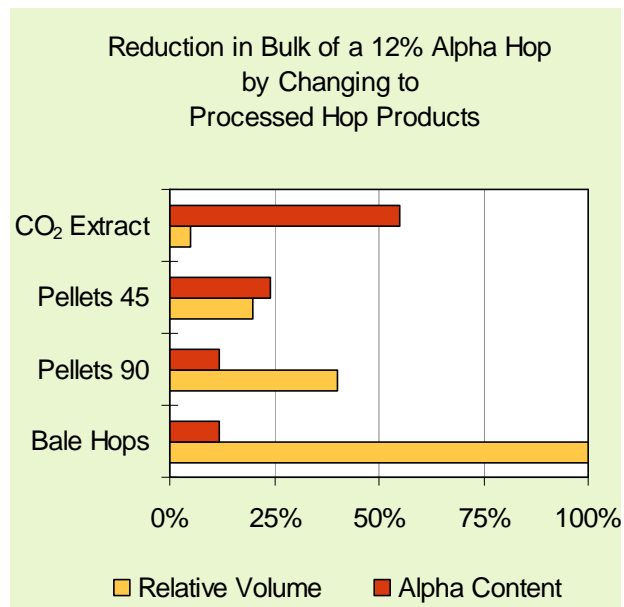


CO₂ Extract

❖ Overview

- **CO₂ Extract** is an extract of hops produced by extraction of hop pellets using carbon dioxide under liquid or supercritical conditions.
- **CO₂ Extract** contains alpha-acids, beta-acids and essential oils and is normally used as a partial or complete replacement for kettle hops or hop pellets.
- **CO₂ Extract** is an extremely stable, convenient and concentrated alternative to the use of hops or hop pellets.



❖ Specification

- **Description:** A golden/amber/green, semi-fluid syrup or paste at room temperature.
- **Alpha-acids:** Variety specific; typically c. 35 % for an aroma hop and > 50 % for a high alpha hop.
- **Beta-acids:** Variety specific; normally in range 15 – 40 %
- **Hop oils:** Variety specific; typically 3 – 12 %
- **Density:** Typically 0.9 – 1.0 g/ml

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❖ Properties

□ Appearance

A golden/amber/green (dependent on variety and extraction conditions), thick syrup which becomes more fluid on warming.

□ Utilization

Early addition of **CO₂ Extract** to the wort boil normally results in a fractionally higher utilization of the α -acids into the beer than that of corresponding Type 90 Pellets, typically in the range 32 – 38 %. Late additions may have utilizations as little as one half of these values.

□ Flavor

The brewing characteristics of the original hops are maintained. Therefore, early addition of **CO₂ Extract** to the kettle imparts mainly bitterness, while late addition allows carry over of a proportion of the volatile oils resulting in a beer with aromatic “late hop” character.

□ Chemical Residues

Nitrates and heavy metals are almost completely eliminated in **CO₂ Extract**. Many pesticide and fungicide residues are also largely removed by CO₂ extraction.

□ Quality

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

❖ Packaging

CO₂ Extract can be packaged in cans, pails and drums according to customer requirements:

Cans: 0.5 to 4 kgs USA;
0.5 to 6 kgs Germany

Pails: 3 to 20 kgs (6.5 – 44 lbs); USA only

Drums: 50 & 200 kgs (110 – 441 lbs)

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

Alternatively, the α -acids content of **CO₂ Extract** can be standardized to any particular concentration using glucose syrup (non-GM glucose cannot be guaranteed) and the container filled to a standard weight (e.g. 30 % alpha in 1-kg cans).

❖ Product Use

Typically used in the kettle as a complete or partial replacement for hops or hop pellets.

□ Dosage

Addition to the kettle is based on the α -acids concentration in the **CO₂ Extract** and the assumption that the utilization is likely to be slightly better than that achieved with hops or hop pellets. Actual utilization will vary from brewery to brewery depending on plant and process conditions.

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□ Addition

For the best utilization **CO₂ Extract** should be added early in wort boiling. However, owing to likely losses caused by protein precipitation, the product is best added 10 mins. after the start of boiling. For imparting “late hop” character, extract should be added not less than 5 mins. before kettle cast. However, in this situation, better results can be achieved using the pre-isomerized kettle extracts – IKE and PIKE. If extract is used in cans, it does not need to be warmed prior to use. However should **CO₂ Extract** be used in automatic dosing units, it should be warmed to 40°C (104°F) and gently mixed to ensure perfect dosing.

□ Storage

CO₂ Extract should be stored in sealed containers at < 10°C (50°F). Opened containers should be used within a few days.

□ Best Before Date

CO₂ Extract is stable 4 years from date of production under the recommended storage conditions.

□ Safety

CO₂ Extract is a natural substance 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 **CO₂ Extract** gets into the eyes, irrigate with excess water until clear and seek medical attention.

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

❖ Analytical Methods

□ Concentrations of α- and β-acids

The concentrations of these hop resin acids are measured by:

- HPLC, using the current ICE standard, normally according to the EBC 7.7 or the ASBC Hops-14 methods.
- Conductometric methods – IOB 6.4, EBC 7.4, EBC 7.5 or ASBC Hops-8 and spectrophotometric method ASBC Hops-6 can also be used.

□ Concentrations of Hop oils

Hop oil concentration is normally measured by 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