

PRODUCT DATA SHEET

CO₂ Hop Extract



PRODUCED BY

Yakima Chief - Hopunion
203 Division Street, Yakima, WA 98902 USA
P 509.453.4792 // F 509.453.1551

DESCRIPTION

CO₂ hop extract products are produced from soft, hop pellets by supercritical CO₂ extraction. CO₂ hop extract is the pure resin extract of hops containing alpha acids, beta acids, and hop oils, and is designed to deliver clean bitterness and hop aroma in the kettle boil. CO₂ hop extract typically contains 45-65% alpha acid, 15-35% beta acid and 5-15% oil. CO₂ hop extract can be produced from any hop variety but is typically available in several high alpha varieties. Informational summaries for these hop varieties are available at ychhops.com.

APPLICATION

CO₂ hop extract is primarily used as a kettle hop ingredient to provide clean bitterness and hop character to beer. It also improves physical stability and contributes to consistency. Traditionally, kettle hopping with extract will also lead to improved trub formation and improved antimicrobial and anti-foaming properties.

ADDITION PROCEDURE

Add CO₂ hop extract in wort early during kettle boil for bitterness and late during kettle boil for aroma. Based on quantity required, CO₂ hop extract packaged in custom tins can be directly flushed with hot wort in the brew kettle or in specific by-pass dosing systems or heated to 122°F - 140°F (50°C - 60°C) and poured directly into the kettle. Heating temperature and time may depend on variety. Addition rates depend on the alpha concentration of the extract.

USE RATE CALCULATIONS

Addition during early kettle boil to achieve average bitterness in high gravity wort/beer will typically lead to the isomerisation of 35% of the alpha acids in the finished beer. Addition rate is thus calculated as follows:

$$\text{kgA} = \text{BU} \times \text{HL} / 3500$$

Where: kgA = kg of alpha acids to add in the brew kettle

BU = the desired amount of bitterness units in the finished beer

HL = hectoliters of finished beer (1 barrel = 1.173477657999771 hectoliter)

Use rates may vary depending on the brewing process and the desired hopping level.

AROMA

The aroma of the CO₂ hop extract is variety specific. Perception of hoppy character and various related notes in beer are also variety specific in some instances and will depend on the quantity of extract added and the time of addition during kettle boil. CO₂ hop extract is primarily utilized in bittering applications with high alpha varieties so aroma is limited.

ANALYSIS

Alpha acids and beta acids are measured by HPLC with the International Calibration Extract as reference or by UV Spectrophotometric. Total oils are measured by steam distillation.

PACKAGING

Standard packaging is available in 55-gallon PET or steel drums, or in 0.5 kg, 1 kg, 2 kg, 3 kg and 4 kg tins containing 200 g to 2.4 kg alpha acids.

Uniformity of CO₂ hop extract can be achieved with lot sizes up to 10,000 kg.

The inner coating of metal tins and drums are approved by the FDA for use with food products and meet the requirements of Food Additive Regulation 21 CFR 175.300. Tins are marked with 16-9000 food grade ink.

STORAGE

CO₂ hop extract may be stored at room temperature or in cold storage conditions.

When stored in closed drums or tins, "Best Use Before Dates" are as follows:

Room Temperature (41°F - 77°F (5°C - 25°C) - 3 Years

Cold Storage (30°F - 41°F (-1°C - 5°C) - 5 Years

SPECIFICATION SHEET

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	METHOD	TYPICAL ANALYSIS
IDENTIFICATION	UV absorption curve is similar to that of reference standard	
ALPHA ACIDS ASSAY*	UV Spectro. by ASBC HOPS-6A HPLC - EBC 7.7 or ASBC HOPS-14 (ICE-3 Std.)	45 - 65% (w/w)
BETA ACIDS ASSAY*	UV Spectro. by ASBC HOPS-6A HPLC - EBC 7.7 or ASBC HOPS-14 (ICE-3 Std.)	15 - 35% (w/w)
% OILS BY DISTILLATION*	EBC 7.10 or ASBC HOPS-13	5 -15% (v/w)
LEAD		< 1.0 ppm
ARSENIC		< 0.5 ppm
CADMIUM		< 0.03 ppm
TOTAL HEAVY METALS (as Pb eq.)		< 10 ppm
PESTICIDES	US regulations and EC Dir. 90/642/EEC w/ amendments	

* NOTE: Concentration dependent upon variety of hops and crop year

1. PRODUCT IDENTIFICATION

1.1 Product Name	Supercritical CO ₂ Hop Extract (Pure Resin CO ₂ Hop Extract, Kettle Extract, Liquid CO ₂ Extract, Pure Resin Extract, Standardized Extract) Resin concentrated of humulones, lupulones and essential hop oils made from hop pellets
1.2 Supplier	Yakima Chief - Hopunion, LLC 203 Division St. Yakima, WA 98902 (USA) Tel.: 800 952 4873 555 West South Hill Road PO Box 209 Sunnyside, WA 98944 (USA) Tel.: (509) 839-9022
1.3 Emergency Contact	Yakima Chief - Hopunion, LLC 203 Division St. Yakima, WA 98902 (USA) Tel.: 800 952 4873 Website: ychhops.com
1.4 Recommended Use	Ingredient used in brewing beer
1.5 Restrictions on Use	None

