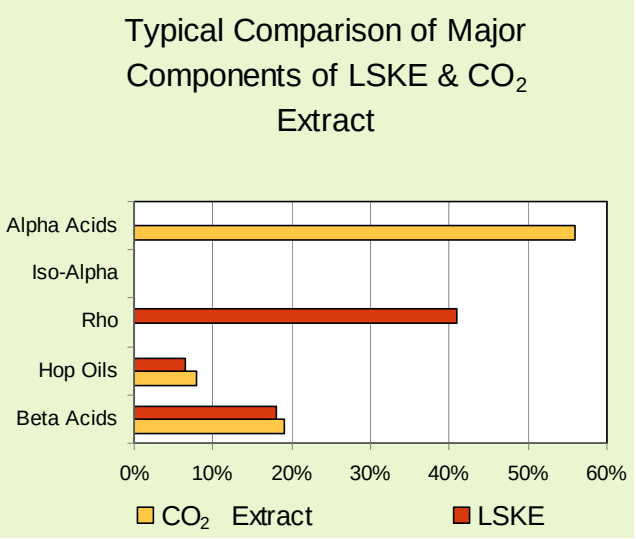
Light Stable Kettle Extract (LSKE)

❖ Overview

- **Light Stable Kettle Extract** is produced from CO_2 hop extract and can be used as a complete replacement for normal kettle extract.
- **Light Stable Kettle Extract** contains reduced (*Rho)* isomerized alpha acids (in their potassium salt form), beta acids and hop oils.
- **Light Stable Kettle Extract** gives substantial protection against light-struck flavors when used as the sole source of hop-derived bittering.
- **Light Stable Kettle Extract** provides utilization improvements similar to other pre-isomerized kettle products.



❖ Specification

- **Description:** A golden to amber, semi-fluid syrup or paste.
- ***Rho*-iso-alpha-acids:** Typically about 40 % (depending on variety)
- **Iso-alpha-acids:** < 0.3 %
- **Alpha-acids:** < 0.1 %
- **Beta-acids:** Normally in the range 12 – 35 % (depending on variety)
- **Hop oils:** Typically 2 – 10 % (depending on variety)
- **Density:** Typically 1.05 – 1.10 g/ml

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❖ Properties

❑ Appearance

A golden or amber thick syrup that becomes more fluid on warming.

❑ Utilization

Based on HPLC analysis, utilization of *rho*-iso-α-acids in beer can be 50 – 75 %. Trials have also shown that hop oil retention is significantly enhanced when **LSKE** is added late in the kettle boil.

❑ Flavor

Unlike all other reduced products added post-fermentation, the flavor characteristics of **LSKE** are similar to those of normal CO_2 extract. The presence of both β-acids and hop oils in the kettle results in a more rounded, fuller flavor and the reduced iso-α is said to produce a 'softer' bitterness than normal iso-alpha acid.

❑ Chemical Residues

Nitrates and heavy metals are almost entirely absent from **LSKE.** Some pesticide residues are also largely removed during the CO_2 extraction.

❑ Quality

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

❖ Packaging

LSKE 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 lbs);
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. 400 g *rho*-iso-α per can). (Recommended).

❖ Product Use

We recommend that **LSKE** be used in the kettle as a complete replacement for hops, hop pellets or standard hop extracts.

❑ Dosage

Determination of the dosing rate is of course based on the anticipated utilisation but must take account of the fact that reduced (*rho*) iso-α-acids are inherently about 30 % less bitter than are normal iso-α-acids. Addition to the kettle should also be based on the *rho*-iso-α-acids concentration in the **LSKE** and calculated on the presumption that the utilization is likely to be at least 50 % better than that achieved with normal CO_2 hop extracts. Actual utilization will vary from brewery to brewery depending on plant and process conditions.

❑ Addition

LSKE may be added at any time during wort boiling. However, for imparting "late hop" character, a substantial portion of the **LSKE** should be added between 15 and 5 minutes before kettle cast.

If the **LSKE** is used in cans, it does not need to be warmed prior to use. However, should **LSKE** be used in automatic dosing units, it should first be warmed to about 55ºC (131ºF) and then thoroughly mixed to ensure perfect dosing.

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❑ 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

LSKE should be stored in sealed containers at < 10ºC (50ºF). Opened containers should be used within a few days.

❑ Best Before Date

LSKE is stable 2 years from date of production under the recommended storage conditions.

❑ Safety

LSKE 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 **LSKE** 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

❑ Concentrations of *Rho*-Iso-α-acids, β-acids and residual α-acids

The concentrations of *rho*-iso-α-acids, β-acids and residual α-acids are measured by HPLC using the current ICS and ICE Standards according to the EBC 7.8 chromatographic method; sample preparation according to EBC method 7.7.

Alternatively, the chromatographic conditions of ASBC Hops -15 may be used.

Details of recommended methods are available on request.

❑ Concentrations of Hop oils

Hop oil concentration is normally measured by one of the following methods - IOB 6.3 or ASBC Hops-13.

❖ 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

❖ Patent

Steiner Patent pending.

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