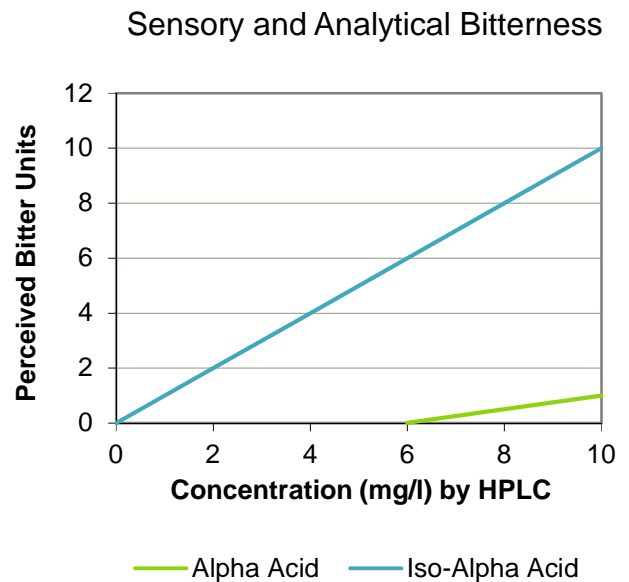


## AlphaExtract

### ❖ Overview

- **AlphaExtract** is a pure, aqueous solution of natural alpha acids in the form of potassium salts, produced from CO<sub>2</sub>-extract.
- **AlphaExtract** provides a smooth bitterness to beer and its intensity is only 10 % of the iso-alpha acids bitterness.
- **AlphaExtract** also improves the stability and cling of beer foam.



### ❖ Specification

- **Description:** A yellow to amber colored solution containing the potassium salts of hop alpha acids
- **Concentration:** 20 ± 1 % (w/w) of alpha acids
- **pH:** 8.5 (± 0.5)
- **Viscosity:** 6 mPas at 20°C (68 °F)
- **Density:** 1.050 (± 0.020) g / ml at 20°C (68 °F)

## ❖ Properties

### • Appearance

Homogeneous yellow to amber, aqueous solution, free flowing at recommended storage conditions. Miscible with demineralized water and alcohol.

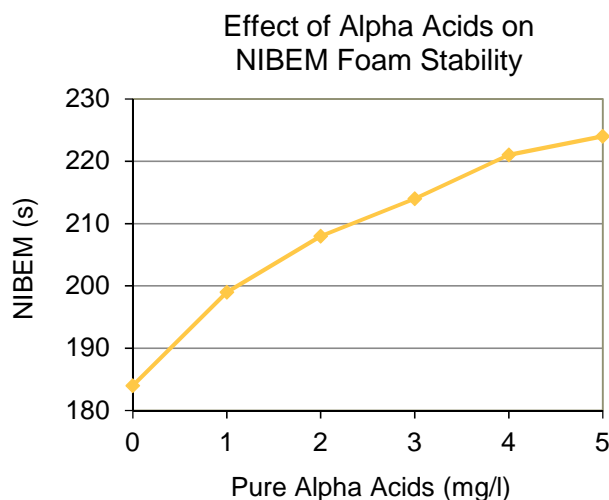
### • Utilization

Utilization of alpha acids in final beer can vary between 60 – 70 % depending on the time and efficiency of dosing, quantity of adjuncts (if any) and bitterness level.

Actual utilization will vary from brewery to brewery depending on plant and process conditions.

### • Flavor

**AlphaExtract** provides a smooth sensorial bitterness at a dose rate from 7 – 8 mg/l, depending on the type of beer. However, this will lead to an increase in the analytical bitterness (BU). The perceived **AlphaExtract** bitterness is smoother compared to pure iso-alpha acids. At the same time, **AlphaExtract** enhances the stability and cling of beer foam. Noticeable foam improvement can already be achieved with 3 – 4 mg/l of alpha acids in the finished beer.



### • Quality

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

## ❖ Packaging

**AlphaExtract** is normally packaged into 20 or 25 kg pails. Other package sizes are available on request, e.g. IBC of 640 up to 1000 kg.

## ❖ Product Use

**AlphaExtract** is typically added before final filtration.

### • Dosage

Dosage is calculated based on the product concentration, desired dosing rate and the expected utilization. Actual utilization will vary from brewery to brewery depending on method and time of addition.

### • Addition

We recommend dosing **AlphaExtract** undiluted to the center of the beer stream during at least 70 % of the beer transfer, preferably before final filtration.

An accurate, high pressure dosing pump is recommended ensuring vigorous injection into the beer stream.

If dilution is necessary, always add **AlphaExtract** to demineralized water to achieve a dilution; adjust pH to 8.5 – 9.5 using potassium hydroxide (KOH) or potassium carbonate (K<sub>2</sub>CO<sub>3</sub>).

In case containers are used for several days, it is recommended to flush the headspace with nitrogen (CO<sub>2</sub> is not suitable).

- **Cleaning Recommendation**

**AlphaExtract** should not be left in dosing lines at low temperatures. Lines and dosing pump should be flushed with warm, slightly alkaline, demineralized water or ethanol to clean.

- **Storage**

**AlphaExtract** should be stored in sealed containers at 1 - 5°C (34 - 41°F). Avoid exposure to sunlight and use up opened containers as soon as possible.

- **Best Before Date**

**AlphaExtract** is stable 1 year from date of production under the recommended storage conditions.

- **Safety**

**AlphaExtract** should be handled with due care, especially to prevent contact with the eyes. Any contamination of the skin should be washed off with soap and water.

If **AlphaExtract** gets into the eyes, irrigate with excess water until clear and seek medical attention.

For full safety information please see the relevant Hopsteiner® safety data sheet.

## ❖ Analytical Methods

- **Concentration of Bitter Substances**

Alpha acids can be measured by any of the following methods:

- HPLC method according to Analytica-EBC 7.7. or ASBC Hops-14 , using the current ICE standard

- **Concentration of Alpha acids in Beer**

The concentration of alpha acids in beer is best determined by HPLC using the current ICE standard.

If the BU analytical method is applied (either Analytica-EBC 9.8 or ASBC Beer-23) it should be observed that 1 mg/l of alpha acids equals an increase of 0.4 – 0.6 BU. At the same time, the sensorial bitterness is only slightly changing although the analytical BUs increase.

## ❖ Supplementary Information

- **Usage in Combination**

If **AlphaExtract** shall be used in combination with Iso-Extract, a customer specific stable aqueous solutions of alpha plus iso-alpha acids can be produced.

In case **AlphaExtract** and Tetra shall be added to beer, it is important that **AlphaExtract** is added to the beer before Tetra.

- **Stability of Alpha Acids in Beer**

During the normal shelf-life of beer it is not unusual to detect a loss of alpha acids. Nevertheless, it has been demonstrated that this had no effect on the stability and cling of beer foam.

- **Light Stability of Alpha Acids**

It is not recommended to use **AlphaExtract** in light stable beers, as alpha acids can transform into iso-alpha acids, which are not light stable.

## ❖ Technical Support

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

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

## ❖ Patent

Patent Pending US 2011/0287152 A1.

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