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**Publisher:**

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Nuremberg, November 2018

## HOP HARVEST GUIDE 2018



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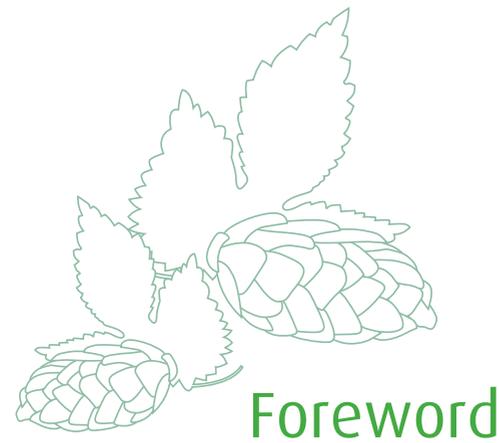
## Australia

# Category characterisation

The table below gives a detailed description of the aromas that are assigned to the individual categories.

CATEGORY	This includes the following aromas:
FLORAL	Elderflower, camomile blossom, lily of the valley, jasmine, apple blossom, rose, geranium, carnation, lily, lilac, lavender
CITRUS	Grapefruit, orange, lemon, lime, bergamot, lemon grass, ginger, tangerine
SWEET FRUITS	Banana, watermelon, honeydew melon, peach, apricot, passion fruit, lychee, dried fruit, plum, pineapple, cherry, kiwi, mango, guava
GREEN FRUITS	Pear, apple, quince, gooseberry, white wine grape
BERRY&CURRANT	Cassis, blueberry, raspberry, blackberry, strawberry, red currant, black currant, wild strawberry, cranberry
CREAM CARAMEL	Butter, chocolate, yoghurt, honey, cream, caramel, toffee, coffee, tonka bean, vanilla
WOODY AROMATIC	Tobacco, cognac, barrique, leather, woodruff, incense, myrrh, resin, cedar, pine, earth
MENTHOL	Mint, balm, camphor, menthol, wine yeast
HERBAL	Lovage, marjoram, tarragon, dill, parsley, basil, fennel, coriander, rosemary, thyme, green tea, black tea, mate tea, sage
SPICY	Pepper, chilli, curry, juniper, aniseed, liquorice, fennel seed, clove, cinnamon, gingerbread, coriander seed, nutmeg
GREEN GRASSY	Green grassy, tomato leaf, green pepper, fresh cut grass, hay, nettle, cucumber
VEGETAL	Celery root, celery stock, leek, onion, artichoke, garlic, wild garlic

Applicable for all spider diagrams: for the cold infusion 2 g of pellets was dissolved in 200 ml water (20 °C) for 30 min and subsequently evaluated in order to simulate to some extent the change in aroma through dry hopping.



# Foreword

## The 2018 Hop Harvest Guide

In many ways the hop crop 2018 was, as many harvests have been before, challenging. Unusually long periods of heat and dryness in Europe and specifically in Germany demanded their tribute. In the months of July and August this combination made the hops suffer. As a result the total crop amount in Europe is somewhat lower this year. The climate change also affect the physiology of the plants. The oil content of some varieties were lower than their historical averages, however the hop aroma intensities were not impaired. . The US crop was good, Citra has become the biggest variety- in relation to the acreage – in the US.

Since 2014, our experts have described the characteristics of the individual hop varieties for every crop year and write them up for you. For this, the fifth edition of our Hop Harvest Guide, a total of 40 hop varieties were assessed – 16 of them from Germany, 10 from the USA, 6 from Australia, 3 from Slovenia, 3 from the Czech Republic and one each from France and Poland.

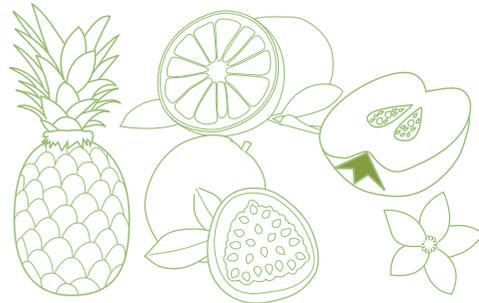
In the majority of hop varieties, the 2018 harvest is characterised by an average aroma intensity. The characteristic aroma of many famous hop varieties was intact and true to type.. As every year, the varieties were tested according to the BARTH-HAAS testing scheme. Developed in collaboration with perfumers, this scheme consists of twelve categories, by means of which the variety-specific aroma and flavour profiles can be described precisely.

The new Hop Harvest Guide shows the total potential of varieties and aromas from the 2018 harvest. We, the Brewing Solutions Team, are pleased to describe the aromas and flavors of the 2018 crop for your beer and brewing innovations.

Stephan J. Barth



Tangerine  
Jasmine  
Passion Fruit  
Pineapple  
Quince

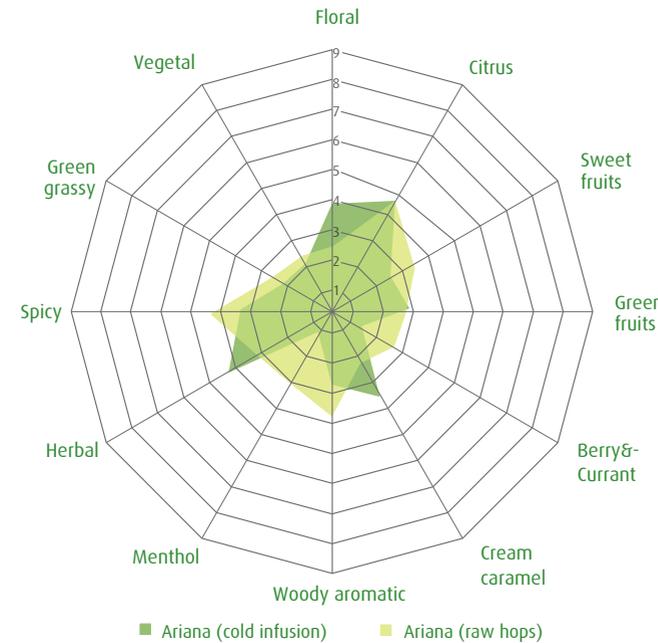


This cross, from the well-known Herkules variety and a wild male variety, was named 2010/72/20 during the testing period at the Hop Research Center in Hüll. Since her baptism she bears the name Ariana and provides a wonderful aroma of sweet fruits to various beer styles.

Analytical values	
Growing Area	Germany
Lineage	Herkules x wild male hop
Alpha acids*	8.0 – 13.0 %
Beta acids	4.5 – 6.0 %
Total Polyphenols	3.3 %
Total oils	1.5 – 2.4 ml/100g
Myrcene	58.0 % of total
Linalool	0.5 % of total
Alpha ø 2018	8.8 %
Oil ø 2018	1.4 mL/100g

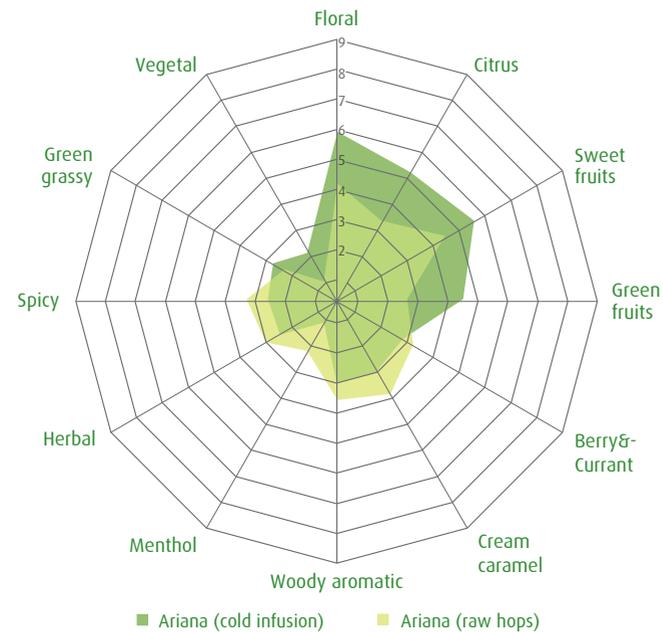
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

A veritable multi-fruit cocktail of orange juice, watermelon, banana, mango, quince, strawberry and blackberry. The raw hop aroma is clearly dominated by sweet fruits and berries. The cold infusion brings out the additional element of spring-like apple blossom. The flavour profile is rounded off with a note of green peppers.

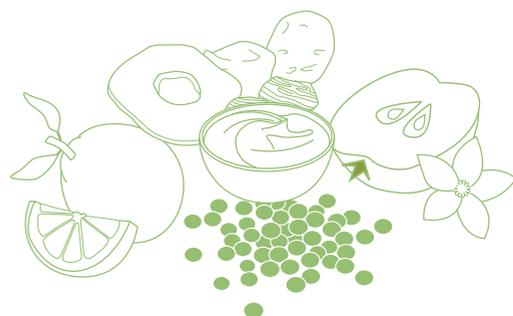


## Crop 2018

Again, Ariana presents herself very fruity. Starting at a vast combination of sweet fruits, like passion fruit, pineapple, mango and lychee in the raw hops complemented by kiwi and cantaloupe melon in the cold infusion. In the raw hops, tangerine and apple are combined with rose hip, whereas the cold infusion shows itself with quince aroma combined with flowery jasmine.



Dried Fruits  
Pepper  
Lime  
Apple Blossom  
Cream

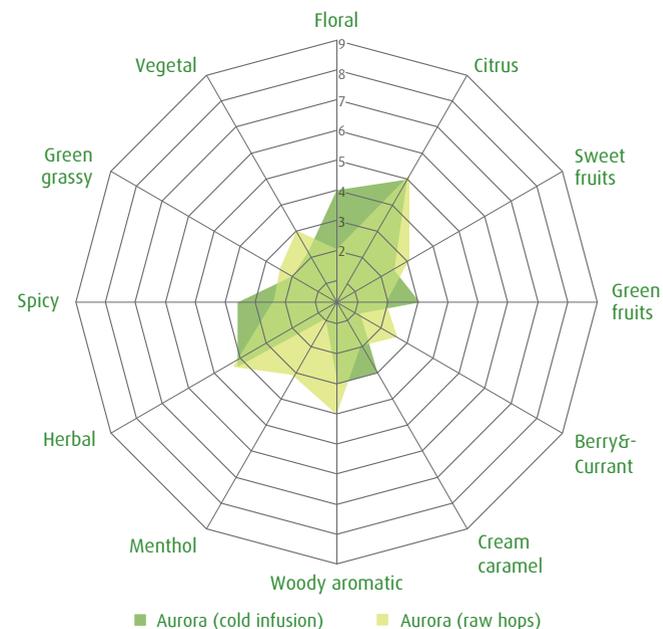


Aurora is the Latin word for dawn. This cultivar used to be called Super Styrian and is derived from Northern Brewer. It has a rich green colour, an intense, pleasantly hoppy aroma and has outstandingly good storage stability.

Analytical values	
Growing Area	Slovenia
Lineage	Daughter of Northern Brewer
Alpha acids*	7.0 – 9.0 %
Beta acids	3.0 – 5.0 %
Total Polyphenols	No data
Total oils	0.9 – 1.4 mL/100 g
Myrcene	35.0 – 53.0 % of total
Linalool	No data
Alpha $\alpha$ 2018	10.0 %

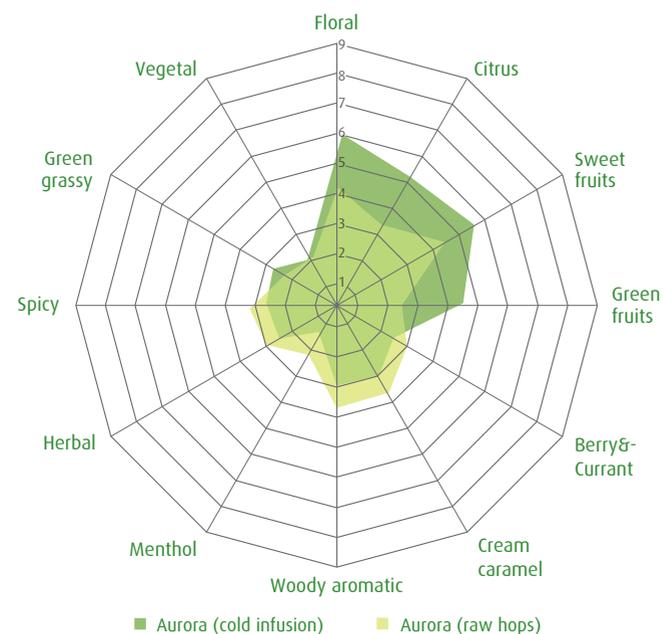
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

Aurora's appeal lies in its exceptionally spicy notes. In the cold infusion, it is strongly reminiscent of tea and citrus, with floral overtones. In its raw state, it is characterised by spicy-herbal aromas of lovage, marjoram, lavender and aniseed, pleasantly rounded off by the fruitiness of lime and mandarin orange as well as resinous, woody notes of incense.

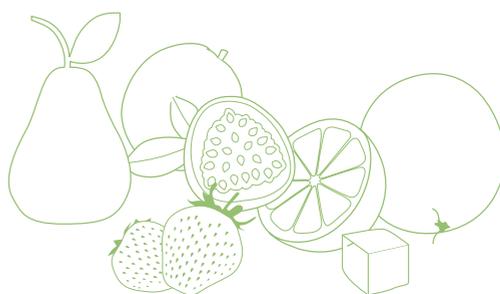


## Crop 2018

Aurora presents herself quite steady in her aroma impressions. Also Aurora shows yearly a particularly striking character in the cold infusion. The beguilingly fragrant lime note blends in perfectly with spicy, woody elements such as fennel and leather. The latter are toned down by sweet fruits like pineapple. In the raw hops, they are joined by dried fruit and a delicate note of cream and geranium.