2. HAZARD IDENTIFICATION

2.1 Hazard Classification	Not applicable; product is natural, unrefined and contains no additives
2.2 Label Elements	Not applicable
2.3 Other Hazards	Prolonged skin contact could cause dermatitis in some individuals

3. COMPOSITION, INGREDIENT INFORMATION

3.1 Composition	A slightly acidic solid or resinous phase; concentrate of alpha acids, beta acids, oils and uncharacterized resins produced by CO ₂ extraction
3.2 Hazard Components	Not applicable; product is natural, unrefined and contains no additives

4. FIRST AID MEASURES

4.1 Oral Ingestion	Not applicable
4.2 Eye Contact	Wash with copious amounts of water Seek medical attention if irritation persists
4.3 Skin Contact	Wash with warm, soapy water Seek medical attention if irritation persists Launder contaminated clothing before reuse
4.4 Inhalation	Move affected person to fresh air Administer oxygen if necessary
4.5 Symptoms	None known

5. FIRE FIGHTING MEASURES

5.1 Extinguishing Media	Dry powder, foam, water, CO ₂
5.2 Hazards from Fire	None known

6. ACCIDENTAL RELEASE MEASURES

6.1 Procedure	Scoop/shovel spilled material into recovery container Flush area with hot soapy water to remove final traces
6.2 Protective Equipment	Use adequate ventilation or a respirator if in a confined area Use rubber gloves Wear safety glasses

7. HANDLING AND STORAGE

7.1 Handling Equipment	Closed container of food grade quality Stainless steel, lacquered steel or PET
7.2 Precautions	Avoid prolonged skin contact Use personal protective equipment (Section 8)
7.3 Storage Conditions	Store at room temperature or at a temperature range of 30°F to 77°F (-1°C to 25°C)

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

8.1 Permissible Exposure Limits (PELs)	Not applicable
8.2 Threshold Limit Values (TLVs)	Not applicable
8.3 Engineering Controls	Provide adequate ventilation
8.4 Personal Protective Equipment (PPE)	Skin Protection: wear rubber gloves if prolonged exposure Eye Protection: wear safety glasses

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance	Green, yellow or brown resin concentrate
9.2 Odor	Pungent odor
9.3 Odor Threshold	No data available
9.4 pH	4 - 6
9.5 Melting Point	40 – 60° (104 – 140°F), depending on variety
9.6 Boiling Point	> 100°C
9.7 Flash Point	> 100°C
9.8 Evaporation Rate	< 1
9.9 Flammability	No data available
9.10 Upper/Lower Flammability	No data available
9.11 Vapor Pressure	No data available
9.12 Vapor Density	No data available
9.13 Density	0.85 – 1.10
9.14 Solubility in Water	Insoluble
9.15 Partition Coefficient	No data available
9.16 Auto-ignition Temperature	No data available
9.17 Decomposition Temperature	No data available
9.18 Viscosity	No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity	Product is sensitive to oxidation in open containers, and/or under excessive temperatures
10.2 Stability	Product is stable under appropriate storage conditions, in closed containers and/or under inert atmosphere (Section 7.3)
10.3 Possibility of Hazardous Reactions	None known
10.4 Conditions to Avoid	See Section 7.3
10.5 Incompatible Materials	None known
10.6 Hazardous Decomposition Products	None known

11. TOXICOLOGICAL INFORMATION

11.1 Acute Toxicity	None known; product is "Generally Recognized As Safe" (GRAS 21 CFR 182.20)
11.2 Routes of Exposure	Inhalation: No data available Ingestion: No data available Skin contact: No data available Eye contact: No data available
11.3 National Toxicology Program	Not listed on report of carcinogens

12. ECOLOGICAL INFORMATION

12.1 Toxicity	No data available
12.2 Potential for Persistence and Degradation	No data available; product is all-natural and biodegradable
12.3 Bioaccumulation	No data available; product is all-natural
12.4 Mobility in Soil	No data available
12.5 Other Effects	No data available

13. DISPOSAL CONSIDERATIONS

13.1 Product Disposal	According to regulations in force
13.2 Packaging Disposal	According to regulations in force; for paper/cardboard, steel and PET

14. TRANSPORTATION INFORMATION

14.1 UN Number	Non-hazardous product
14.2 Shipping Name	Supercritical CO ₂ Hop Extract
14.3 Hazard Class	Non-hazardous product
14.4 Packing Group	Non-hazardous product
14.5 Environmental Hazards	Non-hazardous product
14.6 Other	Product is not classified as ADR and should not be transported along with ADR classified cargo Product should be stored away from engines or any heat source during transportation.

15. REGULATORY INFORMATION

15.1 Regulations	Food safe Heavy metals, pesticides/herbicides/fungicides, nitrates, radioactivity: Below tolerance levels Allergenic-free, non GMO, traceable
15.2 REACH	Not applicable (No EINECS Ref.)

16. OTHER INFORMATION

16.1 Issue Date	26 May 2015
16.2 Revision Date	
16.3 Other	