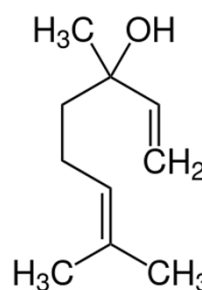


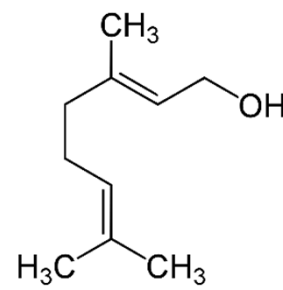
Hop Oil – Type ESSENTIAL variety specific (v.s.)

❖ Overview

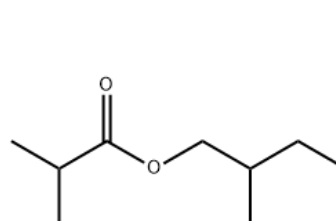
- **Hop Oil – Type ESSENTIAL v.s.** is produced either from leaf hops, hop pellets or conventional hop extracts of a specific hop variety and contains the essential aroma components as resulting from a regular late and dry hopping.
- **Hop Oil – Type ESSENTIAL v.s.** is a hop product that highlights the variety characteristics after late and dry hopping.
- **Hop Oil – Type ESSENTIAL v.s.** is typically added during filtration and results in improved aroma yields compared to traditional hopping techniques. By using **Hop Oil – Type ESSENTIAL v.s.** the so-called “hop creep effect” will NOT occur.



Linalool



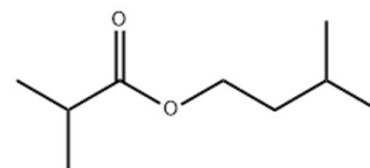
Geraniol



3-MBIB



4-MMP



2-MBIB

❖ Specifications

- Description: pure hop oil of a single hop variety diluted in propylene glycol
- Key compounds:
 - linalool
 - myrcene
 - humulene
 - caryophyllene
 - geraniol
 - hop esters
 - hop thiols
- Bittering substances: not detectable
- Viscosity: approx. 46 mPas at 25 °C (77 °F)
- Density: approx. 1.0 g/ml at 20 °C (68 °F)

For batch-dependent information, please refer to the enclosed certificate of analysis.

❖ Properties

• Appearance

Hop Oil – Type ESSENTIAL v.s. is a nearly colorless to light green, transparent or slightly turbid liquid, containing hop essential oils.

• Flavor

Hop Oil – Type ESSENTIAL v.s. has similar hop aroma compositions as in late or dry-hopped beers.

By using **Hop Oil – Type ESSENTIAL v.s.**, the late and/or dry hop flavor of the variety used is pronounced. Therefore any flavor from herbal to fruity and citrusy can be achieved, and the intensity and character depends on the quantity used.

During beer aging the aroma components of **Hop Oil – Type ESSENTIAL v.s.** remain stable and contribute to overall flavor stability.

• Utilization

Depending on the time and point of the addition, the recovery rate for most important aroma compounds of the hop oil can be close to 100%. Actual utilization will vary from brewery to brewery due to differences in equipment and process conditions.

• Quality

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

❖ Packaging

Hop Oil – Type ESSENTIAL v.s. is normally packaged in aluminum bottles of various sizes. The product is usually supplied as a dilution in propylene glycol.

❖ Product Use

• Dosage

The quantity of **Hop Oil – Type ESSENTIAL v.s.** to be dosed is determined by the brewer and depends on the time of addition, the character and intensity of the desired aroma.

Example (addition before / during filtration):

- **1 to 30 ml/hl** for bottom-fermented beers
- **5 to 40 ml/hl** for top-fermented beers

Trials performed by injecting the product into bottled beer with a microliter syringe are helpful for determining the quantity of **Hop Oil – Type ESSENTIAL v.s.** required.

• Application

Shake the packaging well before use.

Hop Oil – Type ESSENTIAL v.s. can be added at different stages on the cold side of beer production, typically prior to filtration. Dosing equipment which pumps the product into the beer stream is preferred for the addition of **Hop Oil – Type ESSENTIAL v.s.** Alternatively, the hop oil can be added to the tank prior to filling. In both cases, an excellent late and/or dry hop flavor can be achieved immediately after addition.

Hop Oil – Type ESSENTIAL v.s. is ideal for bottle conditioned beers: the hop creep effect will NOT occur.

- **Storage**

Hop Oil – Type ESSENTIAL v.s should ideally be stored at temperatures of 1 - 10 °C and in the delivered original container.

- **Best Before Date**

Hop Oil – Type ESSENTIAL v.s. is stable for one year from the date it was produced / packaged if stored under the recommended conditions. Once opened, it is recommended to use within one month and limit the number of openings.

- **Safety**

Any product coming into contact with the skin should be immediately washed off with soap and water or an appropriate hand cleanser. If **Hop Oil – Type ESSENTIAL v.s.** gets into the eyes, flush with copious amounts of water until clear and seek medical attention.

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

❖ Analytical Methods

- **Aroma Compounds**

Individual hop oil compounds can be analyzed by means of gas chromatography techniques using the following methods:

- Analytica-EBC 7.12
- ASBC Hops-17

❖ Technical Support

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

- 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.