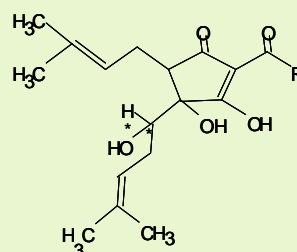


Rho Concentrate

❖ Overview

- **Rho Concentrate** is a product consisting of purified, reduced (Rho) iso- α -acids that can be used in the kettle as the source of bittering for the production of light stable beer.
- **Rho Concentrate** contains reduced (rho) isomerized alpha acids in their potassium salt form for better stability and dispersion in wort.
- **Rho Concentrate** gives substantial protection against light-struck flavors and some foam enhancement, when used as the sole source of hop-derived bittering.
- **Rho Concentrate** provides utilization improvements similar to other pre-isomerized kettle products.

Structure of and Properties of Reduced (Rho) Iso-alpha-acids



Foam:	same as Iso- α -Acids
Light strike resistance:	good
Bitterness :	0.6 - 0.7 of Iso- α -Acids

* Normal iso-alpha-acids have a carbonyl (-C=O) group at this point.

❖ Specification

- **Description:** A reddish amber, semi-fluid resin
- **Rho-iso-alpha-acids:** Typically 50 – 60 % by HPLC
- **Iso-alpha-acids:** Less than 0.5 %
- **Alpha-acids:** Less than 0.2 %
- **Beta-acids:** Less than 0.5 %
- **Hop oils:** Less than 1.0 %
- **Density:** Typically 1.14 – 1.18 g/ml

PDS 18/06 issued 03/2009

❖ Properties

□ Appearance

A reddish amber resin having a slightly floral aroma and which becomes more fluid on warming.

□ Utilization

Based on HPLC analysis, utilization of rho-iso- α -acids into beer may be expected to fall in the range 55 – 75 %, though actual values will depend upon particular brewery circumstance.

□ Flavor

Rho Concentrate provides only bitterness to the beer. Many brewers consider that Rho-iso- α -acids impart an especially pleasant, “soft” bitterness to beer.

□ Foam

Beer brewed with rho-iso- α -acids to the same taste bitterness as equivalent beer brewed with hops, hop pellets or hop extracts will have a slightly improved foam character.

□ Chemical Residues

Nitrates and heavy metals are almost completely absent from **Rho Concentrate**. Many pesticide residues that were present on the original hops will also be essentially absent or else much reduced in relation to the bittering potential of the product.

□ Quality

All Hopsteiner® products are produced in plants accredited to internationally accepted quality standards.

❖ Packaging

Rho Concentrate can be packaged in cans, pails and drums according to customer requirements:

Cans:	0.5 to 4 kgs (9 lbs);
Pails:	3 to 20 kgs (6.6 – 44 bs);
Drums:	50 & 200 kgs (110 – 441 lbs)

For convenience of use, customers may have their extract packed in cans to any desired content of rho-iso- α -acids per container (e.g. 450 g rho-iso-alpha per can). (Recommended).

Alternatively, the rho-iso- α -acid content of **Rho Concentrate** can be standardized to a particular, lower concentration, and the container filled to a standard weight.

❖ Product Use

We recommend that **Rho Concentrate** be used in the kettle as a complete or major replacement for post-fermentation bittering.

□ Dosage

Addition to the kettle should be based on the rho-iso- α -acids concentration in the **Rho Concentrate** and calculated on the presumption that the utilization is likely to be at least 50 % better than that achieved from normal (non-isomerized) kettle hop products.

Actual utilization will depend upon particular plant and process conditions, but highest utilizations are likely if **Rho Concentrate** is added late in the boil.

Account must also be taken of the fact that rho-iso- α -acids are only 60 – 70 % as bitter as are normal iso- α -acids.

PDS 18/06 issued 03/2009

□ Addition

Rho Concentrate may be handled like a normal CO₂ extract but can be added at any time during wort boiling, excepting only that the addition should normally be made no later than 10 minutes before the end of the boil.

However, like CO₂ Extracts, should **Rho Concentrate** be used in automatic dosing units, it is best warmed to about 60°C (140°F) before use and then thoroughly mixed to ensure perfect dosing.

□ Light Stability

For maximum protection against “Lightstruck” flavors, it is essential that no other sources of non-reduced iso- α -acids be inadvertently introduced into the wort or beer. Therefore, be sure to:

- Avoid contamination from equipment surfaces that have been in contact with normal iso- α -acids.
- Never pitch wort with yeast that has been in contact with normal α - and iso- α -acids.

□ Storage

Rho Concentrate may be stored for up to 3 years in sealed containers at temperatures < 10°C (50°F). Opened containers should be used within a few days.

□ Best Before Date

Rho Concentrate is stable 3 years from date of production.

□ Safety

Rho Concentrate is derived from a natural material and may be safely handled using routine precautions to avoid contact with skin and, particularly, eyes.

Any material coming into contact with the skin should be washed off with soap and water or proprietary hand cleansers. If **Rho Concentrate** gets into the eyes, irrigate thoroughly with water until clear and seek medical attention.

For full safety information please see the relevant Steiner material safety data sheet.

❖ Analytical Methods

□ Concentration of Reduced (Rho) Iso- α -acids

The concentration of reduced (rho) iso- α -acids is measured by HPLC using the current ICS standard according to the modified EBC 7.9 method. Details of recommended methods are available on request.

❖ Technical Support

We will be pleased to offer help and advice on the full range of Hopsteiner® products:

- Copies of all relevant analytical procedures
- Material Safety Data Sheets (MSDS)
- Assistance with pilot or full brewery trials
- Specialist analytical services

PDS 18/06 issued 03/2009