Orange  
Passion Fruit  
Strawberry  
Pear  
Caramel

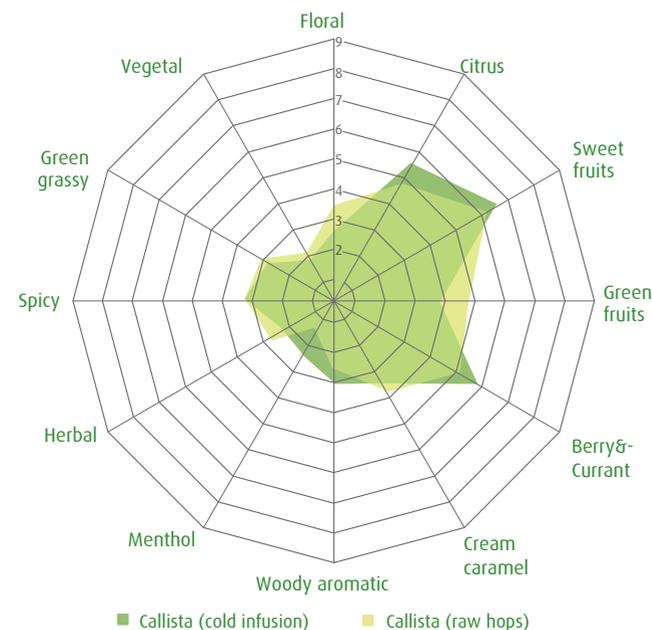


Callista is a daughter of the well-known variety Hallertau Tradition and carries very beautiful big hop cones. She is named after one of Jupiter's moons and can be used in many beer styles with her impressive fruity and harmonious notes.

Analytical values	
Growing Area	Germany
Lineage	Hallertau Tradition x male descendant from Huell
Alpha acids*	2.0 – 5.0 %
Beta acids	5.0 – 10.0 %
Total Polyphenols	5.7 %
Total oils	1.0 – 2.1 mL/100 g
Myrcene	63.5 % of total
Linalool	1.3 % of total
Alpha ø 2018	3.6 %
Oil ø 2018	1.2 mL/100g

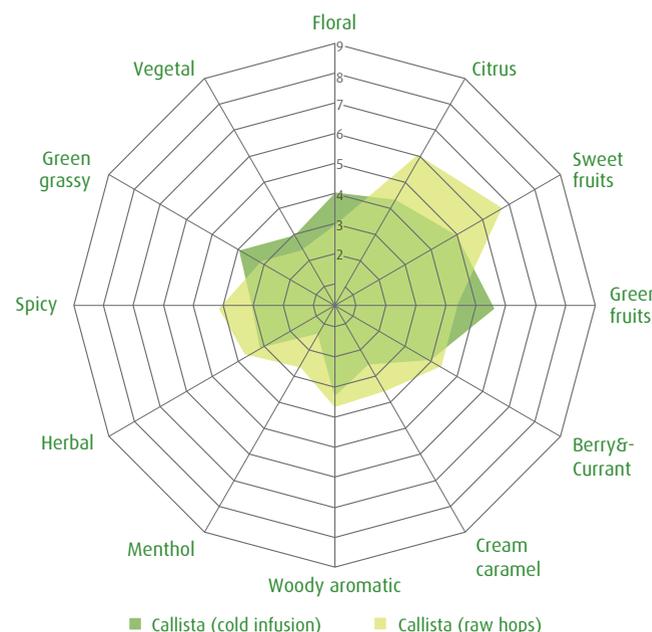
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

Callista conjures up a very special fruit cocktail. The raw hop aroma is a mix of fruits and berries including mango, pineapple, lemon, gooseberry, blackberry, strawberry and blackcurrant. In the cold infusion, orange, kumquat, apricot, passion fruit are added to the mix. This is rounded off with juniper, adding a delicately spicy element.



## Crop 2018

Once again in 2017, Callista conjures up a very special fruit cocktail. The raw hop aroma is a mix of fruits and sweet citrus notes including mango, pineapple, honeydew melon, pomelo and orange, rounded off with delicate notes of caramel. In the cold infusion, rose, lychee and pear with a hint of cucumber are added to the mix.



Lemon  
Geranium  
Passion Fruit  
Raspberry  
Vanilla



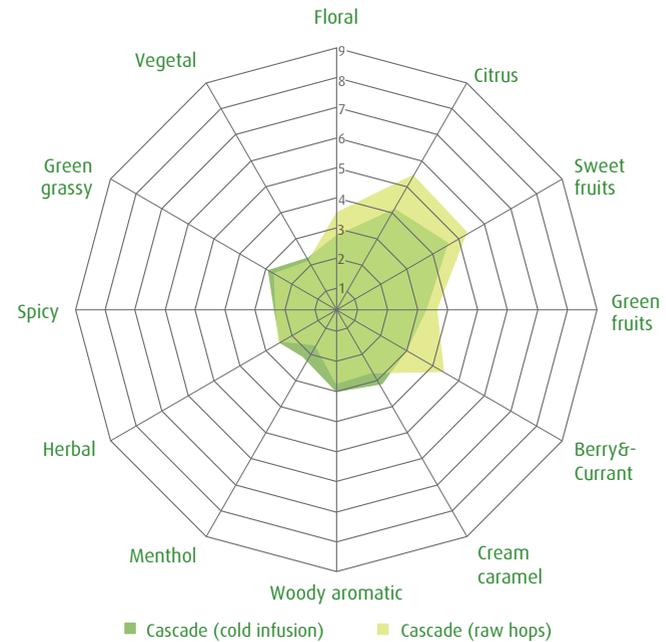
The Cascade cultivar takes its name from the Cascades, a mountain range of volcanic origin in the USA. The Cascade variety was bred in Oregon as part of the USDA breeding programme and released in 1972. The typical features of Cascade are its long, dark-green cones and its relatively low alpha acid content. Cascade has a very pleasant fruity, citrus-like aroma.

### Analytical values

Growing Area	Germany
Lineage	It was obtained by crossing an English Fuggle with a male plant, which originated from the Russian variety Serebrianka
Alpha acids*	5.0 - 7.5 %
Beta acids	3.0 - 4.2 %
Total Polyphenols	No data
Total oils	0.9 - 1.5 mL/100g
Myrcene	72.1 % of total
Linalool	No data
Alpha ø 2018	5.8 %

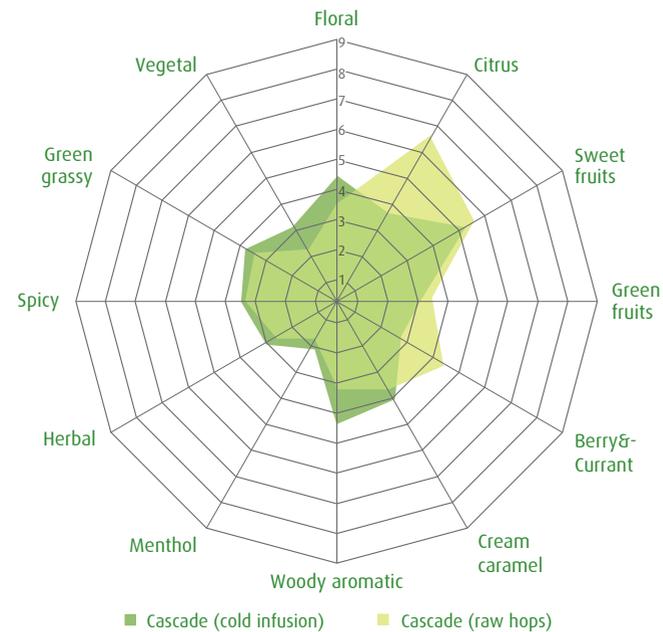
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

The highly distinctive grapefruit note has receded slightly in comparison to US Cascade. Instead, several layers of aroma have been added to the potpourri. Honeydew melon meets blueberry yoghurt; green tea meets fresh hay. The cold infusion shows off the combination of fresh lemon with dry fruit and nuts, along with the fashionable tonka bean and a hint of thyme.

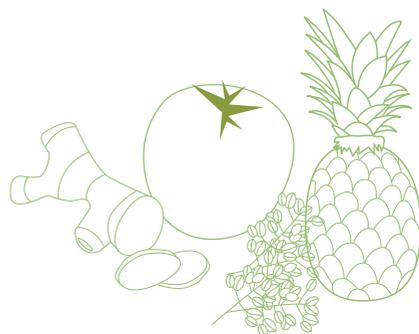


## Crop 2018

In 2018 the German Cascade shows her very dominate citrus aroma characteristic in the form of lemon and limoncello. In the combination with passion fruit and a delicate raspberry aroma the raw hops are quite refreshing. In the cold infusion the hop shows herself more soft with aroma notes of raisins, vanilla and also some woody notes in combination with fresh ginger.



Hazelnut  
Ginger  
Tomatoe leaves  
Thyme  
Pineapple



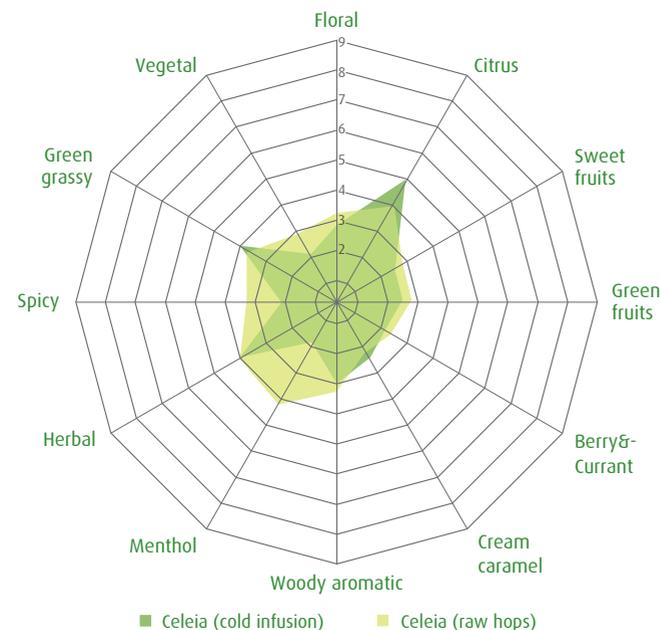
This cultivar is grown mainly in Slovenia, but also in Styria/Austria. Celeia enjoys great popularity on account of its characteristic aroma and its moderate alpha values.

### Analytical values

Growing Area	Slovenia
Lineage	Daughter of Styrian Savinjski Golding
Alpha acids*	2.5 – 6.5 %
Beta acids	2.0 – 3.3 %
Total Polyphenols	No data
Total oils	1.0 – 2.6 mL/100 g
Myrcene	26.0 – 40.0 % of total
Linalool	0.6 – 1.2 % of total
Alpha ø 2018	2.8 %
Oil ø 2018	1.2 mL/100g

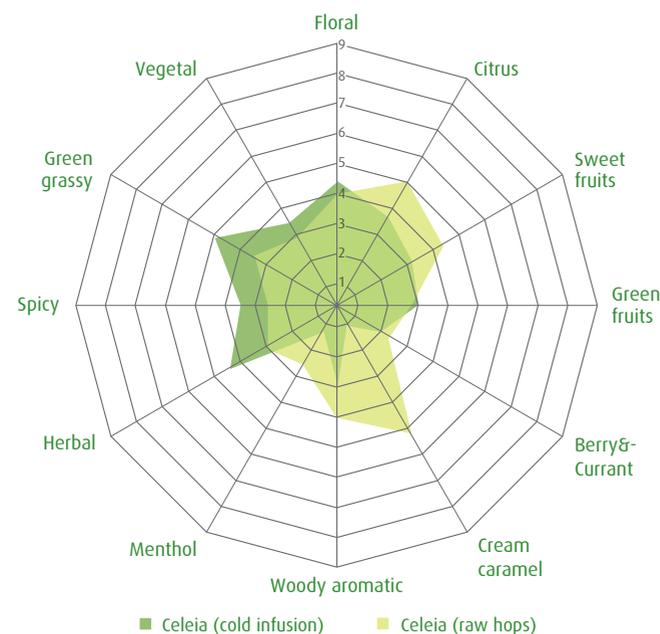
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\* The alpha content is determined by means of spectrophotometric analysis.



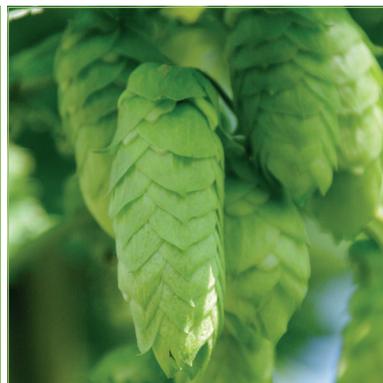
## Aroma characteristics

In the raw hops there are predominantly savoury to cool aromas, such as peppermint, tarragon and thyme, with vegetal nuances. By contrast, the cold infusion displays flavour notes of lime, grapefruit and lemon tea, with floral overtones. They round off the flavour profile, creating a sophisticated overall impression.

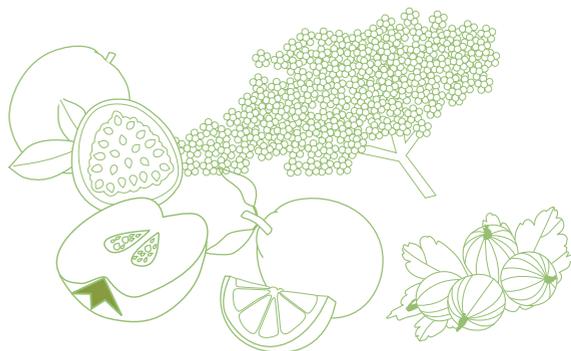


## Crop 2018

In Celeia, fresh notes alternate with delicate ones. From ginger to calendula, to thyme and curry, highlighted by green notes like tomatoe leaves – all are present in the old infusion. The raw hops are lemony fresh, with elements such as inger and lime. All of this is rounded off with fruity notes of pineapple, creamy hazelnut and leather.



Elderflower  
Gooseberry  
Passion Fruit  
Quince  
Bergamot

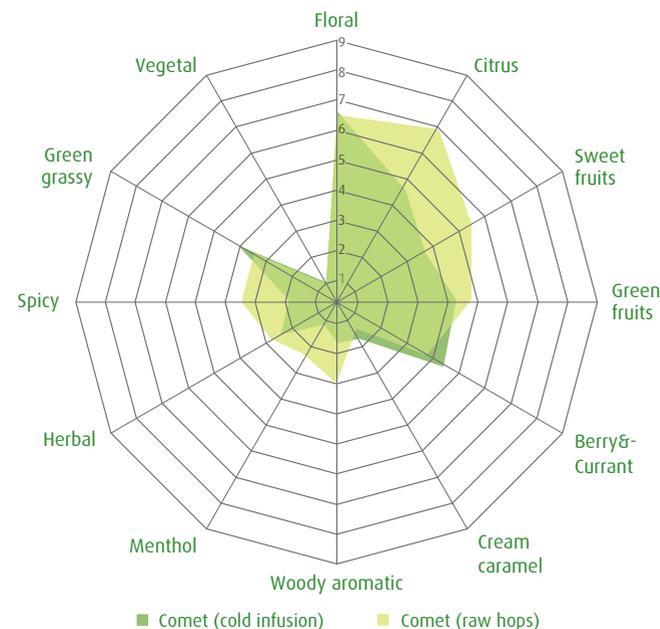


The hop cultivar Comet was bred as a high alpha variety for the states of Washington and Idaho. Today, this hop is grown only in a small area in Germany. It has unusually large cones.

