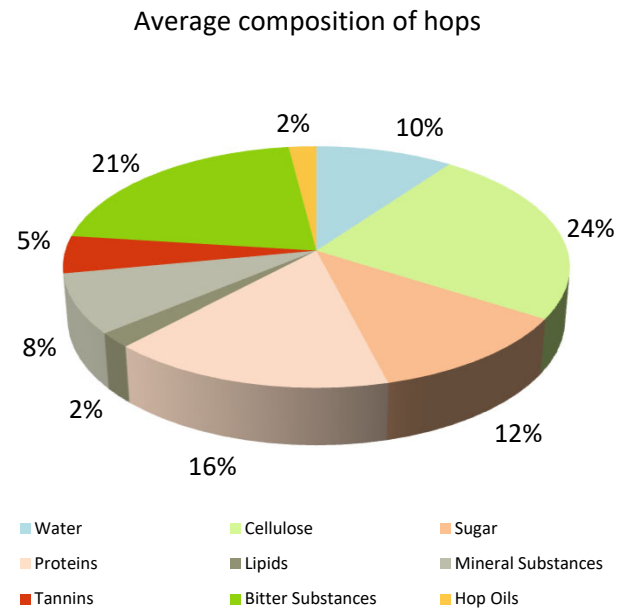


Leaf Hops (bales or vacuum packs)

❖ Overview

- **Leaf Hops** are naturally grown and dried hop cones. The content of oils, resins (alpha and beta acids) and polyphenols is important for the brewing process. These substances contribute to the overall flavor, required level of bitterness and hop aroma of beer.
- **Leaf Hops** can be used on both the hot side (kettle hopping) and the cold side (dry hopping) of the brewing process.
- **Baled Leaf Hops** cannot be stored indefinitely and cold storage is highly recommended. **Leaf Hops** are also available in **vacuum packs** which greatly improve storage stability.



❖ Specifications

- Description: dried and compressed whole hop cones, oval or round in shape
- Color*: green
- Alpha acids*: 1 – 25 %
- Beta acids*: 1 – 14 %
- Hop oil*: 0.2 – 4.0 ml/100g
- Moisture content: 6 – 11 %

*dependent on variety and crop year

❖ Properties

• Appearance

Green, **Leaf Hops** consist of whole hop cones packed in bales. The cones should be intact with little breakage and with minimal true leaf or stem (hop bine) material. In some varieties, the leaves have a striped appearance due to natural color variation.

• Utilization

Given as an early kettle addition (up to 15 min after the boil begins), hop utilization normally falls within a range of 22 – 28 %. When **Leaf Hops** are added late in the boil, utilization is lower and is dependent on individual process conditions.

Both additions can vary depending on the desired intensity and the beer style.

• Flavor

Leaf Hops provide bitterness and aroma to the beer. The flavor depends on the variety, quantity and time of addition. For further information, please refer to the hop variety data sheets.

• Quality

All Hopsteiner® products are processed in facilities which fulfill internationally recognized quality standards.

❖ Packaging

Leaf Hops are normally pressed and wrapped in burlap or polypropylene cloth. Bales are typically rectangular, but sizes and shapes may vary, especially from region to region. Standard bales usually contain 55 – 65 kg in the EU or 50 lb in the USA.

Vacuum-packed Leaf Hops are packaged in 5 kg (350 x 300 x 80 mm) metallized five-layer foil bags. In the USA, **vacuum-packed Leaf Hops** in units of 10 lb or 44 lb are available.

❖ Product Use

• Dosage

The quantity of **Leaf Hops** in an addition can be calculated using the alpha acid content of the leaf hops and an estimated or known utilization.

Late kettle additions of **Leaf Hops** (typically 5 – 20 min prior to the end of the boil) reduce alpha acid utilization but increase hop aroma and flavor.

• Application

For primary bittering or late kettle hopping, **Leaf Hops** can be added directly to the wort kettle or hop dosing vessel.

Dry hopping normally involves the addition of **Leaf Hops** during secondary fermentation or maturation using various techniques.

• Storage

Leaf Hops should be stored in a dry, dark place at low temperatures (< 5 °C or 41 °F). Wet bales are subject to degradation. Precautions must be taken to prevent the self-ignition of baled hops.

• Best Before Date

Leaf Hops should be used within one year of harvesting. During storage, losses of alpha acids will occur.

Vacuum-packed Leaf Hops are stable for at least three years after production / packaging if stored under the recommended conditions.

- **Safety**

There are no known, serious health hazards associated with normal use. When handling this product, it is advisable to wear a dust mask. Leaf hops are combustible.

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

- ❖ **Analytical Methods**

- **Concentration of Bitter Substances**

Alpha and beta acids can be measured using the following methods:

- HPLC according to Analytica-EBC 7.7 or ASBC Hops-14 with the current ICE standard
- spectrophotometric method according to ASBC Hops-6A

The lead conductance value can be measured using the following methods:

- Analytica-EBC 7.4 or 7.5
- ASBC Hops-6B

- **Concentration of Hop Oil**

The hop oil concentration can be measured using the following methods:

- Analytica-EBC 7.10
- ASBC Hops-13

- ❖ **Technical Support**

We are pleased to offer assistance and advice on the full range of Hopsteiner® products:

- copies of all relevant analytical procedures
- Safety Data Sheets (SDS)
- assistance with pilot or full-scale brewing trials
- special analytical services

Disclaimer: The information provided in this document is believed to be correct and valid. However, Hopsteiner® does not guarantee that the information provided here is complete or accurate and thus assumes no liability for any consequences resulting from its application.