

# WetHop – Initial Experience with a New Hop Product

## NOVEL PRESERVATION PROCESS | Hops – the flavour of beer!

And this ever since hops have been used for brewing beer. However, in particular, since the craft beer wave has been rolling over the industry, hops play an even more important, an even firmer role. As an addition to hitherto known processes of hop preservation, a new option has entered the world of beer: WetHop. This article explains what it is all about.

**DRY HOPPING**, though not a new invention, is being increasingly used. Whirlpool hopping is meantime almost standard and green hops are added increasingly often during the harvesting period for producing special beers. Based on use of green hops, Hopfen-Kontor GmbH of Vohburg, Germany has developed a new process for preserving hops. Freshly picked cone hops are shredded, packed and thermally stabilised. Hopfen-Kontor sells the finished product under the name of WetHop.

### ■ From Idea to Product

About five years ago, it occurred to Martin Schmailzl, Managing Director of Hopfen-

Kontor and also a hop farmer that, during hop kilning, especially readily volatile hop components expelled together with water. This led to the idea of finding a method of preserving hops, retaining these readily volatile compounds in particular. The process developed by Schmailzl involves shredding fresh hops under a blanketing atmosphere and packaging in air-tight containers. Cans and aluminium foil bags are currently used for packing. Subsequently, hops are thermally stabilised in the packaging. As hops are thermally treated after packaging, volatile components cannot be expelled. Hops thus treated have currently a shelf-life of 18 months. Due to the blanket atmosphere,

undesirable oxidation processes can neither take place during shredding nor during subsequent thermal treatment. The finished product has a water content of about 75-77 w/w. The difference between WetHop and hops dried conventionally is quite apparent (fig. 1).

Right from the beginning, Doemens kept up with the development, providing pilot-scale tests and subsequent tastings and analyses.

### ■ Product and Applications

The original objective of the development was to obtain a product that allows brewers to brew beers all year-round, having the same aroma profile as a green-hopped beer. It was apparent that WetHop, like pellet hops, can be used during every step of beer production. However, effects on aroma profile of finished beer differ. When adding WetHop already to the copper, most volatile compounds are expelled, similar to kilning of green hops. The later WetHop is added to the process, the more green hop aromas will pass over into the finished beer. When dry hopping, almost all green hop aromas pass over into the beer.



**Fig. 1**  
WetHop (r) compared  
to a conventionally  
dried cone (l)

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In addition to hop aroma, WetHop naturally also supplies adequate bitterness units through  $\alpha$ -acid and aromas through hop oils like all other hop products. However, it was found that WetHop could reduce losses. This can be attributed to partial pre-isomerisation of  $\alpha$ -acid as a result of thermal stabilisation of the product. In addition,  $\alpha$ -acids in the product that is still moist seem to be more readily soluble in wort or green beer. It is important to note that isomerisation is a result of thermal treatment only and not of addition of chemicals that would not be in conformity with the Purity Law.

Use of WetHop was completely unproblematic in most applications. However, tests showed that parts of WetHop tend to float when added to the whirlpool. It may thus be assumed that yield of hop components is incomplete. During dry hopping, WetHop showed inferior sedimentation compared to hop pellets. Thus, filter lives may be reduced when filtering beer after dry hopping.

**Analyses and Sensory Properties**

In view of the high water content, classical hop analyses are difficult. Therefore, analyses carried out and described here should be regarded as references only, with no claim to accuracy. In future, analysis procedures have to be adapted to the new product in view of high water contents in order to yield more conclusive results.

In the context of the development, it was very much more important to investigate sensory properties of beers brewed with WetHop. In initial analyses, all values were calculated on the basis of dry matter. This is not necessarily a common procedure for indicating hop components. However, in view of the clearly varying water contents (about 8 % w/w for pellets and about 76 % w/w for WetHop), this was necessary in order to compare analysis results to some extent. Pellets and WetHop from the same year and hop yard were analysed.

When considering oil levels, it is obvious that they are significantly higher for most hop varieties when using Wethop, as compared to pellets (table 1 and 2). This in turn accounts for the fact that a major portion of hop oils is expelled during hop kilning but retained in WetHop. In terms of  $\alpha$ -acids, WetHop contains significantly lower concentrations com-