Analytical values	
Growing Area	Germany
Lineage	Open pollination
Alpha acids*	9.4 – 12.4 %
Beta acids	3.0 – 6.1 %
Total Polyphenols	No data
Total oils	1.4 – 3.3 mL/100g
Myrcene	No data
Linalool	No data
Alpha $\phi$ 2018	7.8 %

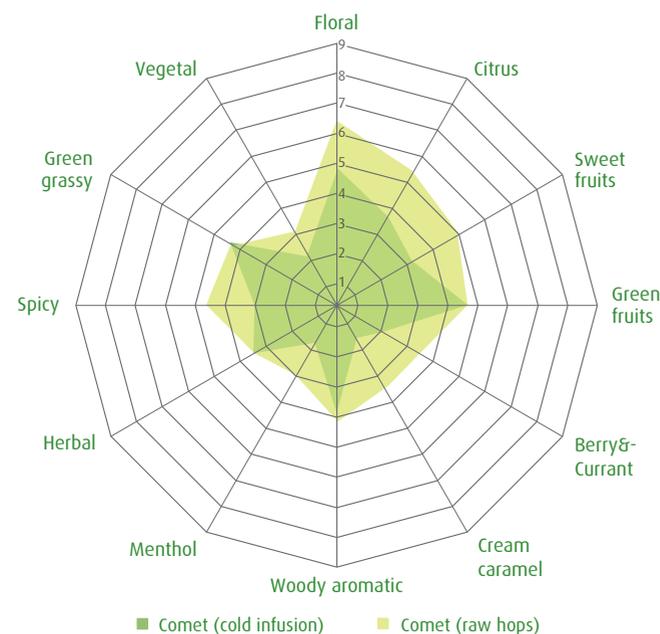
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

Notes of elderflower, red fruits and cassis dominate the cold infusion which is also augmented by nuances of basil. In the raw hops citrus, mandarin, lemon grass combine with floral geranium, green apple and resin components to form a remarkable flavour profile.



## Crop 2018

In 2018 Comet presents itself with an abundance of aromas. Comet is well known for its elderflower aroma and is completed by sweet and green fruits like passion fruit, apricot and gooseberries. This aroma complex is rounded by spicy and green notes like fennel seeds and parsley. The dominant note in the cold infusion is quince, with the addition of lemon-grass, elderflower and also green nettle notes.



Myrrh  
Chamomile  
Muscatel  
Cucumber  
Lemongrass

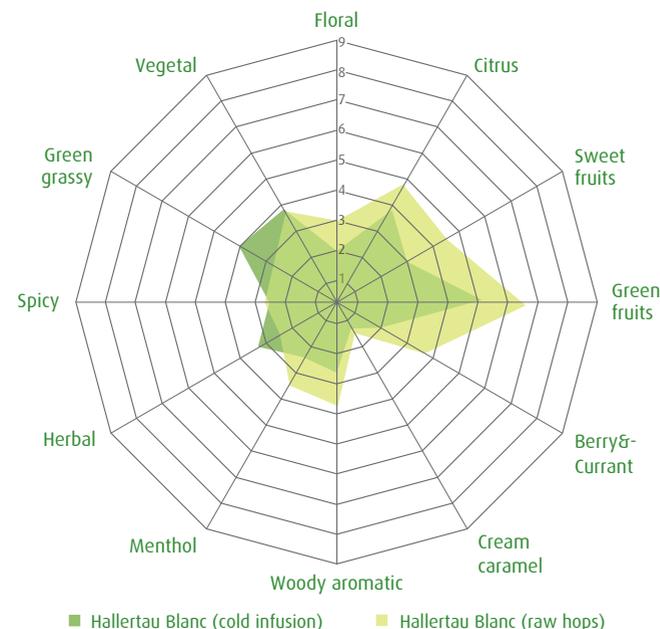


Hallertau Blanc is a daughter of the cultivar Cascade with a fruity-floral white wine bouquet. The aroma variety was bred in Huell at the request of the beer industry in light of its demand for bold tastes and new aromas and came onto the market in 2012.

Analytical values	
Growing Area	Germany
Lineage	Daughter of Cascade
Alpha acids*	9.0 – 11.0 %
Beta acids	4.0 – 7.0 %
Total Polyphenols	3.0 – 4.0 %
Total oils	1.0 – 1.8 mL/100g
Myrcene	70.5 % of total
Linalool	0.4 % of total
Alpha ø 2018	9.5 %
Oil ø 2018	1.3 mL/100g

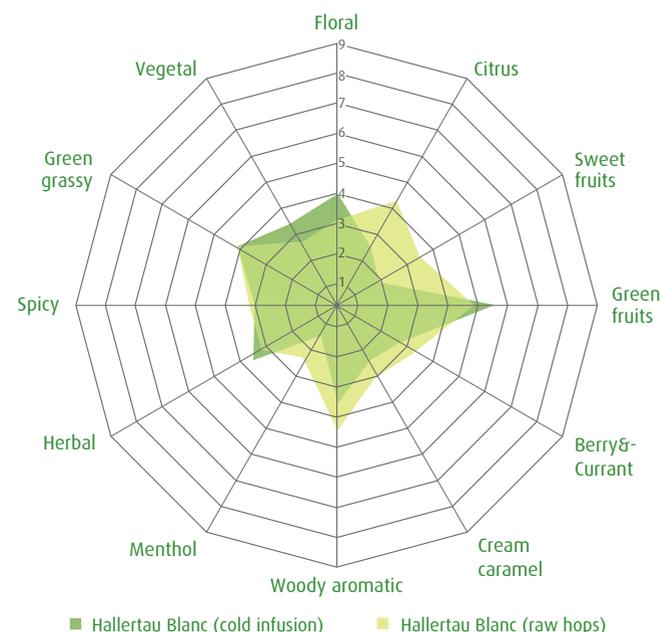
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

In the cold infusion spicy-herbal to woody notes of tomato leaves and barrique come to the fore. These are combined with wine aromas of muscatel and Federweisser. In the raw hops these are complemented by green vegetal elements of lovage and onion but grapefruit notes and fruity nuances of strawberry and cassis can also be distinguished.

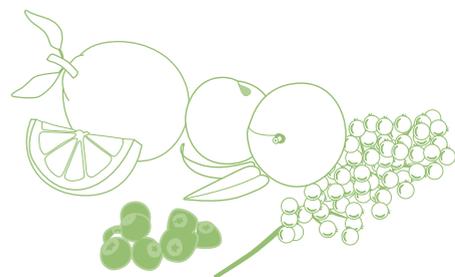


## Crop 2018

The 2018 Hallertau Blanc shows herself - in the raw hops as well as in the cold infusion - similar to the aromas of the overview from 2013-2018. Green fruit notes like muscatel grapes and pear are well balanced with woody aromatic notes from myrrh and hay. In the raw hops fresh lemon grass notes are combined with cool cucumber. And the cold infusion shows the mild side of Hallertau Blanc with mild chamomile blossoms.



Lilac  
Lemon  
Red Currant  
**Apricot**  
Juniper



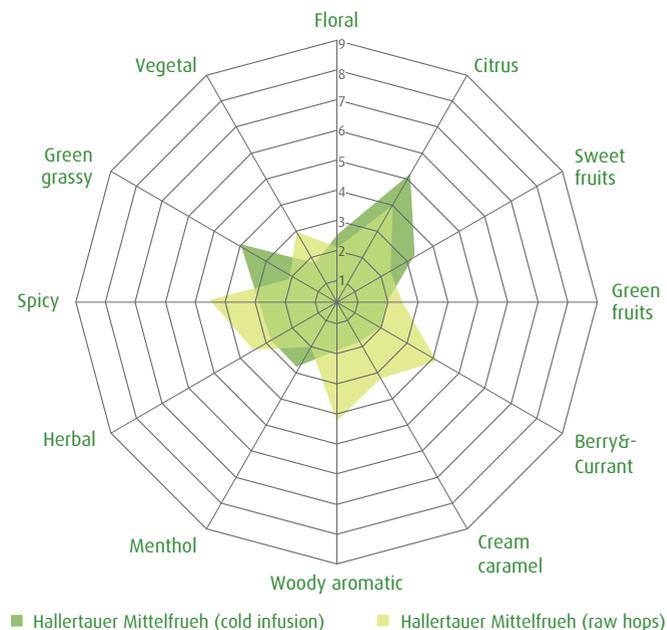
Hallertauer Mittelfrueh is the original regional variety of Hallertau and, with its delicate aroma and average bitter content, is still very popular today. This hop variety almost disappeared due to its high susceptibility to wilt. Thanks to a resurgence in demand and newly available virus-free plants, however, the cultivar is currently making a comeback.

### Analytical values

Growing Area	Germany
Lineage	Land Variety
Alpha acids*	3.0 – 5.5 %
Beta acids	3.0 – 5.0 %
Total Polyphenols	4.0 – 5.0 %
Total oils	0.7 – 1.3 mL/100 g
Myrcene	20.0 – 28.0 % of total
Linalool	0.7 – 1.1 % of total
Alpha ø 2018	3.9 %
Oil ø 2018	1.1 mL/100g

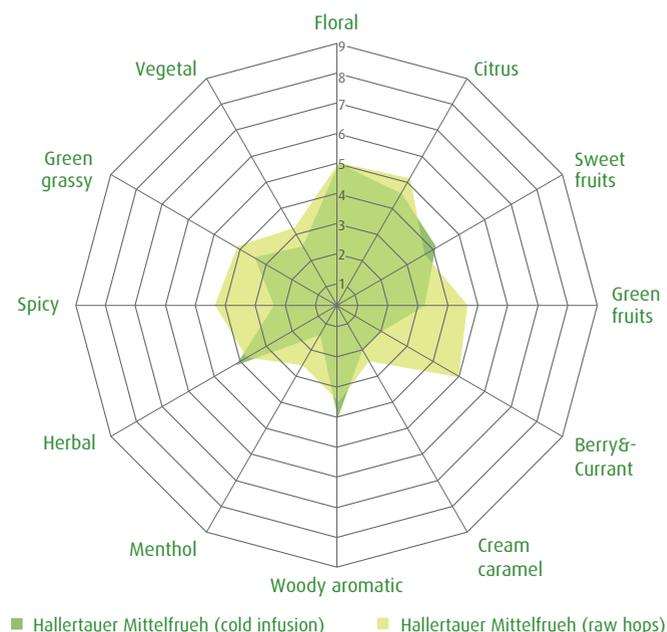
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

The flavour profile of the Hallertauer Mittelfrueh in its raw state is characterised by spicy, woody aromas, such as liquorice and aniseed, with subtle notes of blackberry. The cold infusion also has a woody, tea-like foundation, with spicy bergamot and citrus fruits adding subtlety.

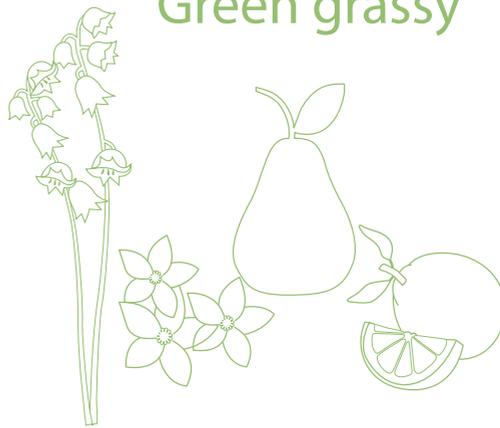


## Crop 2018

2018 seemed to be a good aroma year for Hellertauer Mittelfrueh. A surprisingly vast aroma range from floral to all fruity notes (rose, geranium, lemon, apricot, gooseberries and red currants) are combined with the spiciness of myrtle, juniper and pepper. In the cold infusion the beguilingly fragrant lilac notes are combined with fresh lemon notes as well as sweet apricot aromas highlighted by a hint of marjoram.



Lily of the Valley  
 Pear  
 Jasmine  
 Lime  
 Green grassy

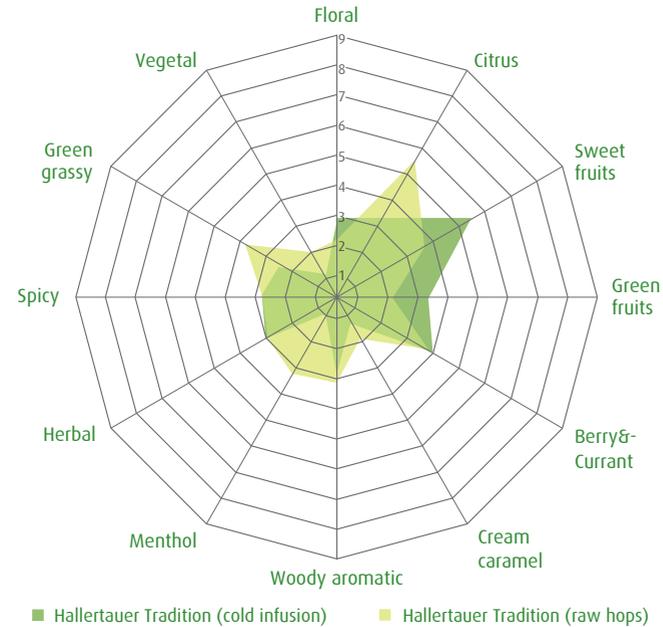


Hallertauer Tradition was bred as a successor to Hallertauer Mittelfrueh and was licensed in 1993. It is comparable to Hallertauer Mittelfrueh and is distinguished by its good yields. The hop variety Tradition displays good resistance to wilt and downy mildew.

