



General:

PHA[®] Classic products are prepared from cone hops by specific extraction and distillation methods. They consist of original hop oil compounds in a 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.

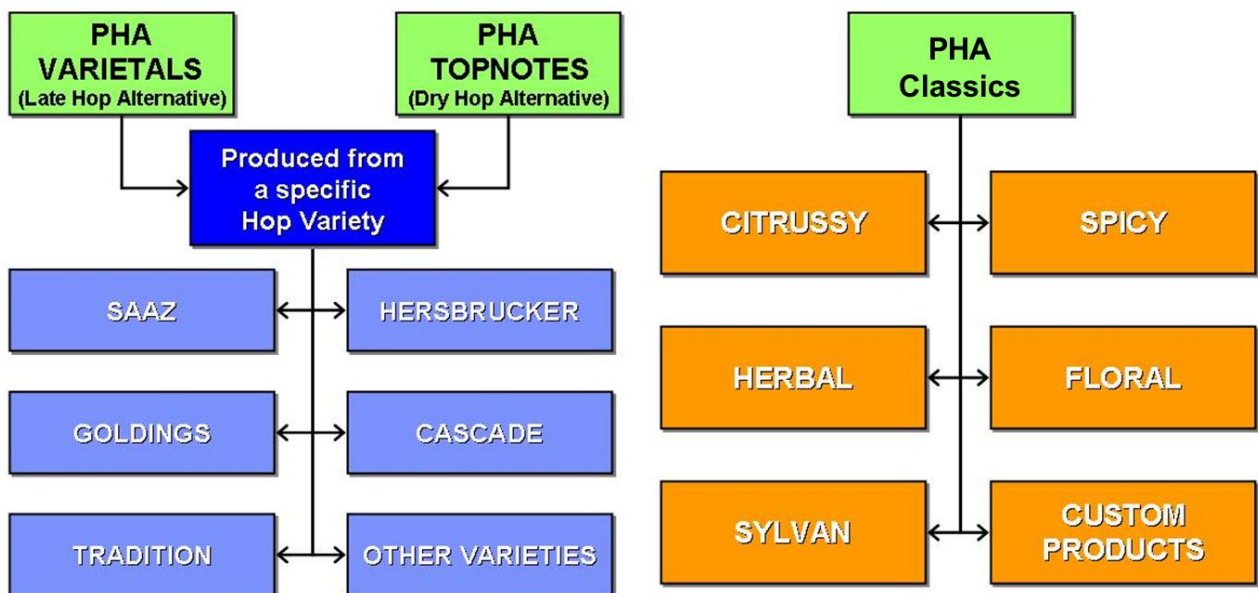


Fig. 1: Range of PHA[®] products

Characteristics:

PHA[®] Classic products 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 and of annual crop variations. They can complement traditional means of adding hop aroma by kettle addition. Specifically, PHA[®] Classic products can impart beer flavour attributes such as citrusy, floral, herbal or spicy characteristics. They enhance pleasant existing flavours in the beer/soft drink and can mask some off-flavours. The following Classic PHA[®] products are available:

Classic PHA[®] :

<p>Citrusy:</p>	<p>Floral:</p>
<p><i>Contains the components of hop oil that contribute a citrus / grapefruit type character</i></p>	<p><i>Contains components of hop oil that add a fragrant, fresh note to beer</i></p>
<p>Sylvan:</p>	<p>Herbal:</p>
<p><i>Contains components from hop oil that contribute a fresh woody character. Very useful in low alcohol beers.</i></p>	<p><i>Contains components of hop oil that contribute a 'green', fresh-hop character</i></p>
<p>Spicy:</p>	
<p><i>Contains components from hop oil that contribute to body and mouth-feel</i></p>	

Product specifications: Available on request.

Product Use:

The PHA[®] Classic 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[®] Classic products are used as a post fermentation addition to finished beer, where 100% utilization is feasible. PHA[®] Classic products are lightstable and therefore can be used to introduce hop aroma into a beer brewed using exclusively downstream products such as Tetrahop Gold[®] and Redihop[®]. 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[®]:

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

Packaging:

The standard package size of PHA[®] is 1 and 5 l aluminium flask. Larger 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, aluminum 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[®] in brewing/soft drink production.