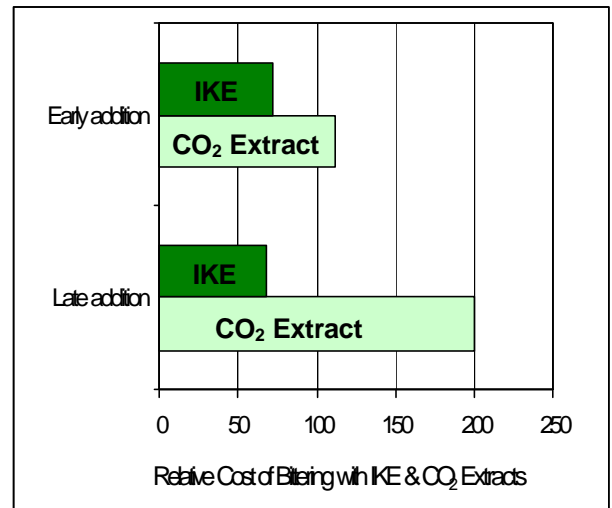


Isomerized Kettle Extract (IKE)

❖ Overview

- **Isomerized Kettle Extract (IKE)** contains isomerized α -acids, β -acids and hop oils.
- **IKE** is produced from CO₂ extract and can be used as a complete replacement for normal or late-addition kettle extract.
- **IKE** produces a similar flavor to CO₂ extract whilst greatly improving the utilization of iso- α -acids.

Cost Saving Opportunities with Isomerized Kettle Extract (Based on Trial Data)



❖ Specification

- **Description:** A solvent-free, non-aqueous mixture of the free acid form of isomerized α -acids, β -resins and oils.
- **Iso- α -acids:** Iso- α -acid content varies according to the hop variety used but is typically in the range 40-60%
- **Alpha-acids:** Typically <2%
- **Beta-acids:** Typically 15-40% (variety dependent)
- **Hop oils:** Typically 3-12% (variety dependent)
- **Density:** Typically 0.9 – 1.0 g/ml.

❖ Properties

□ Appearance:

A golden or pale brown thick syrup which becomes more fluid on warming; more mobile than normal CO₂ extract.

□ Utilization:

Based on HPLC analyses (using the DCHA Iso standard) utilization of iso- α in final beer can be as high as 65-70% when the extract is added at the start of the boil. Added late in the boil, utilizations of over 70% can be achieved. Trials have also shown that hop oil retention in late addition brews is greatly enhanced when using **IKE** (up to 4 times).

□ Flavor:

Brewing trials show that beers of identical aroma and taste can be produced when **IKE** is used as a direct replacement for normal CO₂ extract. However care must be taken to ensure that late addition of **IKE** does not result in excessive hop character due to the increased retention of hop oil in final beer.

□ Stability:

According to our data **IKE** is stable when stored correctly for up to 1 year.

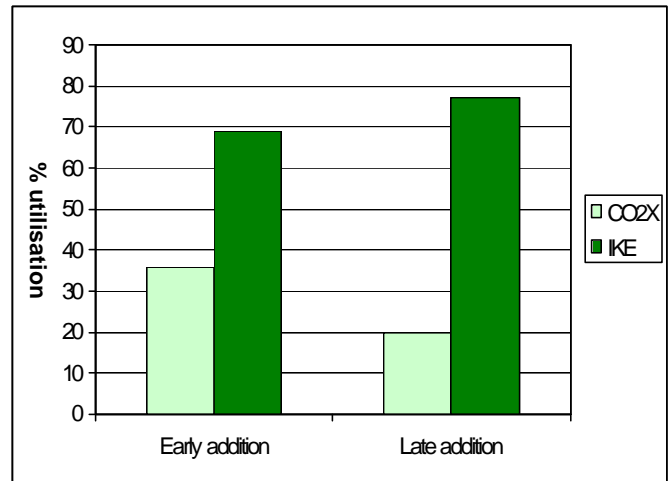
□ Quality:

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

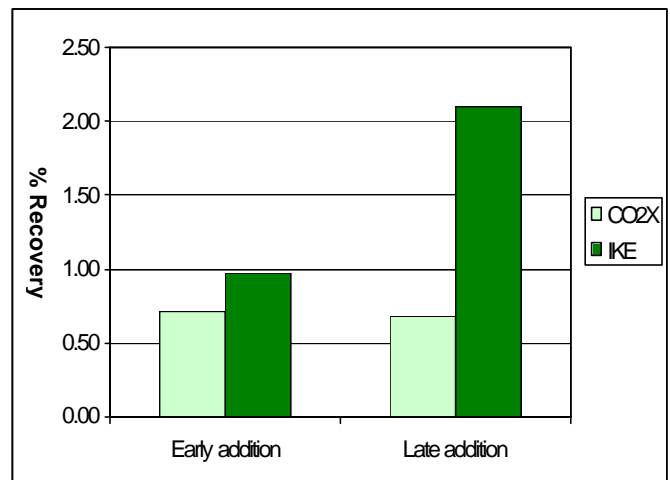
❖ Packaging

IKE is normally packaged in 20 kg pails (44 lbs). It can also be packaged in cans and bulk drums according to customer requirements.

**Comparative Utilisation -
CO₂ Extract & IKE**
(Based on Trial Data)



**Comparative Oil Recovery -
CO₂ Extract & IKE**
(Based on Trial Data)



❖ Product Use

Typically used in the kettle as 100% replacement for normal kettle extracts.

❑ Dosage:

Calculation is based on the iso-alpha concentration in the **IKE** and the assumption that the utilization of the iso-a is likely to be at least 50% better than that achieved with the alpha in normal extracts. Actual utilization will vary from brewery to brewery depending on plant and process conditions.

❑ Addition:

Handled in bulk, **IKE** should be warmed to c. 30°C (82°F) before use; otherwise **IKE** can be added in similar ways to normal kettle extracts. **IKE** can be added into the kettle either at the start of filling, at the start of the boil or up to 5 min before kettle cast. Because of its lower viscosity, it particularly lends itself to bulk handling and dosing.

❑ Storage:

IKE should be stored in sealed containers at <10°C (50°F). Opened containers should be used up quickly.

❑ Safety:

IKE is non-toxic but mildly corrosive due to its low pH. It should be handled in a similar way to normal kettle extract. Any material coming into contact with the skin should be washed off with soap and water. If **IKE** gets into the eyes, irrigate immediately with excess water until clear and seek medical attention.

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

❖ Analytical Methods

❑ Concentration of Iso-a-acids, β -acids and residual a-acids:

The concentrations of iso-a-, β - and a-acids are measured by HPLC using the current ICS & ICE standards according to EBC 7.8 method; sample preparation according to the EBC method 7.7.

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

❑ Concentration of Hop oils:

Hop oil concentration is measured by either the IOB 6.3 or ASBC hops-13 method.

❑ Standardisation:

If required, the concentration of iso-a-acids can be standardised to specified levels by the addition of glucose syrup (non-GM glucose cannot be guaranteed). More conveniently, containers can be packed with a specified amount of iso-a per can.

❖ 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

IKE is produced under a Steiner registered, US patent No. 5,370,897.

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