Analytical values	
Growing Area	Germany
Lineage	Hallertauer Gold x 75/15/106
Alpha acids*	4.0 – 7.0 %
Beta acids	3.0 – 6.0 %
Total Polyphenols	4.0 – 5.0 %
Total oils	0.5 – 1.0 mL/100 g
Myrcene	17.0 – 32.0 % of total
Linalool	0.7 – 1.2 % of total
Alpha $\phi$ 2018	5.2 %
Oil $\phi$ 2018	0.8 mL/100g

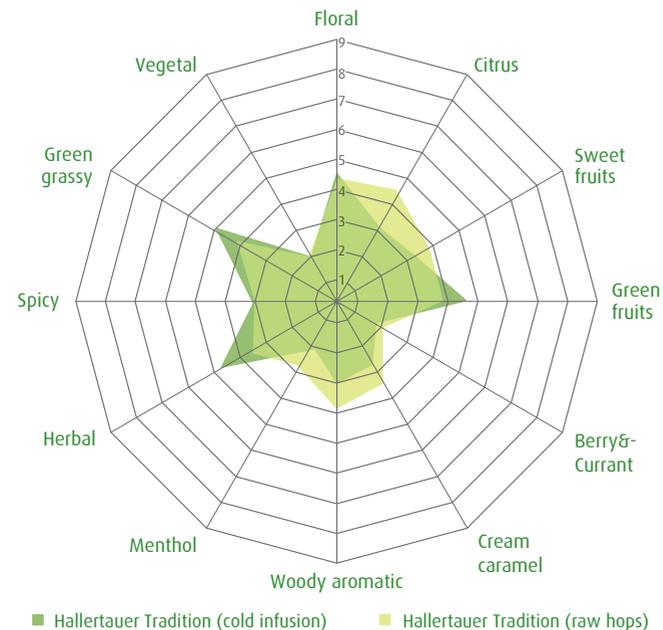
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

The predominant aromas in the raw hops are those of citrus and lime, accompanied by vegetal notes. In the cold infusion, sweet stone fruits such as apricots, peaches and candied cherries contribute to its well-balanced flavour profile which is rounded off with a delicate cassis aroma.



## Crop 2018

2018 brought the floral notes of Hallertauer Tradition to the fore. In the raw hops these notes are augmented by fresh lime, green-grassy and cedar wood notes. In the cold infusion floral notes are combined with the sweet aroma of pear and jasmine tea.



Apricot  
Wild Garlic  
Tomato Leaves  
Marjoram  
Lemon

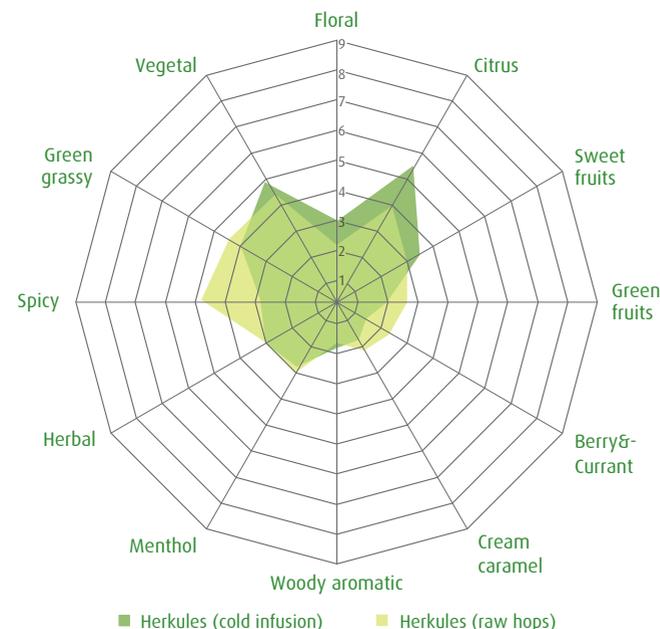


The Herkules cultivar bred at the Huell hop research institute is aptly named after the mighty Greek hero Hercules. In the Greek saga, Hercules completes tasks that were considered quite impossible. Similarly, this high-alpha variety, with its high yields and high amount of bitterness, has to meet a series of high demands from growers and brewers alike. Its acreage in Germany is growing fast.

Analytical values	
Growing Area	Germany
Lineage	Daughter of Taurus
Alpha acids*	12.0 – 17.0 %
Beta acids	4.0 – 5.5 %
Total Polyphenols	3.0 – 4.0 %
Total oils	1.6 – 2.4 mL/100 g
Myrcene	30.0 – 50.0 % of total
Linalool	0.3 – 0.8 % of total
Alpha ø 2018	16.4 %
Oil ø 2018	1.8 mL/100 g

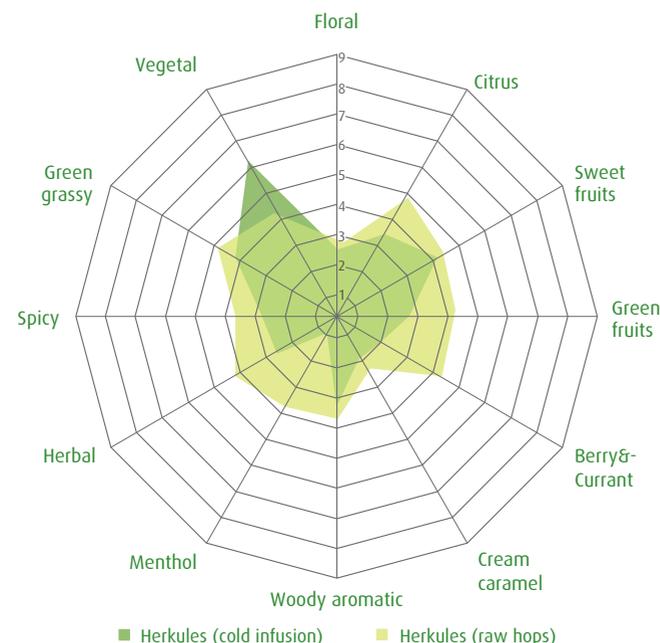
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

Green aromas, such as tomato leaves and peppers, predominate in the raw hops. In the cold infusion, the Herkules hop's flavour profile is characterised by cool notes of melissa and citrus fruits, delicately balanced with floral nuances and the sweet flavour of honeydew melon.



## Crop 2018

The raw hop aroma is strongly influenced by sweet fruits and savoury elements such as honeydew melon and leek seasoned with lovage and marjoram. Combined with fresh green grassy notes like tomatoe leaves and also lemon this produces a harmonious overall impression. The other notable aromas in the cold infusion are lemon, apricot and sauerkraut, making for a remarkable, fresh flavour experience.



Kiwi  
Green bell pepper  
Black Tea  
Grapefruit  
Chamomile

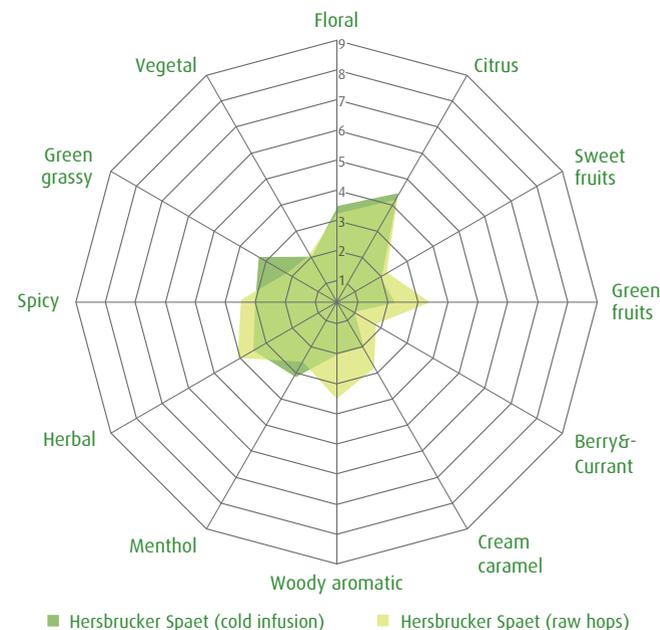


The Hersbrucker hop, a traditional variety from the growing region of the same name, has strong growth characteristics and a particularly robust nature. It is largely resistant to pathogens.

Analytical values	
Growing Area	Germany
Lineage	Land Variety
Alpha acids*	1.5 – 4.0 %
Beta acids	2.5 – 6.0 %
Total Polyphenols	5.0 – 6.0 %
Total oils	0.5 – 1.0 mL/100 g
Myrcene	15.0 – 30.0 % of total
Linalool	0.5 – 1.0 % of total
Alpha ø 2018	2.4 %
Oil ø 2018	1.0 mL/100 g

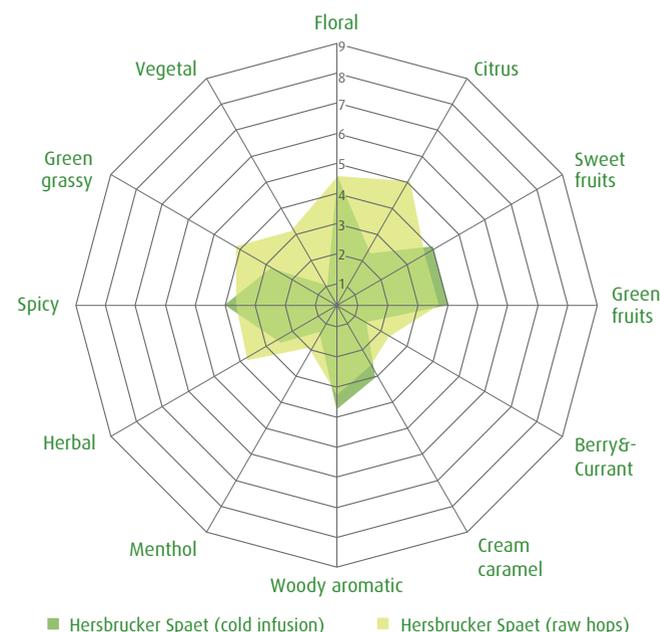
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

The dominant elements in the raw hops are savoury aromas such as lovage combined with a pinch of ginger and lemon grass. In the cold infusion, the flavour profile is defined by nuances of lime and black tea.

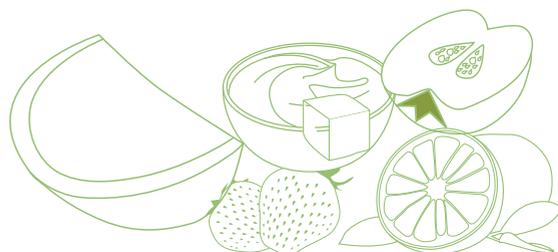


## Crop 2018

This year Hersbrucker raw hops present itself with fresh notes from the floral, citrus and green-grassy aroma spectrum. Chamomile blossom is paired with tangy grapefruit notes and highlighted by green bell pepper. Whereas the cold infusion presents itself more lovely with flowery apple blossoms, sweet kiwi and red apples enhanced by the scent of grape seeds.



Strawberry  
Tangerine  
Honeydew Melon  
Quince  
Caramel

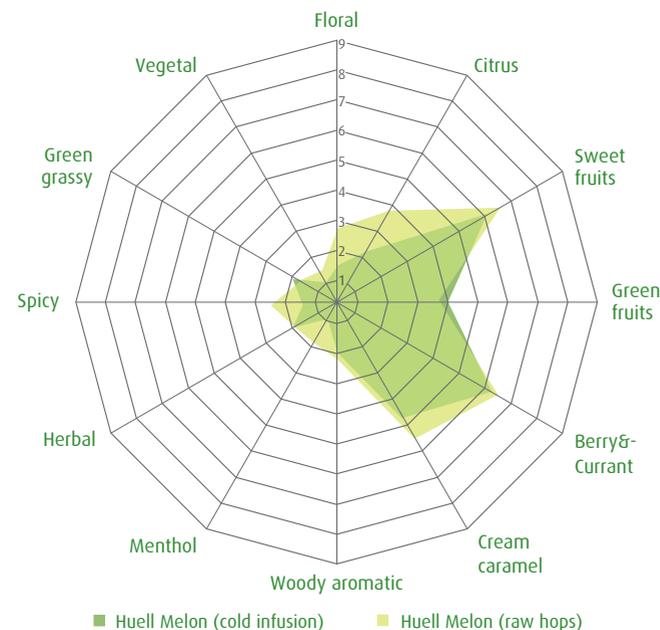


Huell Melon is a new variety from Huell whose character is typified by a strong honeydew melon and strawberry note. This cultivar is a daughter of Cascade and was released in 2012. The aroma variety was bred at the request of the beer industry in light of its demand for bold tastes and new aromas.

Analytical values	
Growing Area	Germany
Lineage	Daughter of Cascade
Alpha acids*	7.0 – 8.0 %
Beta acids	6.0 – 8.0 %
Total Polyphenols	3.0 – 4.0 %
Total oils	0.8 – 2.1 mL/100g
Myrcene	36.2 % of total
Linalool	0.2 % of total
Alpha ø 2017	5.8 %
Oil ø 2017	1.5 mL/100 g

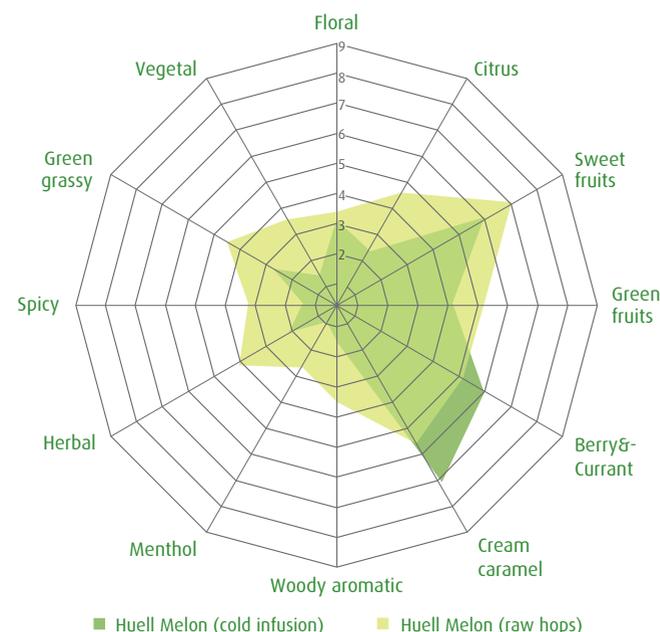
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

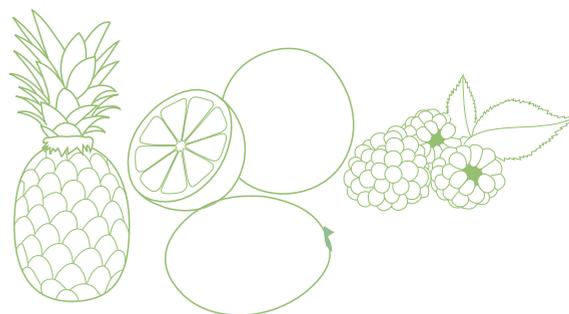
Both in its raw state and in cold infusion, this cultivar displays sweet fruity aromas of wild strawberry and melon, rounded off by creamy notes of yoghurt. Fruit tea, especially ice tea with peach flavour and herbal-spicy lemon balm, aniseed, lavender and floral geranium give the raw hops its special flavour.



