



# CO<sub>2</sub> Hop Extract

CO<sub>2</sub> Hop Extracts have been prepared from hops or hop pellets using carbon dioxide and contain the  $\alpha$ -acids,  $\beta$ -acids and essential oils of hops. CO<sub>2</sub> Hop Extract offers the brewer a concentrated hop product that can provide added efficiency and flexibility in the brew house. In the United States hop extracts are generally recognised as safe (GRAS) in accordance with US FDA regulation 21 CFR 182.20.

## CHARACTERISTICS

CO<sub>2</sub> Hop Extract retains the aroma and the bittering potential of the hops from which it is made. Stability is excellent. Compared to raw hops or hop pellets, the extracts represent a convenient and concentrated alternative. Since the brewing characteristics of the original hops are maintained, an early addition to the kettle imparts mainly bitterness while late addition will result in a carry over of the volatile oils in beer with aromatic "late hop" character.

## PRODUCT SPECIFICATIONS

<b>Description</b>	Depending on the extraction conditions and the hop variety, the colour of the extract can vary from yellow to dark green. It is a semi-fluid paste at room temperature. The product becomes more fluid when heated.
<b>Density</b>	0.9 - 1.0 g/mL
<b>Viscosity</b>	approx. 1 - 3 Pas at 30 - 40 °C (86 - 104 °F), (depending on variety).
<b><math>\alpha</math>-Acids</b>	Typical range for aroma hops approx. 35% and > 50% for high alpha hops (depending on variety)
<b><math>\beta</math>-Acids</b>	Typically 15 - 40% (depending on variety)
<b>Hop oils</b>	3 - 12 mL/100 g (depending on variety)

## PROCESS SPECIFICATIONS FOR SUPERCRITICAL CO<sub>2</sub> HOP EXTRACT

<b>Carbon dioxide quality</b>	Food grade CO <sub>2</sub>
<b>Extract temperature</b>	50 - 60 °C (122 - 140 °F)
<b>Extraction pressure</b>	150 - 500 bar

## PROCESS SPECIFICATIONS FOR SUBCRITICAL (LIQUID) CO<sub>2</sub> HOP EXTRACT

<b>Carbon dioxide quality</b>	Food grade CO <sub>2</sub>
<b>Extract temperature</b>	5 - 15 °C (41 - 59 °F)
<b>Extraction pressure</b>	55 - 70 bar

## QUALITY AND FOOD SAFETY

Barth-Haas maintains quality management systems registered to the ISO 9001 standard, as well as food safety management programs based on internationally recognized (HACCP) principles. Please refer to our web site ([www.barthhaas.com](http://www.barthhaas.com)) for more information on our systems and programs.

## PRODUCT USE

For efficient provision of bitterness, the extract should be added to the kettle at the beginning or up to 10 minutes after the beginning of the wort boil. Utilization of  $\alpha$ -acids in beer is slightly better compared to non-isomerized pellets and typically within the range of 32% - 38%. When added late in the boil, utilization of  $\alpha$ -acids may be reduced considerably. The quantity to be added is calculated using the  $\alpha$ -acids content and the estimated utilization. Actual utilization may vary depending on plant and processing parameters. If added by means of an automatic dosing system, the extract should be warmed up to 40 °C and gently agitated to ensure proper dosing.

## PACKAGING

Standardisation of the  $\alpha$ -acids content can be achieved by adjusting the weight of extract in each container. Alternatively, the  $\alpha$ -acids content of the extract can be standardized by the addition of glucose syrup or some other food grade material. Container sizes range from 0.5 to 4 kg. Non-returnable bulk containers are available in sizes ranging from 50 to 200 kg. Containers meet all food industry packaging regulations. When bulk containers are supplied for automatic dosing units, viscosity analysis may be provided on request. All internal surfaces of containers are lined with a food grade coating.

## STORAGE AND BEST-BY RECOMMENDATION

CO<sub>2</sub> Hop Extract is exceptionally stable when properly stored. Hop oils are preserved in the condition as they were in hops. CO<sub>2</sub> Hop Extract should be cold stored at 0 - 5 °C (32 - 41 °F) and best if used within 8 years after processing. If stored at ambient conditions (below 25 °C, 77 °F) extracts should be used within 3 years. Containers once opened should be used within a few days.

## ANALYTICAL METHODS

- The determination of  $\alpha$ -acids comprises three types of methods: HPLC, spectrophotometric, and conductometric methods. Specifically, the concentrations of hop acids may be measured by:
  - HPLC, using the current ICE standard, according to the EBC 7.7 or the ASBC Hops-14 methods.
  - Conductometric methods - EBC 7.6, or ASBC Hops-8.
  - Spectrophotometric, ASBC Hops-8.
- Hop oil concentration can be determined by:
  - EBC 7.10 or ASBC Hops-13.

## SAFETY

CO<sub>2</sub> Hop Extract is a natural, non-toxic substance and may be safely handled using routine precautions to avoid contact with skin and particularly, eyes. For more information please refer to the relevant Safety Data Sheet (SDS).

## TECHNICAL SUPPORT

We will be pleased to offer help and advice on the use of CO<sub>2</sub> Hop Extract in brewing.

E-Mail: [Brewingsolutions@barthhaas.de](mailto:Brewingsolutions@barthhaas.de)