

# RHO

## PRODUCT DATA SHEET

### PACKAGED BY

Yakima Chief Hops  
306 Division Street, Yakima, WA 98902 USA  
Phone (509) 456-4792, Fax (509) 453-1551

### DESCRIPTION

Rho is dihydroiso-alpha-acids (DHIAA) in pure resin extract form and typically contains 30% w/w of DHIAA when measured by HPLC and more than 35% w/w of DHIAA when measured by UV Spectrophotometer and less than 1.0% w/w of IAA (iso-alpha-acids). Rho is produced from CO2 hop extract by simultaneous isomerization and BH4- reduction. The purity of Rho is typically more than 85% w/w. Formulation and packaging of Rho have been designed to make it a user friendly and economical hop ingredient.

### PACKAGING & STORAGE

20 KG deltangular tight-head PET containers or tins. Product may be customized depending upon the brewer's desired DHIAA quantity per tin.

Rho should be stored at a temperature ranging between 35°F and 50°F (2°C and 10°C) and will remain stable in closed container for 2 years when stored under these conditions. A precipitate may form during storage, to re-dissolve, warm the container to 50°C, 120°F and the agitate.

Opened containers should preferably be used within one month.

### APPLICATION & USAGE

Rho as 100% of the hop bill or in conjunction with other light stable hop extracts for the hopping of light stable beers. Rho is stable to light and will not contribute to the development of sun-struck flavors. Rho is supplied as a pure resin extract to facilitate direct addition. Addition of Rho is a convenient means of getting DHIAA into the beer. The addition means that the hop acids will be present in the fermenter providing anti-microbial protection.

Rho as part of your hop formulation to differentiate beers. Bitterness intensity is 0.7 times the bitterness per BU when compared to iso-alpha acids. The bitterness profile is smoother than iso-alpha acids, leaving a full body mouth feel with little after bitter. This can be perceived at high concentrations (>10 ppm). Formulation of the hop bill with various ratios of IAA:DHIAA:THIAA can provide a wide range of flavors.

Yakima Chief Hops recommends the direct, undiluted addition of Rho into the brew.

### USE RATE CALCULATIONS

The addition of 200 gm of DHIAA of Rho per equivalent 100HL of finished beer will provide 10 BU. Note the above recommended addition rate is per 100HL of finished beer. The effective addition rate will depend upon the desired hopping level and parameters within the individual breweries.

### CHARACTERISTICS

Flavor of a solution in de-ionized water containing 10 mg/L of dihydroiso-alpha-acids: A fine bitterness with no other detectable flavors

Aroma of a solution in de-ionized water containing 10 mg/L of dihydroiso-alpha-acids: None detectable

Gushing potential in beer: No increased potential



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## SPECIFICATION SHEET

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HOP ACIDS ASSAY	METHOD	TYPICAL ANALYSIS
Dihydroiso-alpha-acids (DHIAA)	HPLC by EBC 7.9 (Rho Std.)	30% (w/w)

	METHOD	TYPICAL ANALYSIS
Area Purity	HPLC by EBC 7.9 (Rho Std.)	> 85 %
Boron		< 300 ppm
Lead		< 1.0 ppm
Arsenic		< 0.5 ppm
Cadmium		< 0.03 ppm
Total Heavy Metals (as Pb eq.)		< 10 ppm

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



# RHO

## SAFETY DATA SHEET

### 1. PRODUCT IDENTIFICATION

1.1 Product Name	Rho (Rho 30%, Rho Kettle Extract, Kettle Rho) Made from CO2 Hop Extract
1.2 Supplier	Yakima Chief Hops, LLC 306 Division St. Yakima, WA 98902 (USA) Phone: 1.509.453.4792 Email: Quality@Yakimachief.com Website: Yakimachief.com
1.3 Recommended Use	Ingredient used in brewing beer.
1.4 Restrictions on Use	None

### 2. HAZARD IDENTIFICATION

2.1 Hazard Classification	Not Applicable Product is natural.
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 pure resin extract of dihydroiso-alpha-acids produced by isomerizing and hydrogenating the alpha-acids from CO2 hop extract.
3.2 Hazard Components	Not Applicable Product is natural.

#### 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	Remove 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, CO2
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 in unopened container at 3°C - 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 & Odor	Amber brown resin w/ slight resinous odor.
9.2 Odor	Slight resinous odor.
9.3 Odor Threshold	No data available
9.4 pH	9 - 11
9.5 Freezing Point	< 0°C
9.6 Boiling Point	> 100°C
9.7 Flash Point	Not applicable
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	1.08 +/-0.01
9.14 Solubility in Water	Complete at pH 10
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	Rho
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	2015-05May-26
16.2 Revision Date	2018-08Aug-20
16.3 Other	