## Crop 2018

Sweet - nothing describes this hop aroma better than the attribute "sweet". In the raw hops Sweet fruits - like honey dew melon, apricot and peach - are combined with quince, red apples and strawberries and all these sweet notes are augmented by sweet caramel and highlighted by a fresh tangerine. In the cold infusion the sweet character is even more pronounced by the lack of the tangerine freshness.

Mango  
Pineapple  
Raspberry  
Multivitamin  
Orange



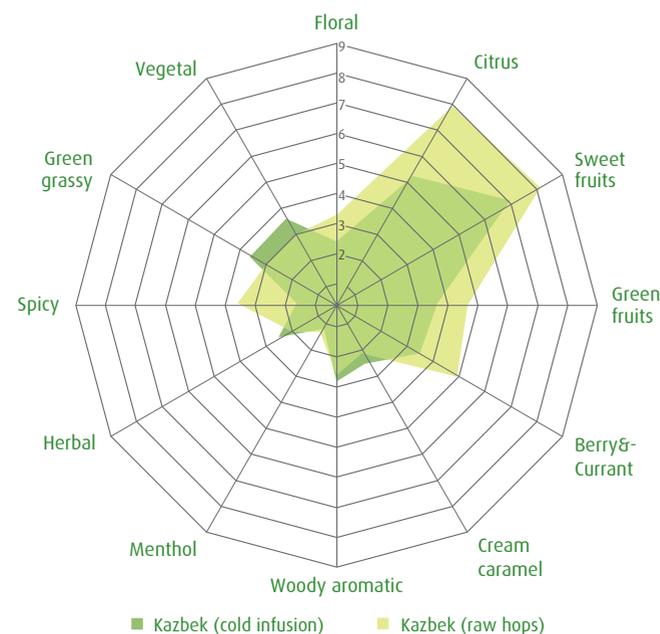
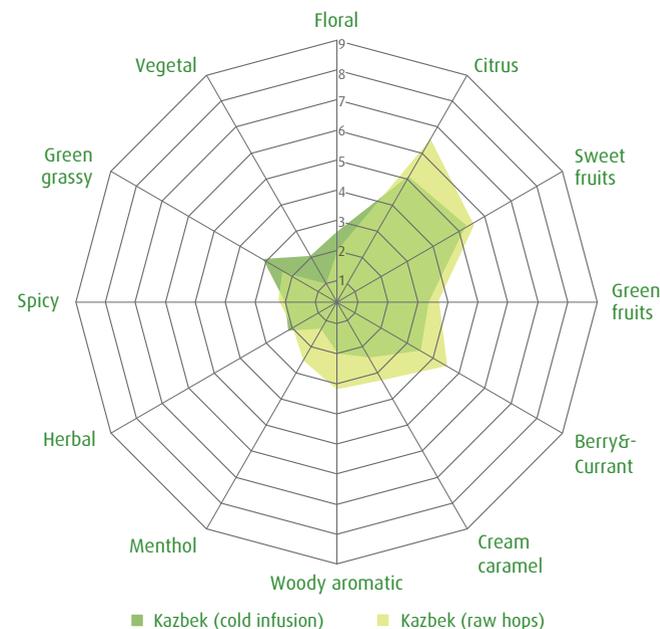
Named after a high peak in the Caucasus Mountains, Kazbek is equally outstanding thanks to the lemon-fruity character of its hop aroma. This cultivar was released in 2008.

### Analytical values

Growing Area	Czech Republic
Lineage	Breeding material with origin in Russian wild hops
Alpha acids*	5.0 – 8.0 %
Beta acids	4.0 – 6.0 %
Total Polyphenols	3.5 – 4.5 %
Total oils	0.9 – 1.8 mL/100g
Myrcene	40.0 – 55.0 % of total
Linalool	0.3 – 0.5 % of total
Alpha $\phi$ 2018	4.7 %

The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

The predominant aromas in the cold infusion are grapefruit, lemon and lime, accompanied by sweet fruits, such as pineapple, passion fruit, peach and watermelon, with light top notes of honey and cream caramel. These aromas also occur in the raw hops where they are joined by nuances of raspberries, orange, ginger, elderberries and chocolate. Light notes of lemon balm add particular emphasis to the overall aroma.

## Crop 2018

Two categories are enough to describe Kazbek - Citrus and sweet fruits. Sweet orange and orange candy is combined with tropical fruit juice aroma of passion fruit, mango, pineapple, banana and a hint of raspberries. Interestingly this applies for the raw hops as well as - slightly less - for the cold infusion.



Pepper  
Thyme  
Apple blossom  
Cucumber  
Hay

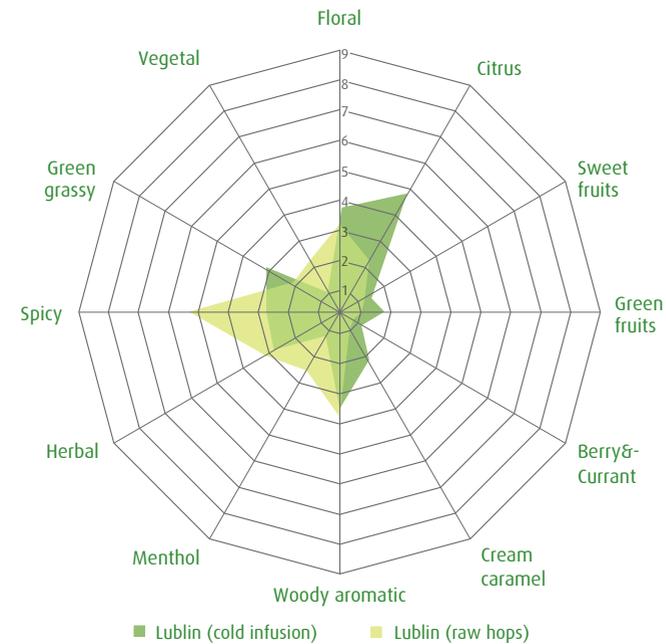


Originating from the Saaz hop, this variety is a Pula-wy breeding with very fine aroma characteristics. Today Lublin is cultivated in the Polish growing regions Lublin, Poznan and Opole. It is average alpha and hectare yield, however, is better than that of Saaz. Lublin has a good tolerance to diseases and grows on light to medium heavy soils.

Growing Area	Poland
Lineage	It was bred from the variety Saaz
Alpha acids*	2.0 – 4.5 Gew.-%
Beta acids	3.0 – 4.0 Gew.-%
Total Polyphenols	-
Total Oil	0.5 – 1.1 mL/100 g
Myrcen	22 – 29 % des Gesamtöls
Linalool	-
Alpha ø 2018	2.1 %

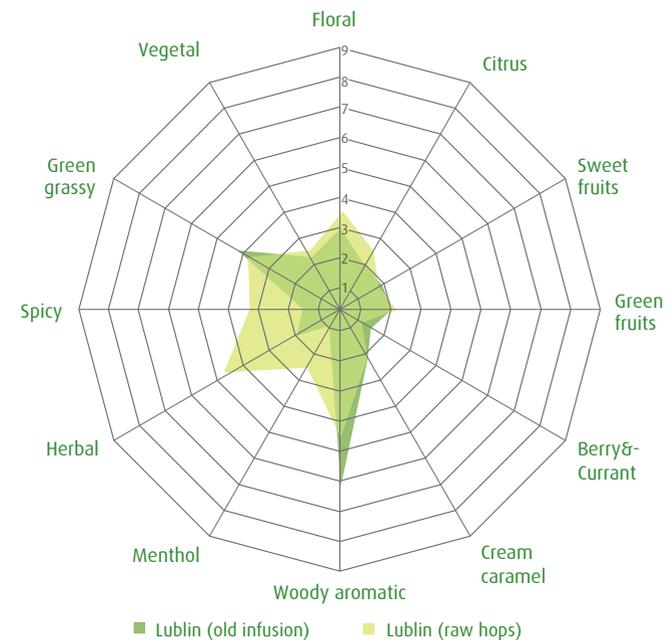
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

In its raw state, this cultivar is defined by the extremely spicy aromas of pepper, juniper, dill and curry, combined with cool, floral notes. Strong citrus notes are the dominant feature in the cold infusion – accompanied by spicy overtones, notes of lemon tea and slight traces of cream-caramel.



## Crop 2018

Woody aromatic notes are mixed with herbal and green grassy notes. Lublin presents herself as a savoury hop variety with resinous notes combined with pepper, lovage, dill and thyme. In the cold infusion also cucumber and hay are present.



Gooseberry  
Orange  
Tangerine  
Cream  
Almond



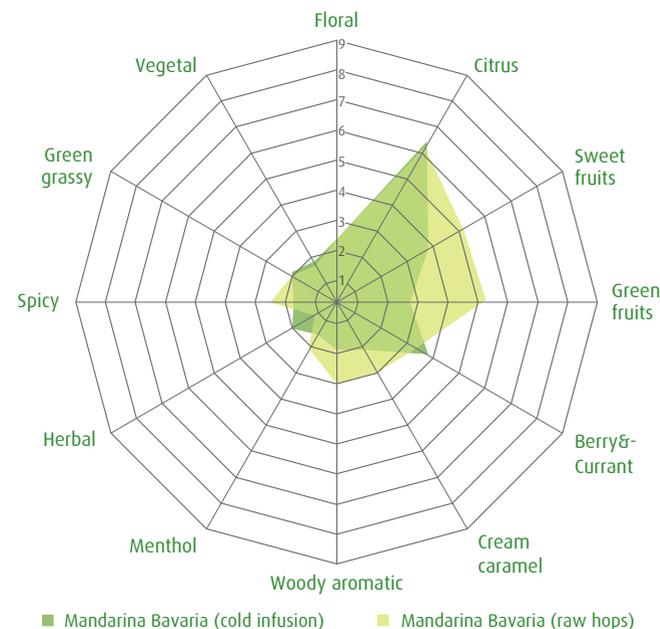
Mandarina Bavaria is a hop variety with a pleasant fruity aroma and a particularly distinctive tangerine note. The aroma variety was bred in Huell at the request of the beer industry in light of its demand for bold tastes and new aromas and came onto the market in 2012.

### Analytical values

Growing Area	Germany
Lineage	Daughter of Cascade
Alpha acids*	7.0 – 10.0 %
Beta acids	4.0 – 7.0 %
Total Polyphenols	2.3 – 2.7 %
Total oils	1.5 – 2.2 mL/100g
Myrcene	71.0 % of total
Linalool	0.3 % of total
Alpha ø 2018	7.6 %
Oil ø 2018	1.8 mL/100 g

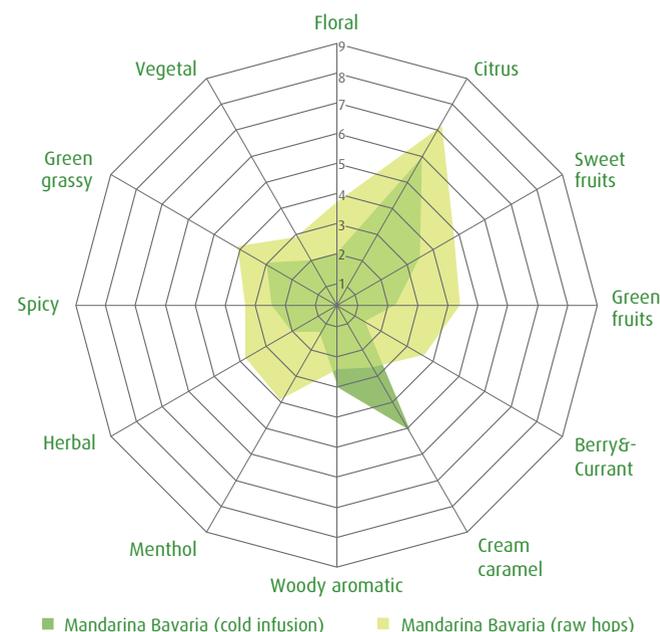
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



### Aroma characteristics

In both the cold infusion and the raw hops Mandarina Bavaria is dominated by citrus notes of grapefruit and lemon, with a flavoursome addition of cassis and redcurrant. In addition, in the raw hops spicy elements such as pepper and exotic pineapple contribute to the flavour profile.

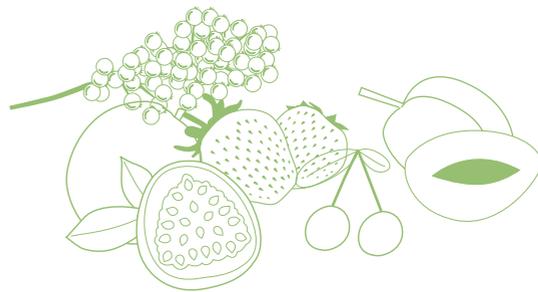


### Crop 2018

Rich in citrus notes like tangerine and orange combined with sweet fruity notes of plum and peach, pear and gooseberry Mandarina presents herself as pleasant as ever. In the cold infusion the tangerine orange notes are augmented by sweet almonds and cream.



Red Currant  
Plum  
Cherry  
Strawberry  
Passion Fruit

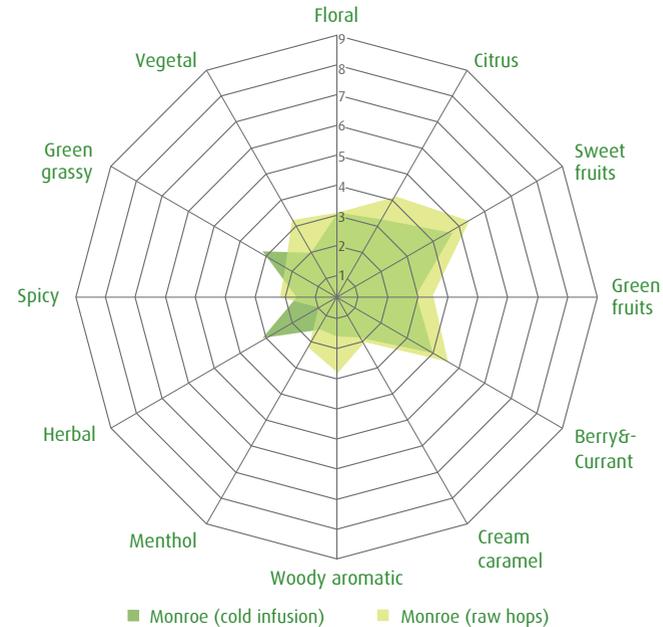


The new hop variety Monroe is almost as extravagant in character as the actress it was named after. With an alpha content of only 2.5 % and an oil content of 0.95 ml/100 g, Monroe showcases itself at the beginning as mild and smooth. When you add the hop to a beer, then she shows her true colours.