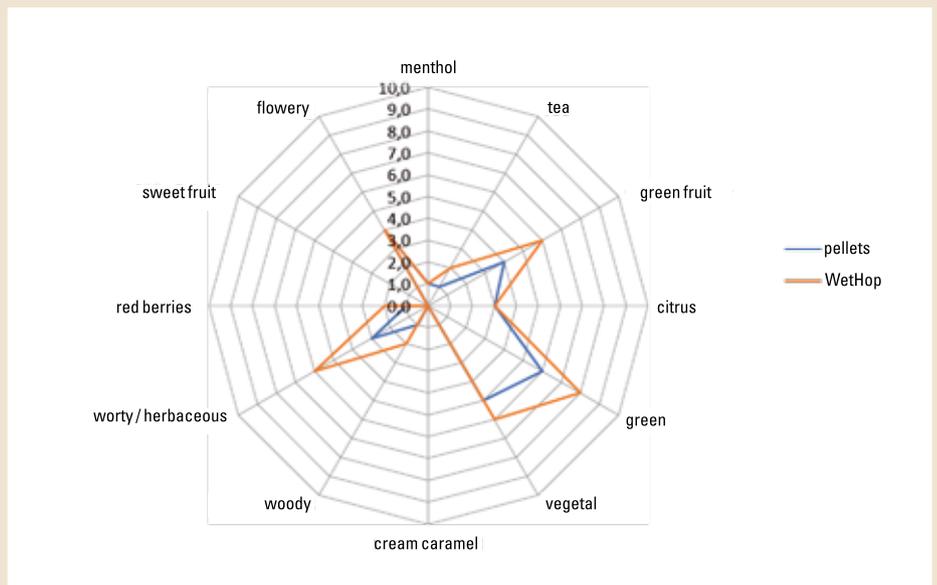


Fig. 2 Herkules – comparison pellets vs. WetHop

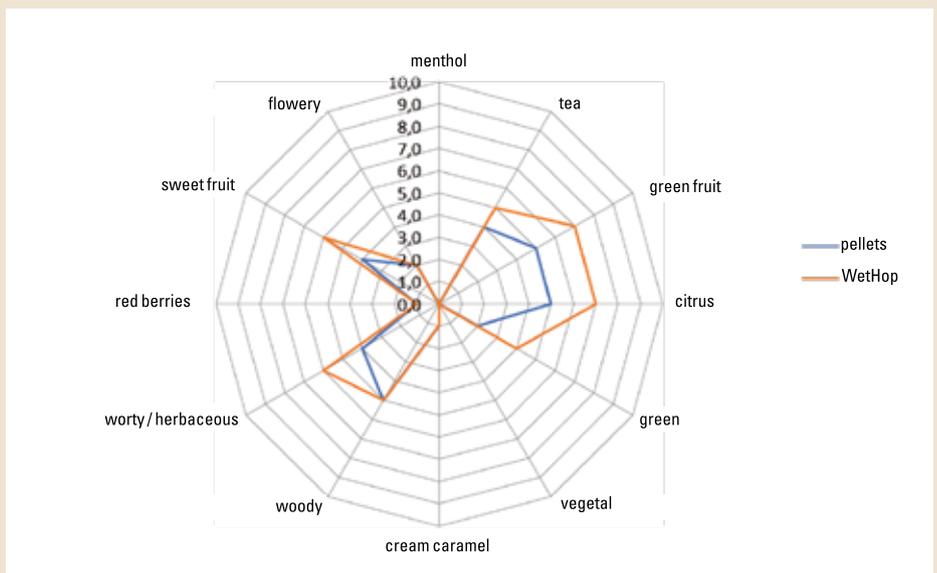


Fig. 3 Polaris – comparison pellets vs. WetHop

OIL AND $\alpha$ -ACID LEVELS OF SELECTED ...			
... hop varieties in pellet form			
Pellets	Variety	Oil level mg/100 g	$\alpha$ -acid %
	Cascade	1.24	5.05
	Herkules	1.45	15.90
	Mandarina Bavaría	1.13	7.96
	Polaris	3.01	19.57

*All values based on dry matter*  
Table 1

OIL, $\alpha$ -ACID LEVELS AND ISO- $\alpha$ -ACID LEVELS ...				
... of selected hop varieties as WetHop				
Wethop	Variety	Oil level mg/100 g	$\alpha$ -acid %	Iso- $\alpha$ -acid %
	Cascade	2.26	4.35	1.41
	Herkules	1.87	12.61	3.48
	Mandarina Bavaría	1.09	6.96	1.30
	Polaris	6.17	19.13	3.48

