

Hop Pellets (Type 90 Pellets)

CHARACTERISTICS:

Provoak is a homogenous mixture of hop and wood powder pelletized as a standard pellet type 90. It is available in two different styles, US-Style and EU-Style, both providing different hop and wood aromas. This dual purpose product is specifically designed for Whirlpool (late hopping) and dry hopping applications to provide hop aroma and wood flavor and body at the same time. Provoak pellets are easy to dose and offers a cost and time efficient alternative to conventional barrel aging. Classically, due to the presence of oxygen during barrel aging, the hop volatiles are degraded resulting in beers without hop character. Provoak offers the possibility to efficiently add hop and wood aroma and flavor to the beer in an oxygen free environment. Moreover, this product enables reproducibility from batch to batch to support a consistent production process. Provoak in accordance with US FDA regulation 21 CFR 170.30(c) and 170.3(f), hop pellets are generally recognised as safe (GRAS).

PRODUCT SPECIFICATIONS

Description: Cylindrical pellets of approx. 6 mm (0.24 inch) diameter, milled and compressed whole hops and wood powder

Consistency: A solid which normally breaks up into a powder

Colour: Typically from olive-green to yellow-green

α -acids: Dependent upon raw hops

β -acids: Dependent upon raw hops

Hop Oils: Depending on style and crop year

Moisture: 7 - 12%

Wood: US-Style toasted oak powder; EU-Style untoasted oak powder

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 recognised (HACCP) principles. Please refer to our web site (www.barthhaas.com) for more information on our systems and programs.

PRODUCT USE:

The quantity to be added is calculated using the oil content. We recommend a dose rate between 2 and 6 mL oil/hL depending on residual extract and beer style. Pellets can be dosed automatically. The product should be used according to common late and dry hopping practices.

PACKAGING:

Provoak is packed in laminated foils with an aluminum layer as a barrier against diffusion of oxygen. They are sealed under inert gas or vacuum packed. The foil material used meets all food industry packaging regulations. The residual oxygen content in the foil packs is less than 2% by volume. Pack sizes are available from 2.5 kg to 140 kg.

STORAGE AND BEST-BY RECOMMENDATION:

Provoak should be stored cold at 0 - 5°C (32 - 41 °F) and is best used within 3 years after processing. If stored at -20 °C (-4 °F) it should be used within 5 years. Foils, once opened, should be used within a few days to avoid deterioration of bitter acids and essential oils.

HOP DETERIORATION DURING STORAGE AND SHIPPING:

| Hop Product | Storage at up to 30°C | Cold Storage at 3 °C |
|---------------------------------|-----------------------|----------------------|
| Cones (3 months storage) | 22 % | 5 % |
| Pellets (1 year storage) | 12 % | 3-6 % |

Table 1: α-Acid losses in % relative during different storage conditions [1]

| Shipping Temperature | Alpha Losses |
|----------------------|--------------|
| Up to 25°C | 3-6 % |
| Up to 30°C | 5-8 % |
| Up to 35 °C | 6-10 % |
| > 35°C | Up to 15 % |

Table 2: Alpha-acid losses during overseas transportation in % relative [2]

ANALYTICAL METHODS:

The determination of α -acids comprises three types of methods, the specific measurement of α -acids by means of HPLC, spectrophotometric, or conductometric methods:

- α -acids can be measured by any of the following methods:
 - EBC method 7.5 - (α -acids as lead conductometric value (LCV))
 - ASBC Spectrophotometric method (Hops-6) - (α and β -acids)
 - By HPLC, using the current ICE standard, according to the EBC 7.7 method, or the ASBC method (Hops-14) - (α and β -acids)
- Hop oil concentration can be measured by:
 - EBC 7.10
 - ASBC Hops-13

SAFETY:

If dust is generated, it is advisable to use a dust mask. Hop pellets are a combustible material. For further information please download the relevant Safety Data Sheet (SDS) from our web site www.barthhaas.com.

TECHNICAL SUPPORT:

We will be pleased to offer help and advice on the use of Provoak in brewing.

E-Mail: Brewingsolutions@barthhaas.de

REFERENCE:

1. Biendl M, Engelhard B, Forster A, et al (2012) Hopfen: vom Anbau bis zum Bier. Hans Carl GmbH, Nürnberg
2. Forster A (2002) What happens to hop pellets during unexpected warm phases? Brauwelt Int 43-46