Analytical values	
Growing Area	Germany
Lineage	From wild US variety
Alpha acids*	2.0 – 4.5 %
Beta acids	No data
Total Polyphenols	No data
Total oils	0.8 - 1.3 mL/100 g
Myrcene	No data
Linalool	No data
Alpha ø 2018	3.2 %
Oil ø 2018	0.96 mL/100 g

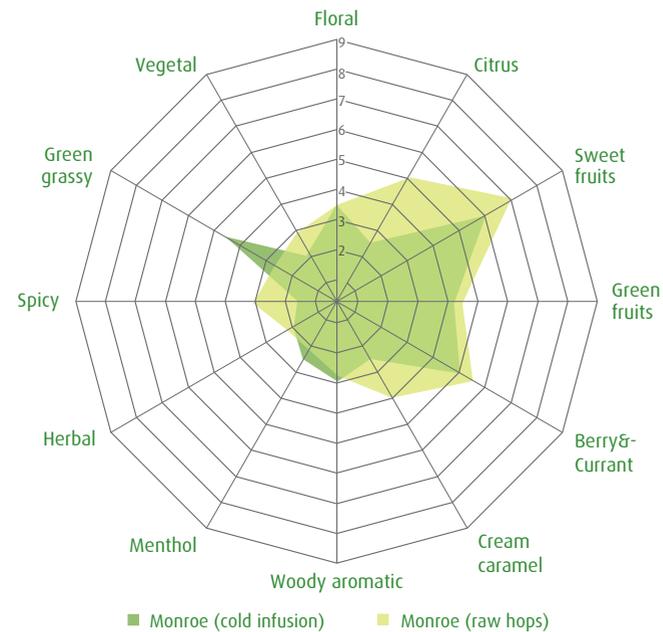
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

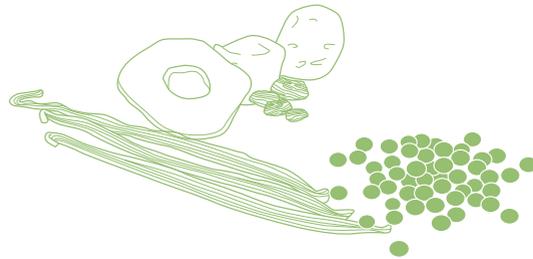
Just like Marilyn Monroe, this hop variety is a knock-out in red (aromas). The raw hops contain lovely notes of raspberry and cassis complimented by orange syrup and lime. Other characteristics such as gooseberry and quince are also present. The cold infusion includes green, grassy elements such as leek, fennel and hay.



## Crop 2018

This year we are presented again with a glamorously fruity performance from the raw hops. The starring roles are played by the very many red fruits such as cherry, strawberry, raspberry and redcurrant, combined with sweet fruits such as passion fruit and peach. The same red fruits are the dominant elements in the cold infusion, crowned here with some floral geranium notes.

Pepper  
Raisin  
Barrique  
Vanilla  
Dried fruits



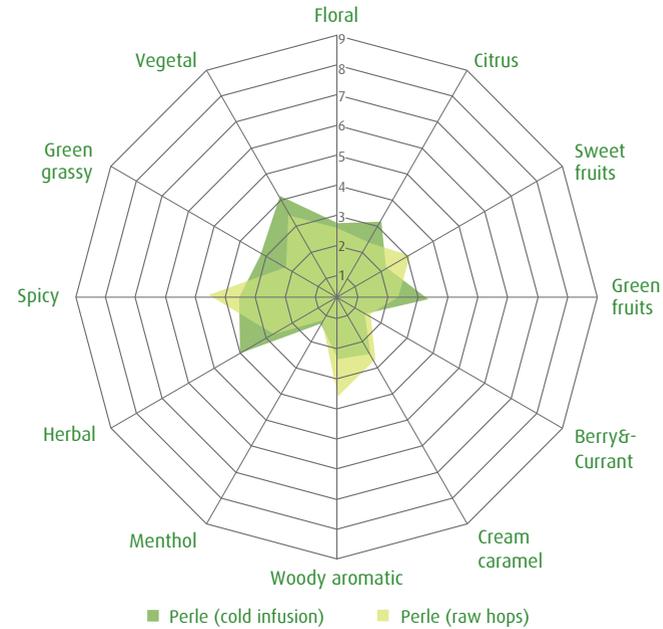
Perle is particularly popular thanks to a perfect combination of aromatic flavour characteristics and a good alpha content. Its remarkable yields and particularly high resistance to diseases make this variety especially attractive to growers.

### Analytical values

Growing Area	Germany
Lineage	It was bred from the variety Northern Brewer
Alpha acids*	4.0 – 9.0 %
Beta acids	2.5 – 4.5 %
Total Polyphenols	3.0 – 5.0 %
Total oils	0.5 – 1.5 mL/100 g
Myrcene	20.0 – 35.0 % of total
Linalool	0.2 – 0.6 % of total
Alpha ø 2018	5.6 %
Oil ø 2018	1.1 mL/100 g

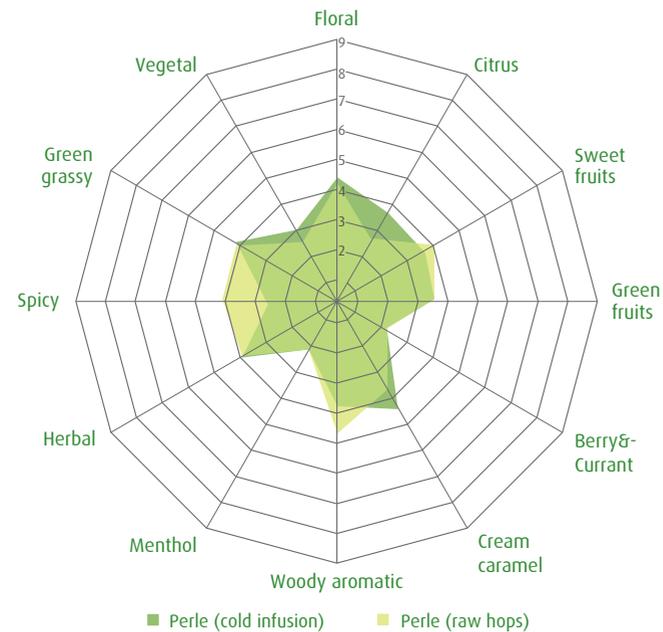
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



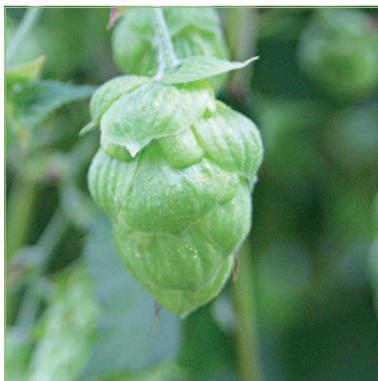
## Aroma characteristics

In the cold infusion, the French cultivar of perle is characterised by aromas of tea with milk and mild smooth components of cream caramel contrasted with a woody straw aroma. In the raw hops green fruits, citrus and honey notes reinforce the overall picture.

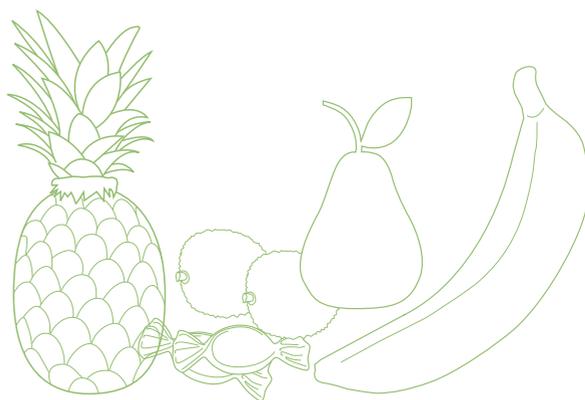


## Crop 2018

Weather conditions in 2018 reduced the fruity aroma from Perle. With dried fruits, barrique and spicy pepper notes the hop variety shines still like a pearl only a little bit more subtle. The cold infusion brings the sweet aromas of Perle like vanilla, raisins and lily to the fore.



Pear  
Pineapple  
Lychee  
**Menthol-Like Candy**  
Banana



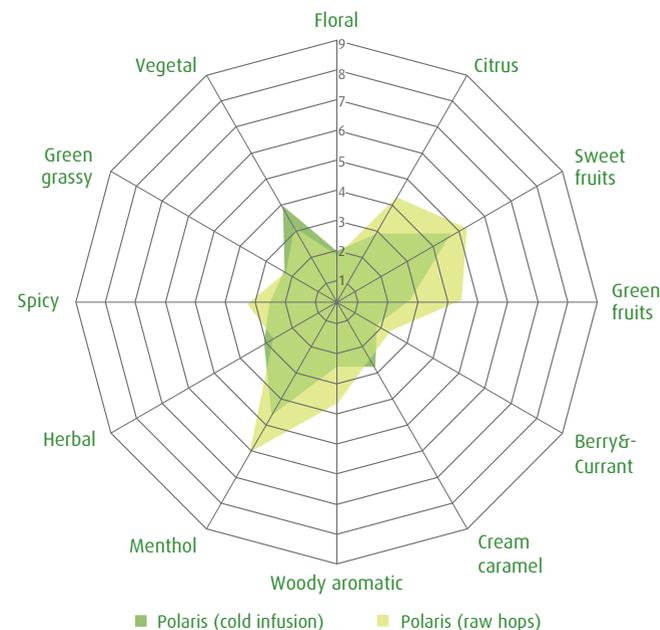
Polaris is a new variety with an intense and pleasant fruit aroma. This very refreshing note is similar to a peppermint where fruity and resin notes come to the forefront. The aroma variety was bred in Huell at the request of the beer industry in light of its demand for bold tastes and new aromas. It came onto the market in 2012.

### Analytical values

Growing Area	Germany
Lineage	Huell breeding line
Alpha acids*	18.0 – 23.0 %
Beta acids	4.5 – 6.0 %
Total Polyphenols	No data
Total oils	3.0 - 4.4 mL/100g
Myrcene	50.3 % of total
Linalool	0.2 % of total
Alpha $\phi$ 2018	18.5 %
Oil $\phi$ 2018	3.0 mL/100 g

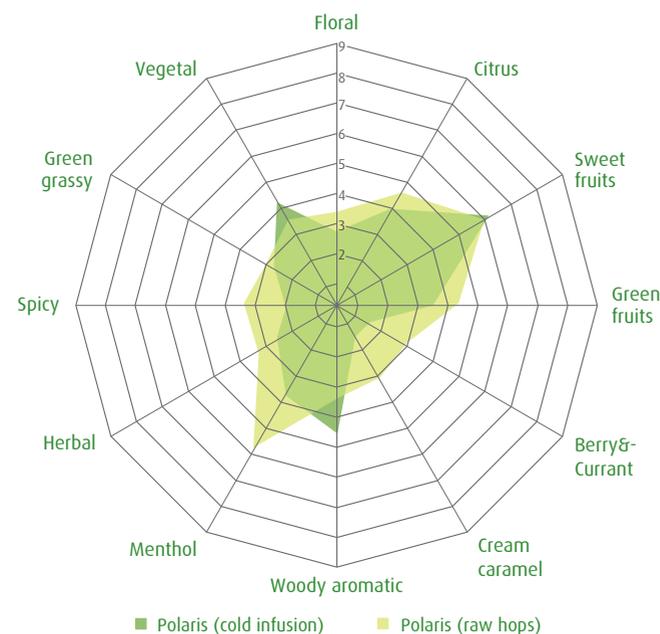
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

As can be gathered from the name of the cultivar, cool menthol notes of mint play a key part in the cold infusion complemented by sweet toffee and banana nuances. In the raw hops, spicy aromatic elements of cumarin, Artemesia, woodruff, lemon balm and bergamot can be distinguished. Fruity quince and pineapple add to the interesting overall picture.



## Crop 2018

Sweet banana, kiwi, lychee, pineapple in combination with heavy menthol aromas show the glacier-cool side of Polaris. In combination with green fruits like pear and gooseberries raw hops and cold infusion battle for the best aroma impressions.



Lavender  
Rose  
Cognac  
Lychee  
Leather

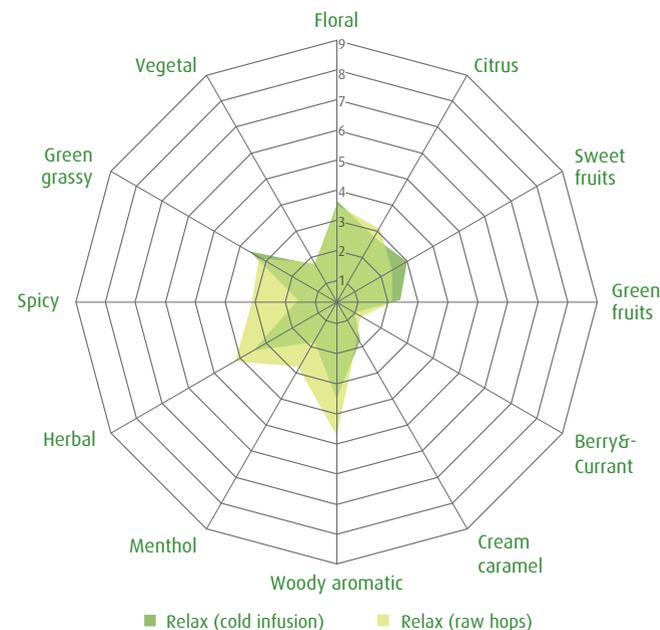


Relax is a hop variety originally bred not for beer, but for tea. Despite having a very low  $\alpha$ -acid content, Relax has a remarkably high  $\beta$ -acid and oil content, which still makes it a very attractive variety for the brewer.

