparison
- Complete production-line and individual equipment supply
- Factory layout, utilities, civil-work coordination, installation, and commissioning
- Raw-material sourcing, trial-batch qualification, and repeat supply planning
- International logistics, customs documentation, operator training, spare parts, and after-sales support

Recommended configuration

For the lowest credible entry, select a 3,000-5,000 L/cycle system with washer and crusher-press, primary fermenters, one 1,000 L aerated acetator, maturation tanks, filter, pasteurizer and semi-automatic filler. Launch either apple or grape vinegar first, using a laboratory-confirmed starter culture and defined total acidity, before alternating fruit types.

Manufacturing Process & Product Portfolio

Integrated process flow



Target products

Product	Typical specification	Primary market
Natural apple vinegar	Buyer-approved total acidity, residual alcohol, clarity, aroma and microbiology	Households, restaurants and food processors
Natural grape vinegar	Defined acidity and grape-derived flavor without spoilage notes	Retail, pickling and culinary buyers
Unfiltered traditional vinegar	Sold only under a validated live-culture and shelf-life specification	Specialty retail buyers

Fruit-vinegar suppliers describe washing, extraction, enzyme treatment where required, alcoholic fermentation, acetic fermentation, maturation, clarification, filtration, sterilization and filling. Dedicated acetators from 500 L upward use acid-resistant stainless steel and intensive aeration. Sanaatchi requires a process technologist to define culture management, oxygen transfer and legal residual-alcohol limits before commercial operation.

Core Equipment Schedule

Step	Equipment	Function	Indicative parameter
1	Fruit washer, crusher and press	Produces clean fruit juice for fermentation	Interchangeable settings for apples and grapes
2	Juice balance and pasteurization tank	Adjusts the starting must and controls contamination	Jacketed sanitary vessel with temperature record
3	Primary fermentation tanks	Supports yeast conversion of sugars to ethanol	Closed, vented, temperature-monitored tanks
4	Aerated vinegar acetator	Oxidizes ethanol to acetic acid	1,000 L acid-resistant vessel with sterile air and cooling
5	Culture and inoculum vessel	Maintains an active controlled starter	Small sanitary seed tank and sampling port
6	Maturation and settling tanks	Develops flavor and settles suspended solids	Covered food-grade vessels with minimal oxygen pickup
7	Filter and pasteurizer	Finishes clear stable vinegar where specified	Selected for filtered or live-culture product
8	Bottle filler, capper and labeler	Packs released vinegar	Semi-automatic 250 mL-1 L starter formats

Equipment models are indicative and will be matched to the selected capacity, local raw-material tests, available utilities, and preferred automation level.

Reference Equipment Gallery



Supplier reference: real stainless sanitary fermentation and process tanks representative of a small fruit-vinegar plant.



Supplier reference: real hygienic tank, piping and heat-treatment installation used for controlled liquid-food fermentation.

Images are supplier references for configuration discussion; final equipment appearance and model may differ.

Plant, Raw Materials & Utility Requirements

Raw materials

- Sound Afghan apples or grapes
- Potable water
- Verified yeast and acetic-acid bacteria cultures
- Only permitted nutrients or processing aids
- Acid-compatible food bottles, caps, labels and cartons

Utilities & infrastructure

- Stable electricity
- Potable water and hygienic drainage
- Oil-free filtered air for the acetator
- Cooling water for fermentation temperature control
- Food-safe heat source for pasteurization
- Ventilated fruit, fermentation and finished-product areas

Quality, safety and environmental controls

- Accept fruit by ripeness, sugar, acidity, mold and pesticide limits
- Control sanitation and starter-culture identity before inoculation
- Track sugar, ethanol, temperature, pH and acidity through both fermentations
- Maintain sterile aeration without foaming or overheating the acetator
- Verify final total acidity, residual alcohol, clarity, flavor and microbiology
- Validate pack compatibility and filtered or live-culture shelf life

A final factory layout must reserve safe forklift routes, maintenance clearances, raw-material segregation, finished-goods storage, fire protection, ventilation, and future expansion space.

Indicative Investment & Implementation Plan

LOW-ENTRY CONFIGURATION

Lowest entry uses a shared fruit press, small primary fermenters, one 1,000 L aerated acetator, simple maturation, filtration and semi-automatic filling. Land, building, fruit inventory, culture laboratory and packaging working capital are excluded.

Component	Indicative range	Notes
Fruit washing, crushing, pressing and juice tank	US\$5k-12k	Compact shared fruit intake
Primary fermenters and 1,000 L acetator	US\$10k-24k	Core two-stage fermentation
Maturation, filtration and pasteurization	US\$5k-12k	One launch product style
Semi-automatic filling, utilities and spares	US\$4k-10k	Limited bottle formats
Freight and clearance	US\$4k-9k	Confirm nested tank shipment
Indicative low-entry total	US\$28k-67k	Building, fruit stock, culture laboratory and bottles excluded

Implementation sequence

Phase 1	3-5 weeks	Confirm fruit, product style, acidity target, cultures and legal requirements
Phase 2	4-7 weeks	Run laboratory and pilot fermentations and approve the process recipe
Phase 3	7-12 weeks	Manufacture, inspect and ship the tanks and equipment
Phase 4	6-10 weeks	Install, train, validate consecutive batches and begin shelf-life study

Ranges are planning targets for a low-cost entry configuration, exclude land, and remain subject to confirmed capacity, supplier quotation, freight, duties, exchange rates and site conditions.

Next Steps & Contact Information

Recommended next steps

- Confirm target products, hourly output, and packaging formats
- Test representative raw materials and document quality requirements
- Complete site survey covering electricity, water, fuel, drainage, roads, and warehouse space
- Request comparable technical and commercial quotations from shortlisted suppliers
- Finalize financing, logistics, installation, training, and spare-parts plan

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Research and image references

- <https://genyang.en.made-in-china.com/product/YmQpQXSxSVWH/China-Papaya-Fruit-Wine-Vinegar-Production-Line.html>
- <https://chinalongqiang.en.made-in-china.com/product/hJYRqevAvtkp/China-Customized-Longqiang-Apple-Making-Equipment-Fruits-Vinegar-Production-Line.html>
- <https://sinoprettech.en.made-in-china.com/product/twNTaAMOYcfm/China-1000L-Apple-Grape-Vinegar-Acetator-Vinegar-Fermentation-Tank-Acetator-Tank.html>