



Soluble Coffee

Freeze concentration of Coffee Extract

Application

The coffee industry manages many products with various quality differences arising from variety beans, roasting conditions, product type and even final processing. Fresh roast and brewed flavour is the goal for all products.

Depending on the required form of the final product (dried powder or liquid concentrate) there are various methods available to complete the process of bean to consumer product.

Once roasted, the coffee can be extracted by

various extraction methods. Generally a battery of extraction columns is filled in sequence and exposed to the heated extraction water. Split or dual extraction is when the freshest beans are contacted with pure water in the initial column. This extract generally contains most of the essential flavour components. The overall process yield can be increased by extracting the same beans again with water. The latter extract contains the additional coffee solids and generally some undesirable flavour components. Splitting these two products and freeze concentrating the first draw offers the possibility to create the highest quality extract. The second draw can be

concentrated using conventional methods and blended to improve yield.

No matter what extraction method used (split, dual, or even full) freeze concentration retains 100% of all the flavour components in the original extract and produces the highest quality liquid concentrate possible.

Why concentration prior to drying?

- Reduction of drying cost
- Smaller freeze drying equipment
- Increased production capacity
- Improvement in quality

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Features

High product quality as a result of:

- **Low processing temperature**

The concentration takes place at the freezing point of the product (e.g. -5°C). All microbiological and chemical reactions have virtually stopped. There is no thermal damage to sensitive flavour components.

- **Efficient separation of the water**

The separated ice crystals are 100% pure water without any included product. The separation of ice crystals in the unique wash column separator is 100% efficient so that all the flavour components remain in the concentrated product.

- **No contact with air**

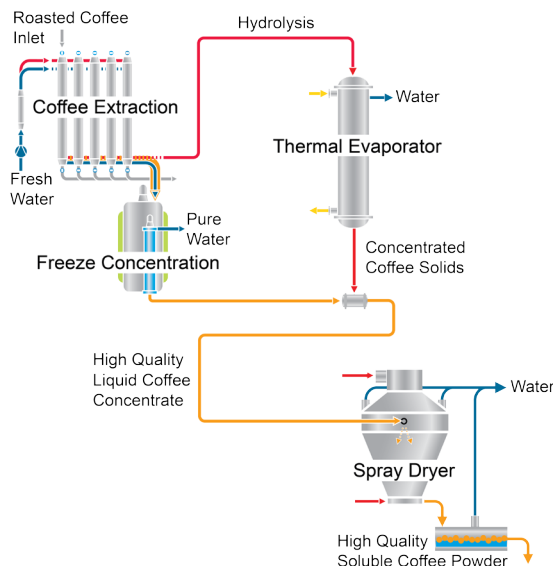
The process operates as a slightly overpressurized liquid filled system. Consequently, all contact with air/oxygen is eliminated and the potential for oxidation is minimized. No vapour space also means no chance for loss of volatile aroma components.

- **No need for intermediate cleaning**

The process operates 24 hours per day and can go for weeks without intermediate cleaning. Throughput is flexible between 0 and 100% of design capacity.

Spray-dried coffee

Split extraction can also be used for high quality instant powder production. The high quality (HQ) aromatic first draw is freeze concentrated while the second draw (hydrolysis) is evaporated to improve the yield. These two concentrated streams are combined and finally spray dried to produce a high quality instant coffee powder.

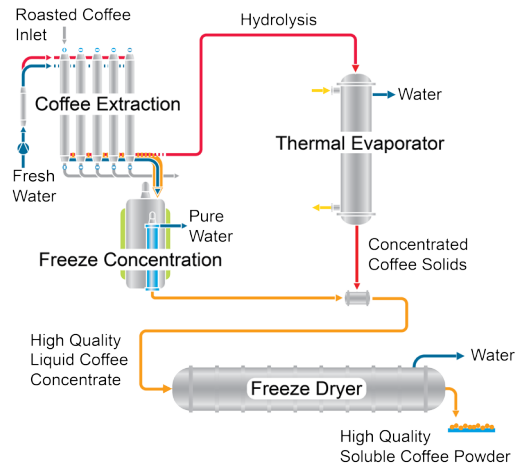


Spray-dried coffee processing line

Freeze-dried coffee

Freeze-drying of coffee extract is widely used and considered the best possible drying technique. Coffee extract is frozen and dried under vacuum at low temperatures resulting in an instant product with good aroma retention.

Freeze concentration provides maximum aroma retention and the water removal costs are much lower than freeze-drying. Pre-concentration with freeze concentration reduces the total production cost with maximum quality retention.



Freeze-dried coffee processing line

On-site demonstration of this technology is possible in various configurations using GEA pilot plants. For more information regarding this technology and your specific configuration requirements, please contact us or get in touch with your local GEA contact on gea.com via the Application Food - Coffee & Tea.

GEA Netherlands

GEA Niro PT B.V.

De Beverspijken 7-b

5221 EE 's-Hertogenbosch, Netherlands

Tel +31 73 6390390

info.niropt.nl@gea.com

gea.com