Analytical values	
Growing Area	Germany
Lineage	Huell breeding line
Alpha acids*	0.25 – 1.5 %
Beta acids	13.2 %
Total Polyphenols	No data
Total oils	0.9 - 1.5 mL/100 g
Myrcene	No data
Linalool	No data
Alpha $\phi$ 2018	0.6 %

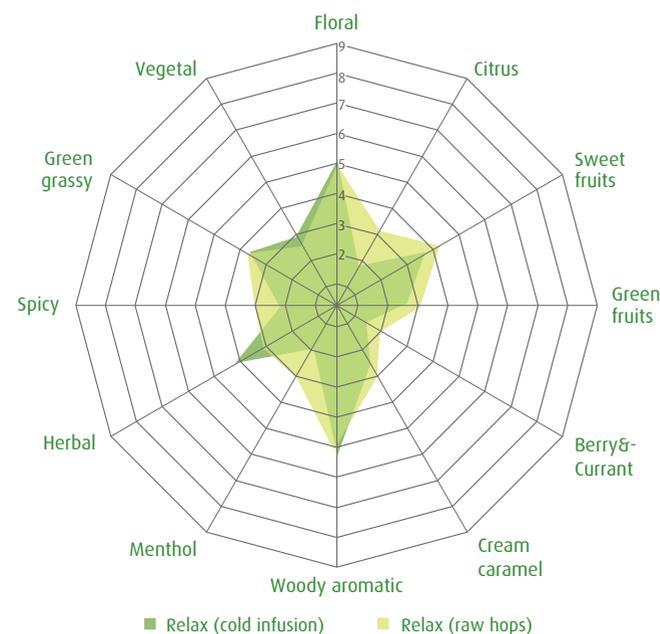
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



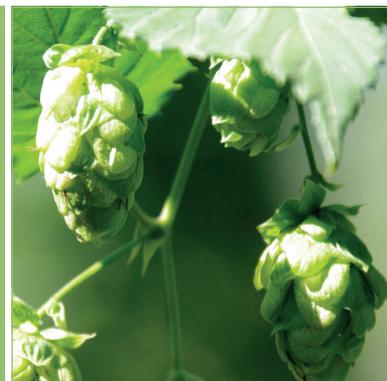
## Aroma characteristics

With such a high oil content, a wide diversity of aromas is to be expected of this hop variety, just as the description of its aroma confirms. From cornflower and the aroma of alpine meadows to lemongrass and hibiscus, this variety shows a refreshing profile. When a cold extraction with this variety is completed, notes of honeydew melon are present.



## Crop 2018

Lavender and rose - peach and lychee - cognac and leather: Aroma combinations which are not typically to be found in one hop variety. Relax has them all in a very similar display in both raw hops and cold infusion.



Calendula  
Cucumber  
Thyme  
Tobacco  
Pine

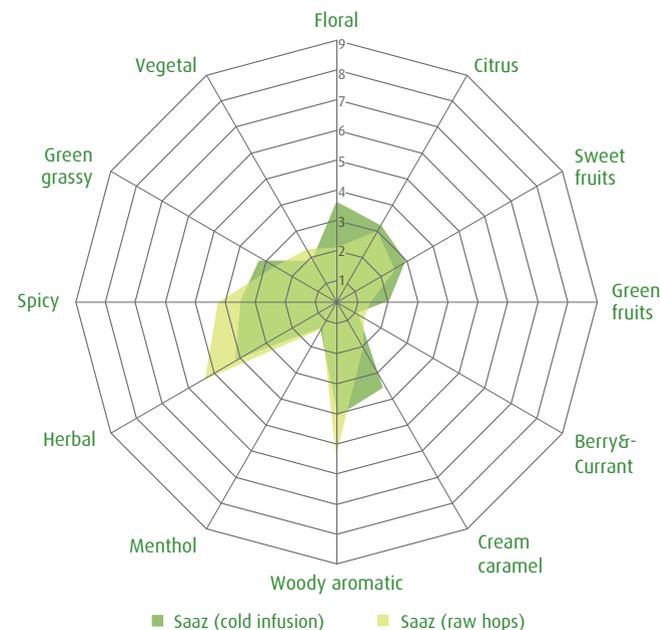


Saaz originates from the Czech growing region of the same name. The success of this old, traditional regional variety lies in its particularly mild hoppy note. The aromas in whole cone hops are predominantly spicy, woody ones, such as tarragon, lavender, cedarwood and smoked bacon.

Analytical values	
Growing Area	Czech Republic
Lineage	Land variety
Alpha acids*	3.0 – 6.0 %
Beta acids	4.5 – 8.0 %
Total Polyphenols	5.5 – 7.0 %
Total oils	0.4 – 1.0 mL/100 g
Myrcene	25.0 – 40.0 % of total
Linalool	app. 0.5 % of total
Alpha ø 2017	3.4 %
Oil ø 2017	0.51 mL/100 g

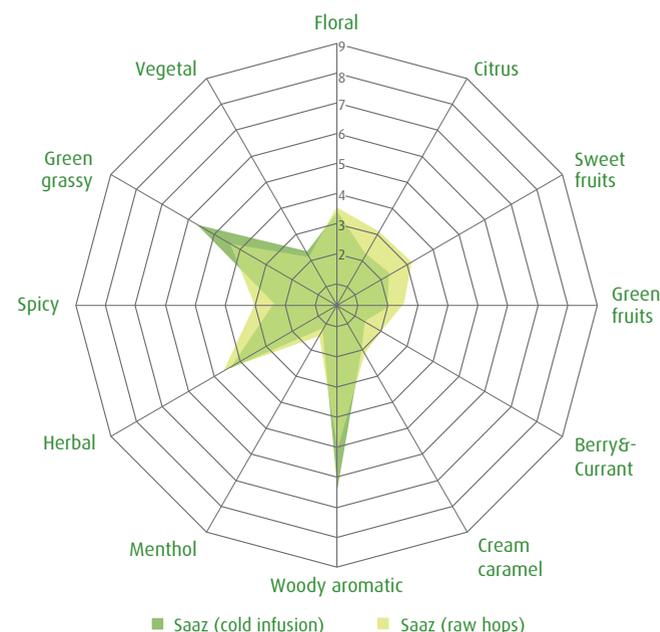
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

Spicy, woody and herbal – this is undoubtedly a variety with a distinctive character. The raw hop aroma has notes of tobacco, cognac, barrique casks, hay and leather. The cold infusion is more mellow, with calming honey, camomile tea and floral components, and yet without any loss of strength.



## Crop 2018

Green grassy - woody - herbal. Saaz presents herself again with distinctive aroma impressions. Surprisingly these aromas are brought in the cold infusion with even more intensity to the fore. Earthy, pine, tobacco, thyme and black tea are mixed with fresh cucumber and parsley mixed with a hint of fresh lime and calendula.



Lemon  
Peach  
Lilac  
Oregano  
Tobacco

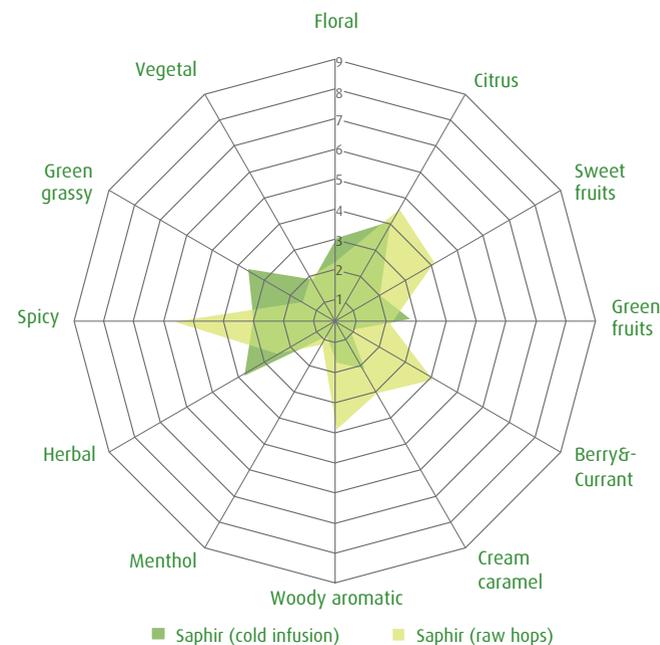


Saphir differs considerably from other German aroma varieties with its fruity aroma characteristics. Saphir was bred at the "Hopfenforschungszentrum Huell" and was released in 2000, together with the varieties Smaragd and Opal as new aroma varieties.

Analytical values	
Growing Area	Germany
Lineage	Huell breeding material
Alpha acids*	2.0 – 4.5 %
Beta acids	4.0 – 7.0 %
Total Polyphenols	4.0 – 5.0 %
Total oils	0.8 – 1.4 mL/100 g
Myrcene	25.0 – 40.0 % of total
Linalool	0.8 – 1.3 % of total
Alpha ø 2018	3.6 %
Oil ø 2018	1.41 mL/100 g

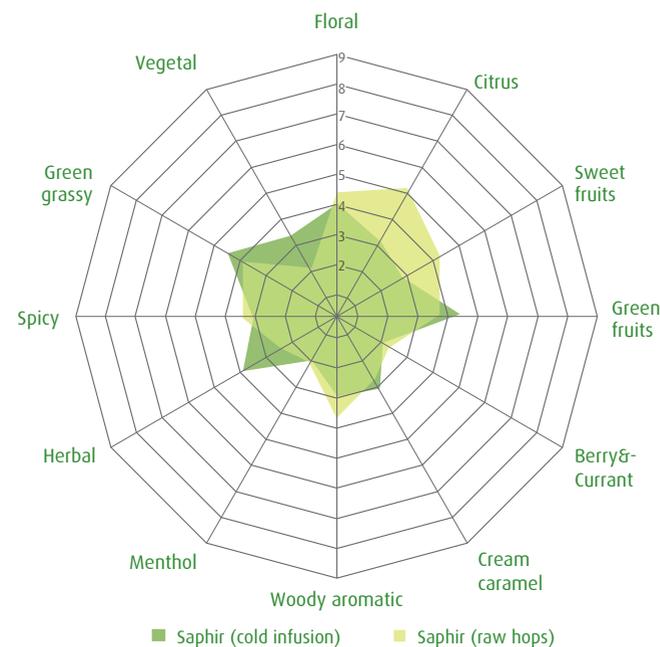
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



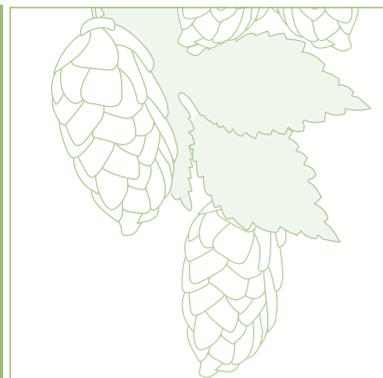
## Aroma characteristics

The unique wealth of contrast in its flavour profile is demonstrated in the raw hops by the spicy woodiness of juniper, combined with red fruits, such as strawberry. In the cold infusion, on the other hand, aromas of citrus, bergamot, lemon grass, black tea and green fruits set the tone.



## Crop 2018

A mighty fine aroma variety, this Saphir. In the raw hops lemon is mixed with the fragrant smell of lilac and sweet fruits like lychee and peach. The aroma is balanced by quince and nettle aromas combined with tobacco. In the cold infusion even more green fruits are present: pear is mixed with oregano and green notes and a refreshing green note with a splash of bergamot is added.



Geranium  
Orange  
Cognac  
Melon  
Gingerbread



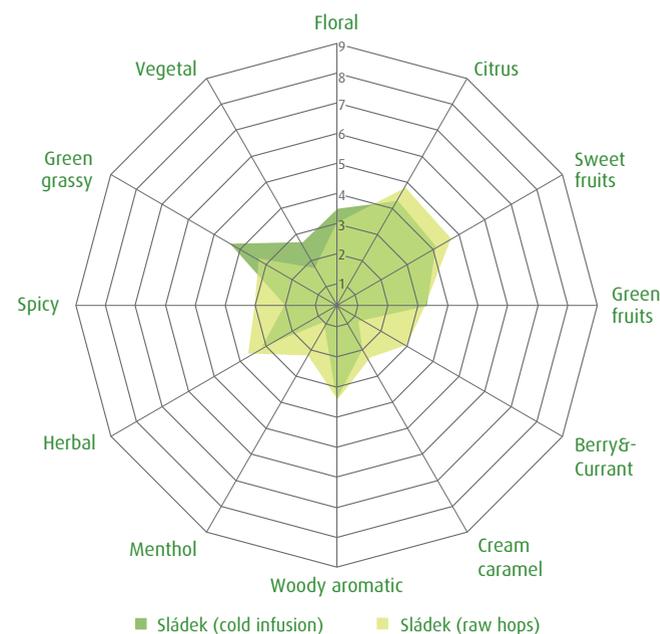
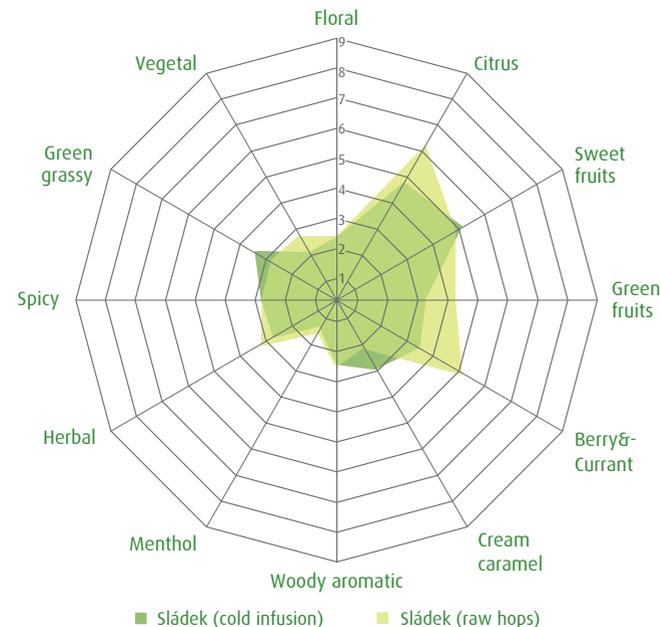
The cultivar's name Sládek is derived from the Czech word meaning "beer brewer". Sládek's fruity flavour profile and its well-balanced bitter taste give the beer a special taste.