*All values based on dry matter*  
Table 2

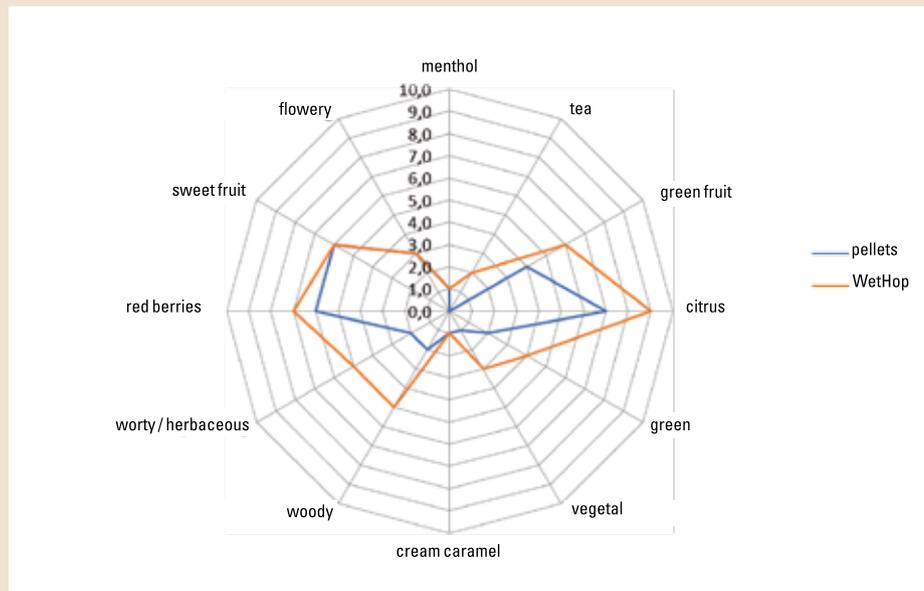


Fig. 4 Mandarinina Bavaria – comparison pellets vs. WetHop

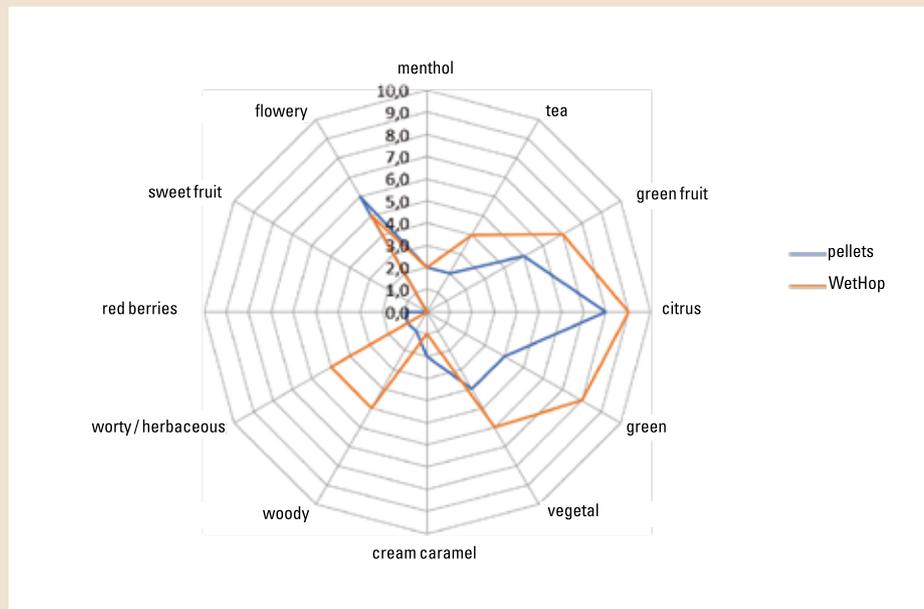


Fig. 5 Cascade – comparison pellets vs. WetHop

pared to pellets. When also considering iso- $\alpha$ -acids, it is obvious that the reduced level of  $\alpha$ -acid in WetHop compared to pellets is compensated for by the level of iso- $\alpha$ -acid. Overall  $\alpha$ -acid levels are, thus, almost identical in pellets and WetHop.

Beers produced with hop varieties Cascade, Herkules, Mandarinina Bavaria and Polaris were assessed in sensory terms in sensory test series. Standardised 12 °P wort was prepared and used as a basis for producing beers with all four hop varieties. WetHop

prepared with those four hop varieties was used and compared to the same quantity (always based on dry matter) of hop pellets of the same variety in beer production. Hop addition during wort boiling was always identical. Boiling always took 60 min:

- 1st Hopping: 20 per cent of total quantity at the beginning of boiling;
- 2nd Hopping: 40 per cent of total quantity 30 min after start of boiling;
- 3rd Hopping: 40 per cent of total quantity 5 min prior to end of boiling.

Hop addition quantity during boiling had been calculated such that the finished beer should have a bitterness of 30 bitterness units.

In further test series, hops were also added in the cold section. But analyses are still ongoing. Results will be published in another article. The spider diagrams in figures 2 to 5 show the individual hop varieties used, comparing WetHop and pellets.

It is apparent that different flavour components come to the fore when using WetHop with its particular hop aromas. As was to be expected, green and spicy notes are much more obvious but also fruity notes are frequently more prominent in WetHop beers.

### Summary

Should WetHop be awarded the Purity Law seal, it will be a very interesting product for brewers. Based on different times of addition, it will be possible to steer and influence hop aromas in beer much better, as is already possible when using pellets. And, or in particular, all aspects of demand for green hopped beers having become increasingly interesting in recent years can be covered all-year round with the product.

Product price is significantly higher than products hitherto on the market. It may thus be assumed that WetHop will never serve a mass market. But the higher price should not be of major importance, in particular for craft and speciality brewers, as their focus is mostly on possibilities of product variation. ■