



General:

PHA® Varietals are prepared from cone hops by specific extraction and distillation methods. They consist of original hop oil compounds in an aqueous propylene glycol (PG) solution. PG is a permitted carrier for flavours as per regulation 2006/52/EC. PHA® products are exclusively supplied worldwide by the Barth-Haas Group.

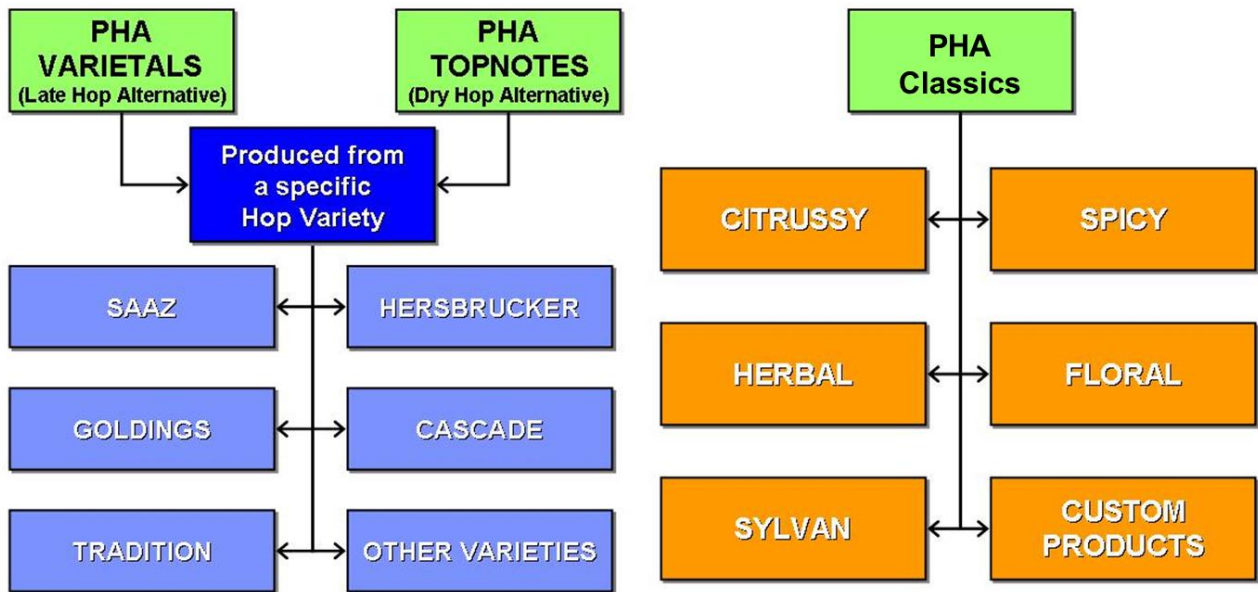


Figure 1: PHA^{1/2} Products

Characteristics:

PHA[®] Varietals are 100% soluble in beer (or other beverages). In general, PHA[®] products offer an alternative means of adding hop aroma independent of any other product or process. Specifically, PHA[®] Varietals give a subtle hop aroma that is characteristic of the specific variety from which it is prepared. They enhance pleasant existing flavors in the beer/soft drink and can mask some off-flavors. The following PHA[®] Varietals are available:

PHA[®] Varietals:



Saaz:

Czech aroma variety selected in the area of the same name. Mild with pleasant hoppy notes.



Hersbrucker:

A traditional variety with good aroma and considered as a successor of Hallertauer Mittelfrueh



East Kent Golding:

Gentle, fragrant, and pleasant. Recognised as having the most typical English aroma.



Cascade:

US variety characterised by medium strength and distinct aroma.



Styrian Golding: This variety is cultivated mainly in Slovenia, but also in Styria (Austria). Characteristic aroma.

Custom Products: Custom-made PHA[®] Varietals from other varieties are available on request.

Product specifications:

Description: Water white solution. Can appear to be slightly hazy.

Specific Gravity (20°C): 1.033 – 1.036

Flash point: >90 °C (194 °F)

Product Use:

PHA[®] products are completely soluble in beer and are intended for addition to fined or filtered beers. The required amount of PHA[®] may be metered directly into the beer stream during transfer to bright beer tank or other appropriate vessel. A usage rate of PHA[®] per hectoliter normally is about 10 ml but might vary between 5 – 40 ml according to the desired intensity of aroma. We recommend laboratory scale trials to determine which concentration gives the desired effect. This evaluation can be carried out on bottles of 250 to 500 ml capacity. The beer chosen for the test should not contain a significant proportion of aroma hops. The rate of initial tasting should be approximately 100 ppm of the PHA[®] as supplied. PHA[®] can be dosed directly using a micro syringe or Zipette at a rate of 0.1ul/ml bottle volume. i.e. for a 330ml bottle 33ul gives a dose rate equivalent to 10ml/hl. Chill the beer to normal drinking temperature.

Open and introduce the required volume of PHA[®] in the headspace of the beer bottle onto the glass or beneath the surface of the beer and reclose the bottle. Invert the bottle several times to ensure mixing and chill again for at least two hours before opening and tasting.

On a large scale, PHA^½ Varietal products are used as a post fermentation addition to finished beer, where 100% utilization is feasible. PHA[®] Varietal products are lightstable and therefore can be used to introduce hop aroma into a beer brewed using exclusively downstream products such as Tetrahop Gold^½ and Redihop^½. These products may be added without prior dilution to beer either before or after the final filtration preferably by metered injection into a turbulent beer stream during transfer. They can also be added

to bright beer without any increase in haze or deterioration in foam stability. If possible the pump should be adjusted to deliver the PHA[®] over approx. 95% of the total transfer time.

Special properties of PHA^{1/2}:

- < **Light stable**
 - All PHA[®] products are free of hop α -acids and can be used with any beer packaging type.
- < **Fully soluble**
 - PHA[®] utilization is up to 100% because it is fully soluble in brewed beverages.
- < **Easy handling**
 - Provided as a standardised solution for direct dosing into bright beer.
- < **Natural**
 - PHA[®] products contain hop oil fractions obtained by physical methods.
- < **Product development**
 - PHA[®] products give the opportunity to differentiate existing products or to create new ones.

Packaging:

The standard package size of PHA^{1/2} is 1 and 5 l aluminium flask. Bigger package units are available on request.

Storage and shelf life:

PHA[®] products are stable in unopened containers for at least 24 months. Store at 0-20°C (32-68°F) in high-grade stainless steel, glass, aluminium or lacquered steel drums.

Safety:

Please refer to our SDS which can be downloaded on our website.

Technical Support:

We will be pleased to offer help and advice on the use of PHA^{1/2} in brewing/soft drink production.