

CRYOFINE (CRY 151) BEER CLARIFICATION

Cryofine contains purified isinglass in convenient powder form. It is added to beer at the end of fermentation to speed maturation and improve filtration by removing yeasts and protein particles. For the purposes of rapid dissolving, enhanced performance and long shelflife, the production of Cryofine involves improved disruption technology to enhance dissolving.

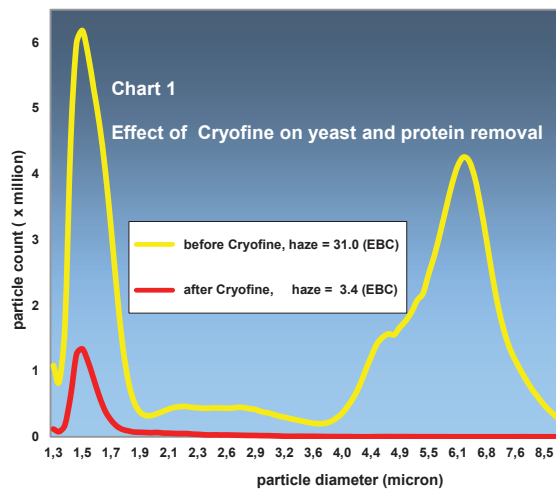


PRINCIPLE

The active component of Cryofine is isinglass (collagen). It is derived from the swim bladder of fish. Processing into finished form involves a regime of rigorous washing and sterilisation, followed by drying and milling. The precise nature of the action of collagen on yeast and proteins is not fully understood, and many suggestions have been promoted.

Collagen exists in solution as tightly bound triple helix strands which possess both positive and negative charged sites along their length. It is clear that the amino acid make-up of collagen, and specifically the high proportion of proline and hydroxyproline, contributes to its remarkable ability to remove both yeasts and proteins so effectively.

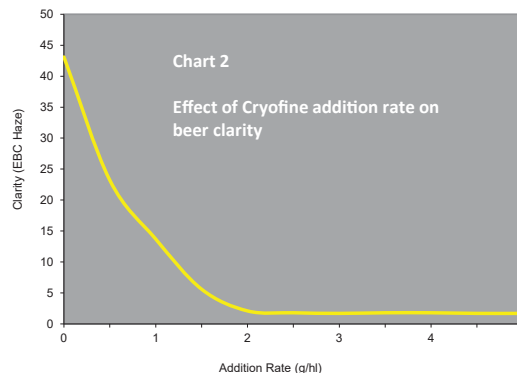
In a typical application greater than 95% of yeast and 90% of protein particles are removed.



TREATMENT RATES

Cryofine is typically added at between 1 and 3 g/hl.

For both performance and commercial considerations it is advisable to identify the correct addition rate. This will vary from beer to beer (a simple optimisation test is detailed later).



BENEFITS

Beer treated with Cryofine requires shorter cold storage time, and has improved filterability. The sediments produced by Cryofine in the cold storage vessel are more compact, so less beer is lost during their removal.

- Reduced cold storage time.
- Fewer vessels.
- Lower energy use.
- Reduced beer loss.
- Improved filtration.
- Faster throughput.
- Reduced powder use.
- Improved beer haze and stability.
- Less re-work.

Cryofine is the preferred isinglass powder where ease of dissolving, and enhanced clarification power are required. Cryofine is particularly useful where less than ideal mixing equipment is available, or only small batches are required. Cryofine has a moderate effect on sensitive protein reduction. Whilst not a beer stabiliser in its own right it contributes to the action of silica gel, and compliments PVPP. During settlement of flocculated solids, foam negative factors can be entrained. Brewers regularly notice that Cryofine-treated beers have improved foam stability.

REGULATORY

The active component of Cryofine is isinglass.

FDA

Isinglass is listed as Generally Recognised as Safe (GRAS) by the Food and Drug Administration (FDA) under 27 CFR 24 subpart L – 24.246.

Australia and New Zealand

Approved for use as a clarifying agent in beer under section 1.3.3. of the Food Standards Code.

UK

Commission Directive 2007/68/EC exempts isinglass from having to be mentioned on labels when used to clarify beer or wine. Cryofine be used as a processing aid as it meets the requirements of EU General Food Law (Regulation (EC) No 178/2002 (as amended)).



