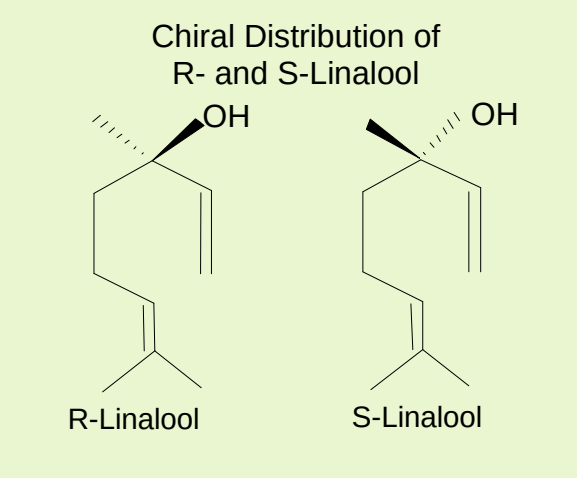
Hop Oil - Type DRY

❖ Overview

- **Hop Oil - Type DRY** is produced from leaf hops and contains the complete range of essential oils.
- **Hop Oil - Type DRY** can be dosed at several stages during the brewing process, resulting in improved oil recoveries compared to normal hopping techniques.
- **Hop Oil - Type DRY** produces pleasant hop aroma that can be subtly altered according to the manner of its use.



❖ Specification

- **Description:** An almost colorless, clear liquid, containing the complete range of hop essential oils.
- **Iso-alpha-acids:** < 0.1 %
- **Alpha-acids:** < 0.1 %
- **Beta-acids:** < 0.1 %
- **Main essential oils:**

Myrcene:	55 – 75 %	(depending on variety)
Humulene:	8 – 15 %	(depending on variety)
Caryophyllene:	5 – 10 %	(depending on variety)

- **Solvent residue:** Ethanol content < 2 %
- **Density:** Typically 0.8 g/ml

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❖ Properties

❑ Flavor

Hop Oil - Type DRY can be used to provide a strong or, alternatively, a more subtle hop aroma depending on the quantity added, method and point of addition.
As well as aroma, **Hop Oil - Type DRY** also has an influence on total hop flavor. It is therefore very suitable for addition to lightstable beers in order to enhance hop character.

❑ Recovery

Depending on the time and method of addition, hop oil recoveries can range between 1 – 50 %. These figures are only valid when the hop oil is used according to the section entitled “Product Use”.

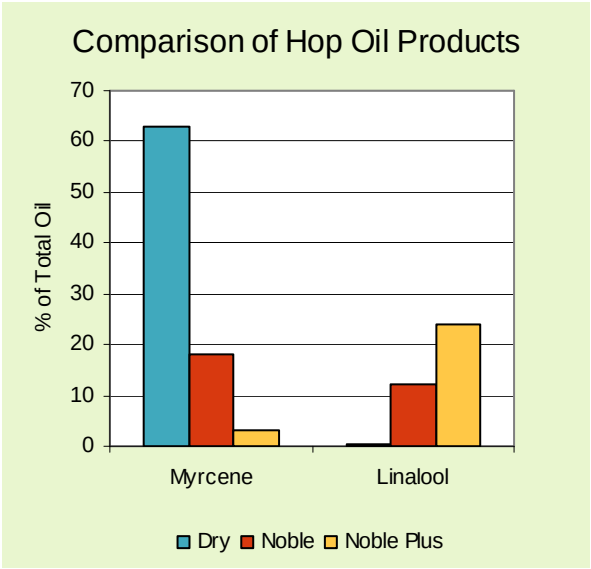
❑ Quality

All Hopsteiner® products are produced in plants accredited to internationally accepted quality standards.

❖ Packaging

Hop Oil - Type DRY is usually packaged in aluminium bottles containing either 0.5 kg or 1 kg.

Hop Oil - Type DRY can be delivered as pure hop oil or diluted with ethanol, ethanol / water and propylene glycol.



❖ Product Use

❑ Addition

Hop Oil - Type DRY can be added at different stages during beer production:

- **To the kettle:** results in low recoveries. Blending **Hop Oil - Type DRY** with a “carrier material”, like beta acids, improves recoveries.
- **Pre-fermentation:** the chemical reaction of volatile compounds during fermentation, combined with the modification of aroma compounds by yeast, can produce a more ‘typical’ or ‘comparable’ aroma.
- **Post-fermentation:** direct addition prior to filtration, results in the hop oils dissolving unchanged into the beer.

For the latter two addition options **Hop Oil - Type DRY** should be diluted to 1 % with ethanol.

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❑ Dosage

The quantity of hop oil to be dosed depends on the method of addition:

- Kettle addition: 1 – 5 g per hl
- Pre-fermentation: 0.5 – 2 g per hl
- Post-fermentation: 0.05 – 0.2 g per hl

The above figures are indications only; actual additions will depend on the quality and strength of aroma required. Dosing experiments, using a microlitre syringe to inject oil into bright beer, will give useful indications of the target quantity required.

(Note: Where additions are made pre-fermentation, the influence of the fermentation conditions must be taken into consideration.)

❑ Storage

Hop Oil - Type DRY should be stored cold in screw top bottles. If cold storage is not possible, the temperature should not exceed 10°C. If aluminium bottles are not used, exposure to light must be avoided.

❑ Best Before

Hop Oil - Type DRY is stable 1 year from date of production.

❑ Safety

If material comes into contact with the skin, wash off with soap and water. If material gets into the eyes, irrigate with excess water and seek medical attention. **Hop Oil - Type DRY** is a combustible material.

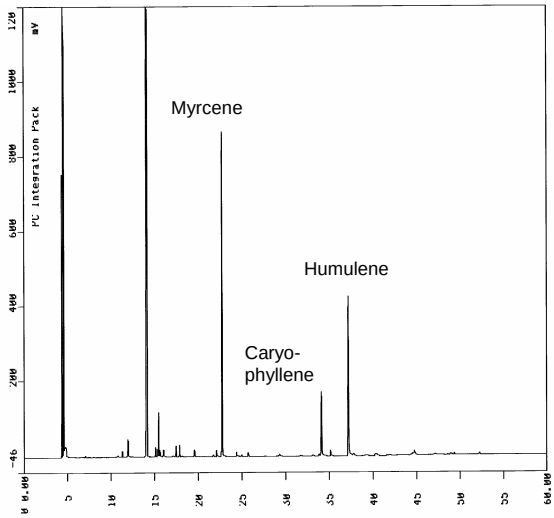
For full safety information please see the relevant Steiner material safety data sheet.

❖ Analytical Methods

❑ Composition of hop oils

For the analysis of individual hop oil components, gas chromatography techniques are used. Details of methods are available on request from Steiner.

Typical Gas Chromatogram of Hop Oil – Type DRY



❖ Technical Support

We will be pleased to offer help and advice on the full range of Hopsteiner® products:

- ❑ Copies of all relevant analytical procedures
- ❑ Material Safety Data Sheets (MSDS)
- ❑ Assistance with pilot or full brewery trials
- ❑ Specialist analytical services

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