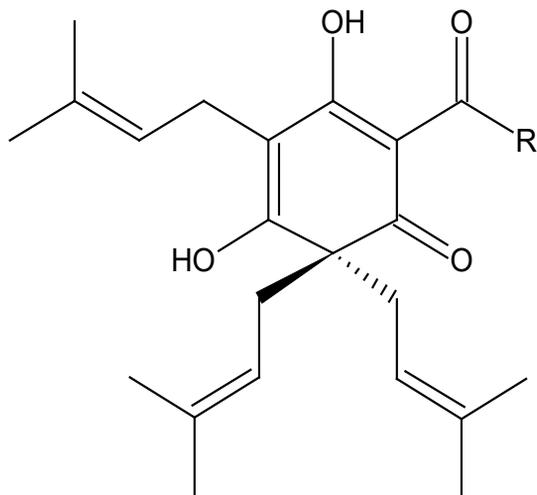


## Beta Rich Hop Extract (BRHE)

### ❖ Overview

- **BRHE** is a fraction of hop extract, which predominantly contains the hop beta acid in its form as potassium salts. After extracting the natural hops with supercritical carbon dioxide, the beta-acids are separated from the extract and dissolved in food-grade propylene glycol.
- **BRHE** with its content of beta acids and essential hop oils, has aromatic properties and can be dosed as a (hop) flavouring.

Structure of Beta acids



- |  |              |
|--|--------------|
| R = -CH-(CH <sub>3</sub> ) <sub>2</sub>                    | (Colupulone) |
| R = -CH <sub>2</sub> -CH-(CH <sub>3</sub> ) <sub>2</sub>   | (Lupulone)   |
| R = -CH(CH <sub>3</sub> )-CH <sub>2</sub> -CH <sub>3</sub> | (Adlupulone) |

### ❖ Specification

- |                     |   |
|---------------------|---|
| • Description:      | A dark brown liquid                         |
| • Beta acids:       | 40.0 % (± 1.5)                              |
| • Alpha acids:      | < 1.5 %                                     |
| • Hop oils:         | 1.5 % (± 0.5)                               |
| • Propylene Glycol: | 20 % (± 15)                                 |
| • Moisture:         | < 8 %                                       |
| • pH in water:      | 11.0 (± 0.5) (1 pt product : 3.5 pts water) |
| • Viscosity:        | 300 - 1000 mPas at 20°C / 68 °F             |
| • Density:          | 1.00 (± 0.10) g / ml at 20°C / 68 °F        |

## ❖ Properties

### • Appearance

A dark brown, viscous liquid at room temperature, becoming more liquid when heated. Remains fluid even at 0 °C.

### • Flavor

**BRHE** leads to a non-iso-alpha acid bitterness and intensifies the typical hop character of a product. Small residual amounts of iso-alpha and alpha acids also contribute to the bitterness of the product.

### • Quality

All Hopsteiner® products are produced in plants accredited to internationally accepted quality standards. **BRHE** is certified as Kosher, including for Passover, GRAS and Food Grade.

## ❖ Packaging

**BRHE** is regularly available in 25 kilo pails (HDPE) or IBC. Other pack sizes (including totes) are available on request.

## ❖ Product Use

We recommend that **BRHE** is always used in its undiluted form. It is not difficult to pump and is compatible with the usual materials used in food processing plants.

### • Dosage

Actual dosage will depend on the application and the substrate. Typically, **BRHE** has flavouring properties already at low ppm concentrations.

### • Application

**BRHE** may be dosed directly into process streams or added to solid or semi-solid products in a suitable blender. When dosing into pipelines or vessels it is best to ensure that there is vigorous mixing to disperse the product quickly. E.g. this can be achieved by injecting into the bulk fluid at high pressure through a suitable nozzle or small-bore pipe so that a high degree of turbulence is generated.

### • Storage

**BRHE** has excellent storage stability at temperatures from 5 – 15 °C (41 – 59 °F) in unopened, original containers. Bulk storage in heated tanks (up to 40 °C) is also possible, provided the product is not directly exposed to air and used within about 3 months.

### • Best Before Date

**BRHE** is stable for six years from the date it was produced / packaged if stored under the recommended conditions.

### • Safety

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

For full safety information, please refer to the relevant Hopsteiner® safety data sheet.

## ❖ Analytical Methods

### • Concentration of Bitter Substances

Beta acids (as well as alpha acids) can be measured using the following methods:

- HPLC according to Analytica-EBC 7.8 with the current ICE standard
- UV spectrophotometric analysis acc. to ASBC Hops-14

## ❖ Technical Support

We are pleased to offer assistance and advice on the entire Hopsteiner® product range:

- information on all relevant analytical procedures
- Safety Data Sheets (SDS)
- special analytical services

## ❖ Supplementary Information

### • Beta acids

Beta acids are natural, major constituents of hops and are present in amounts ranging from about 2 – 12 % according to variety. They are soluble in organic solvents and are readily extracted by liquid or supercritical carbon dioxide. CO<sub>2</sub> extracts produced commercially for use in brewing typically contain from 15 – 35 % beta acids, of which there are three major homologs - colupulone, lupulone and adlupulone.

### • Propylene Glycol

Propylene glycol (1,2-propanediol) is regarded as a very safe material and is widely used as a carrier for food ingredients. It is permitted for use in foodstuffs at levels not to exceed regulatory limits. At high concentrations it has a sweet taste.