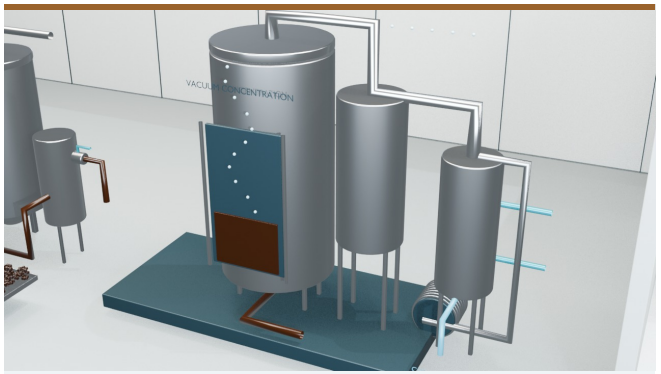
SJ SCIENTIFIC

Freeze-dried coffee

Batch process concept: roasted beans, concentrated extract, frozen granules and an SJ FFD-series dryer.

01 Grind, extract and filter

Grind roasted beans. Extract soluble coffee with water, then separate the spent grounds.

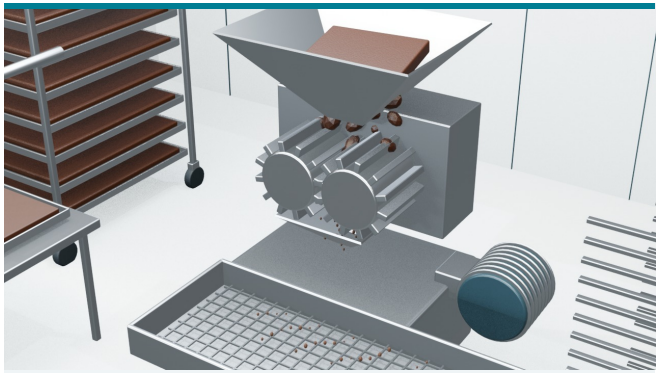


02 Concentrate the extract

Low-temperature vacuum evaporation removes some water. Freeze concentration is an alternative.

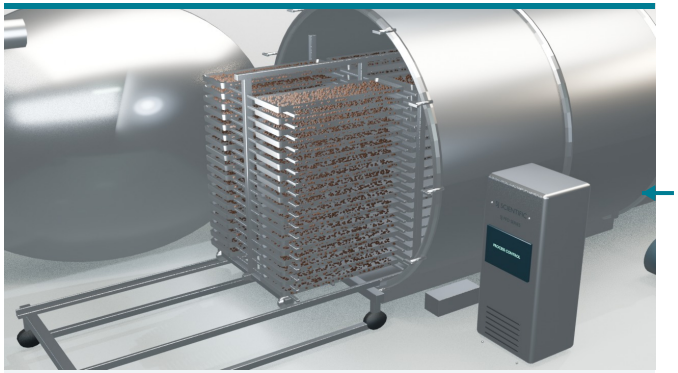
03 Pre-freeze in trays

Fill shallow trays and freeze the concentrate into solid slabs in the refrigerated room.



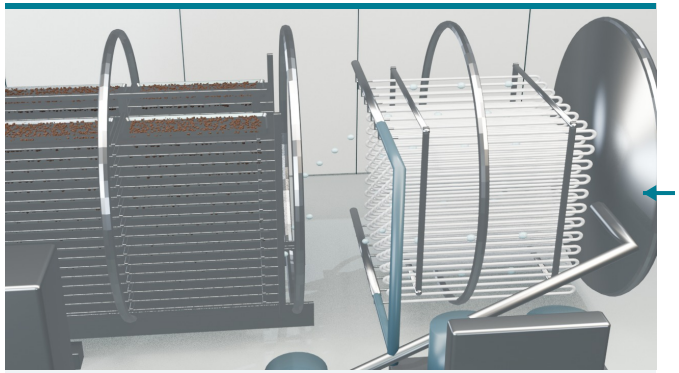
04 Granulate while frozen

Inside the cold room, break and mill the slabs, then sieve to control the particle-size range.



05 Load trays and transfer

Keep the granules frozen. Load the rack, dock the trolley and roll the upper rack into the pre-cooled dryer.



06 Freeze dry and protect

Ice leaves the product as vapor and deposits on internal coils. Pack the dry coffee in moisture-barrier packaging.

The animation preserves the separate upper rack and lower transfer trolley, twin stationary shelf banks, bottom guide rails and internal rear cold-trap coils from the supplied SJ equipment references. Product temperatures and cycle conditions are set for the coffee formulation.

Equipment reference guide

A starting point for selecting and sizing the equipment in this batch coffee process.

EQUIPMENT	ROLE IN THIS CONCEPT	REFERENCE / SELECTION BASIS
Roller grinder	Prepare the roasted coffee for extraction.	MPE SRM-MAX is a compact commercial form reference. The rendered grinder is an original concept. [1]
Extraction and filter	Produce a soluble coffee extract; remove insoluble grounds.	GEA coffee technologies and its coffee specialist video provide extraction context. The vessels shown are a batch concept. [2, 3]
Vacuum concentrator	Evaporate water at reduced pressure before pre-freezing.	Evaporator, separator, condenser and vacuum pump concept. Final duty and arrangement require coffee process data. [4]
Pre-freezing room	Freeze concentrate in trays before size reduction.	Independent batch concept. Refrigeration must cover incoming-product freezing duty, airflow and holding inventory.
Frozen granulator / sieve	Break frozen slabs and control granule size inside the cold room.	Frozen-coffee preparation reference: GEA coffee brochure. Cold-room installation and equipment selection are project-specific. [4]
SJ FFD-series dryer	Cold rack transfer, vacuum drying and vapor capture.	Customer references determine the rack, trolley, rails, shelf banks and internal coil arrangement. Coffee capacity is not assigned here.
Dry handling / packing	Protect finished granules from moisture.	Select the handling environment and packaging line for the intended product and package format.

ALTERNATIVE CONCENTRATION ROUTE

GEA IceCon / IceCon Compact removes water by forming and separating ice crystals while retaining a liquid concentrate. That concentration step is different from fully freezing the concentrate into slabs for granulation. [5]

For sizing: define dry output, extract and concentrate solids, granule size, tray fill depth, freezing duty and utilities. Coffee-specific loading and drying conditions are established through product trials.

[1] MPE SRM-MAX [2] GEA coffee systems [3] GEA video / transcript [4] GEA coffee brochure [5] GEA freeze concentration