APPLICATION

Cryofine is added via a solution to beer at the end of fermentation and chilling, or if centrifuges are used immediately after centrifugation. It is fully compatible with silica gel, but all other processing aids at this stage should be added separately.

(methods of solution preparation are detailed later)

For maximum benefit the Cryofine solution should be added in-line to the beer during transfer. If added prior to the chiller satisfactory incorporation will occur. A static inline mixer is advisable otherwise. Some beers react very quickly with Cryofine - flocculation can occur within minutes of addition. In these cases Cryofine addition should take place throughout the whole period of beer transfer. If this is not possible additions should be made during the latter part of the

transfer, or to the filled vessel.

Unitank operation presents a special set of circumstances. The beer should be chilled conventionally.

Immediately before

addition of Cryofine the sedimented yeast should be fully removed. The Cryofine solution can be pumped into the bottom of the vessel and mixed with CO₂.

The design and size of the cold storage vessel and the filterability requirements of the beer, will dictate the length of time required for settlement.

In all instances care should be taken in removing all the settled solids prior to filtration.

| Vessel size (hl) | Storage (days) |
|------------------|----------------|
| 2,000 | 2 |
| 4,000 | 3 |
| 8,000 | 4 |
| 10,000 | 5 |

Typical cold storage times for Cryofine treated beers (cylindroconical)

BREWING PRACTICE

Isinglass has long been used in the clarification of traditional British cask ale. In this role it's effectiveness has never been rivaled, although many attempts have been made to find alternatives over the years.

The same ability to remove yeast, and more importantly, proteins makes it an ideal partner in the cost effective production of filtered beers.

New generation centrifuges are being introduced into the brewing process. This has seen interest in Cryofine increase, as the action of the centrifuge on large particulate solids and Cryofine on the more troublesome smaller particles results in beers with excellent filtration characteristics.



PRACTICAL HINT

The dissolving action of the mixer can be supplemented by re-circulating the solution via a centrifugal or similar pump.



IDENTIFICATION OF OPTIMUM ADDITION RATE

- Prepare a 0.5% w/v solution by first dispersing 2.5 g Cryofine in 500 ml cold water.
- After a 30 minute hydration period dissolve the Cryofine by mixing vigorously for 2 to 3 minutes. This is best achieved with a hand held domestic food blender.
- Note: if the Cryofine powder is allowed to stand overnight a satisfactory solution can be prepared with a simple laboratory magnetic mixer.
- Take samples of beer at end of fermentation, either from the transfer line or directly from fermentation vessel.
- Cool to 0°C and remove yeast if necessary.
- Fill clear glass bottles or laboratory measuring cylinders and dose with Cryofine solution at rates of 0, 1, 2, 3, 4 and 5 g/hl.
- Store the treated beers at 0°C overnight and assess clarity both visually and by haze measurement.
- The optimum rate is determined as the point at which further additions of Cryofine give little or no clarity improvement. In the example shown in Chart 2 this is 2 g/hl.



CRYOFINE SOLUTION PREPARATION PLANT SCALE

The exact method will depend on the equipment available and external constraints, for example time.

Certain basic requirements should, however, be met.

- Potable water at a temperature of less than 10°C. ideally
- de-aerated.
- Vessels and pipework made of stainless steel or other inert materials, e.g. polypropylene
- High speed mixer capable of maintaining a vigorous stirring action in a Cryofine solution with typical viscosity of 2,000 centipoise.
- The isinglass component of Cryofine is sensitive to heat damage as soon as it is dissolved. A Cryofine solution is stable for up to 1 week if maintained at a temperature below 15°C. In cases where this is not possible the solution should be used within 24 hours.

Run approximately half of the required water volume into the mixing vessel. With the mixer stirring slowly add the Cryofine powder to avoid formation of lumps. Leave the mixer stirring for minimum 30 minutes but ideally 2 hours. As the Cryofine dissolves the viscosity of the solution increases. Add extra water as necessary until the final volume is achieved.

CONTACT US

For more information, please visit us at www.lallemandbrewing.com

For any questions, you can also reach us at abvickers@lallemand.com