### Analytical values

Growing Area	Czech Republic
Lineage	Breeding material with origin of Northern Brewer and Saaz
Alpha acids*	4.0 – 9.0 %
Beta acids	8.0 – 11.0 %
Total Polyphenols	3.5 – 5.5 %
Total oils	0.8 – 1.0 mL/100g
Myrcene	25.0 – 40.0 % of total
Linalool	0.15 – 0.3 % of total
Alpha ø 2018	4.2 %

The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

Due to the dominance of citrus, green fruits and berries, the raw hops of this variety are second to none for enjoyment. Here, tangy grapefruit meets exciting cassis; melon and apple meet quince and gooseberry. This fruit cocktail is also found in the cold infusion, where it is joined by peach, strawberry and passion fruit.

## Crop 2018

Orange and apricot blended with geranium and Cognac, Sládek is again in favour of a citrus-fresh tangy cocktail. Spiced with some gingerbread aroma and honey Christmas seems to be coming sooner this year. The cold infusion is more refreshing with more lemon, water melon and grassy aromas.



Pear  
Melon  
Green bell pepper  
Hay  
Incense

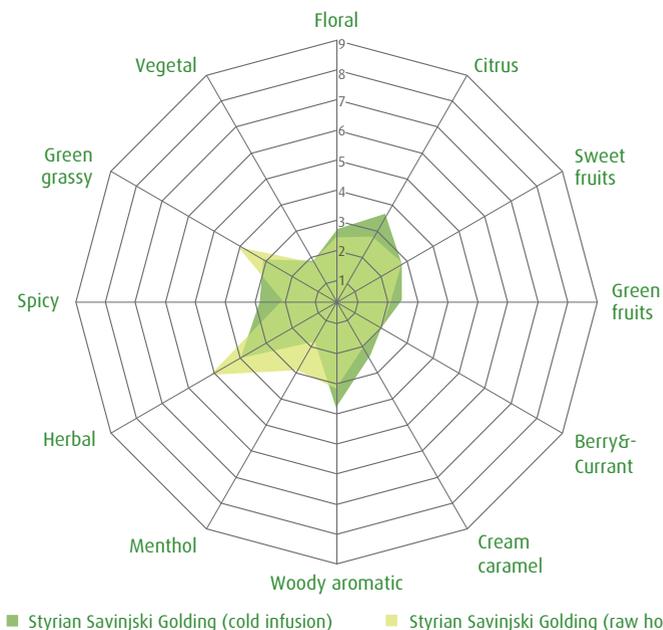


Styrian Savinjski Golding is a traditional Slovenian variety originating from the English variety Fuggle, which was brought to Slovenia in the early 19th century. This variety is known for its noble hop aroma and pleasant bitterness.

Analytical values	
Growing Area	Slovenia
Lineage	Daughter of Fuggle
Alpha acids*	3.5 – 6.0 %
Beta acids	2.5 – 3.5 %
Total Polyphenols	No data
Total oils	0.5 – 1.0 mL/100 g
Myrcene	27.0 – 33.0 % of total
Linalool	ca. 0.8 % of total
Alpha $\alpha$ 2018	4.2 %

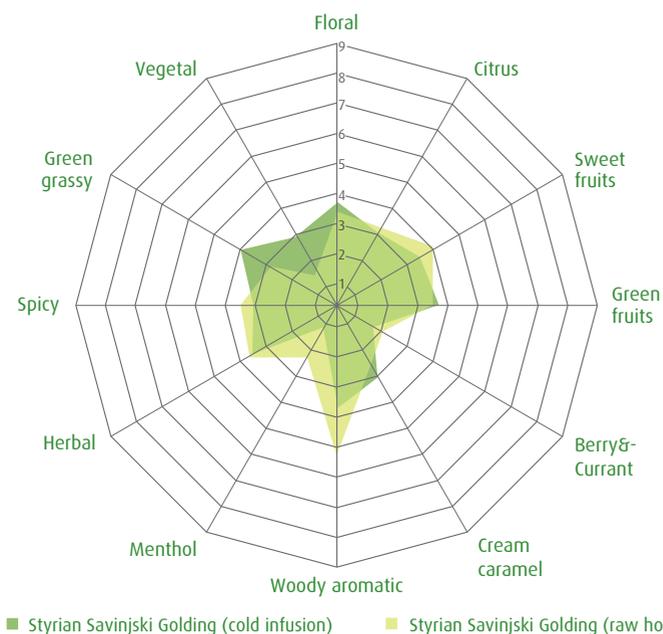
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

In the cold infusion Savinjski Golding's appeal lies in aromas of green tea, lemon and iced tea. In addition, spicy herbal notes of flavourful compounds combine with elements of sweet fruits. In the raw hops, citrus and tea-like components such as lemon grass and green tea also predominate, along with peppermint and green apple.



## Crop 2018

Also in 2018: these fresh raw hops evoke thoughts of lying in the hay. Their aroma is spiced with a good pinch of incense and grape seeds. The additional note of melon has a refreshing effect on the palate. The cold infusion is dominated by green bell pepper, finely seasoned with pear.



Cream  
Lemon  
Tarragon  
Caramel  
Apple

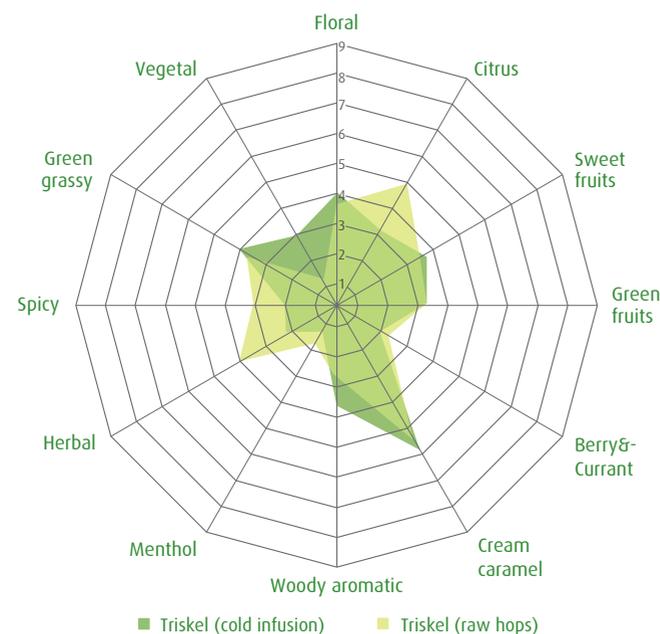
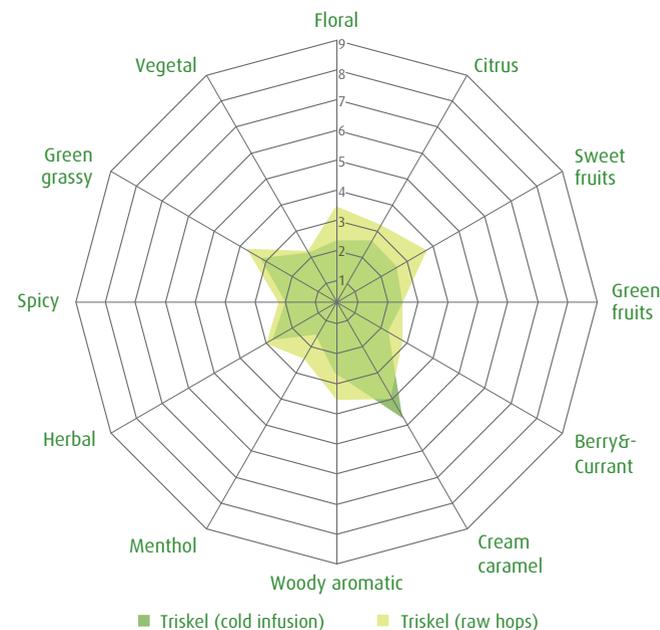


Triskel is a newly bred hop with an aroma similar to Strisselspalter. The name "Triskel" was inspired by triskelion, the symbol of the Gauls, the ancestors of the modern French people. This represents the three elements: earth, air and water.

Analytical values	
Growing Area	France
Lineage	A cross between Strisselspalter and the male plant of the English hop variety Yeoman
Alpha acids*	8.0 – 9.0 %
Beta acids	4.0 – 4.7 %
Total Polyphenols	3.7 – 5.4 %
Total oils	1.5 – 2.0 mL/100g
Myrcene	60.0 % of total
Linalool	0.7 % of total
Alpha ø 2018	3.0 %

The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

In the cold infusion, notes of cream caramel such as toffee combine with strawberry aromas and green vegetal artichokes, peppers and nettles. Woodyaromatic tobacco contributes an interesting note to the overall flavour profile. In the raw hops, besides these green vegetal components, there are extracts of creamy yoghurt with sweet honey, fruity peach, succulent watermelon and floral geranium.

## Crop 2018

Mild creamy notes with a pinch of freshness provoked by lemon and tarragon notes. In 2018 Triskel is both: sweet and mild plus tangy and tart. As well in the raw hops as in the cold infusion.



Peach  
Pineapple  
Gooseberry  
Grapefruit  
Celeriac



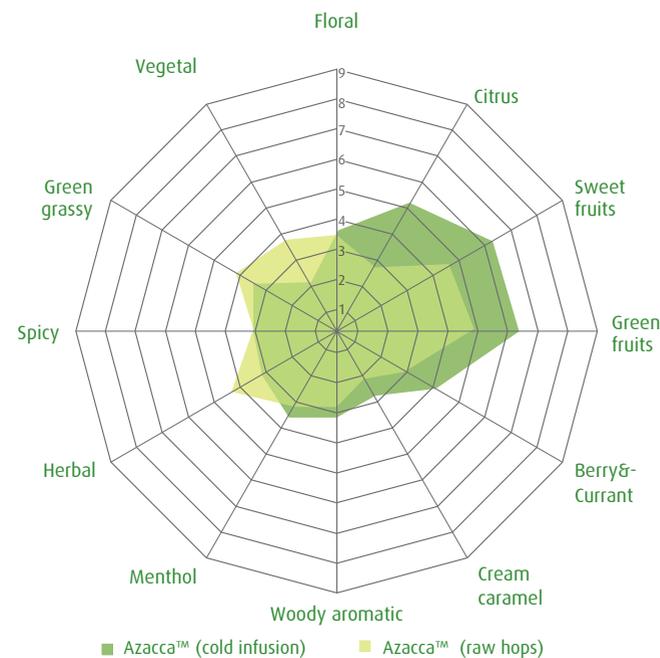
Azacca™ is the lwa or the spirit of the agriculture and the farming practices. The hop formerly known as #483 was released from the American Dwarf Hop Association 2014.

**Analytical values**

Growing Area	USA
Lineage	Mother Toyomidori, Father ADHA 94/95
Alpha acids*	14.0 - 16.0
Beta acids	4.0 - 5.5 %
Total Polyphenols	No data
Total oils	1.6 - 2.5 mL/100 g
Myrcene	45.0 - 55.0 % of total
Linalool	No data
Alpha ø 2018	11.7 %
Oil ø 2018	1.6 mL/100g

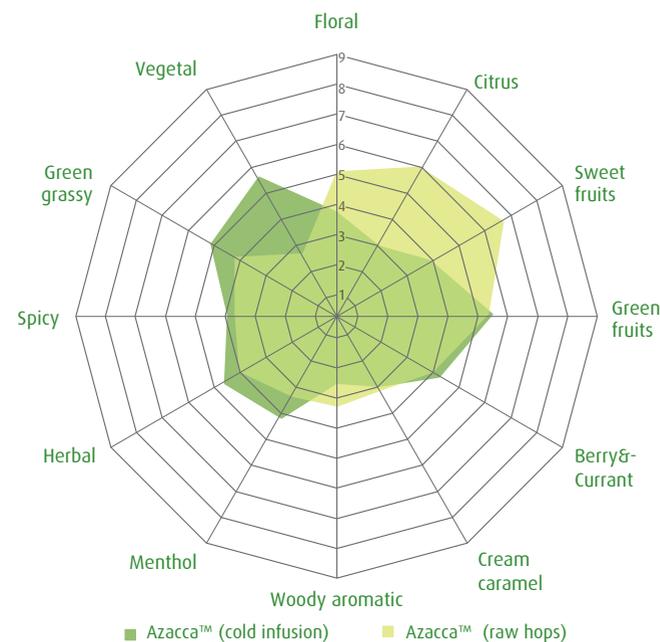
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



**Aroma characteristics**

The appeal of this variety in the raw hops lies in green fruits such as quince and gooseberry. These are joined by sweet mango and kiwi, while mint adds a fresh element to the aroma. Green tea and rose leaves are added to this fruity composition in the cold infusion.



**Crop 2018**

The appeal of this variety in the raw hops lies in sweet fruits such as mango and pineapple, while grapefruit adds a fresh element to the aroma. These are joined by pear and gooseberry and lily of the valley makes this variety really special. In the cold infusion some savoury celeriac gives the variety that certain something to the otherwise sweet and green fruit aroma.



Plum  
Lime  
Passion Fruit  
Tomato leaves  
Geranium



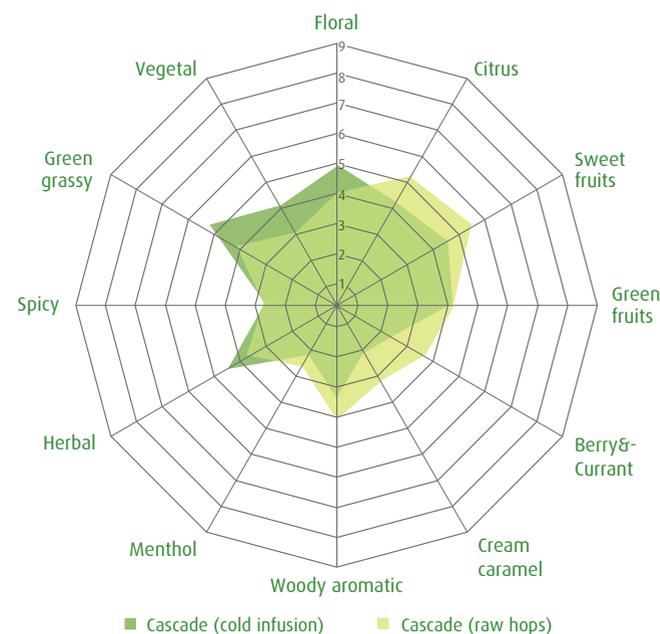
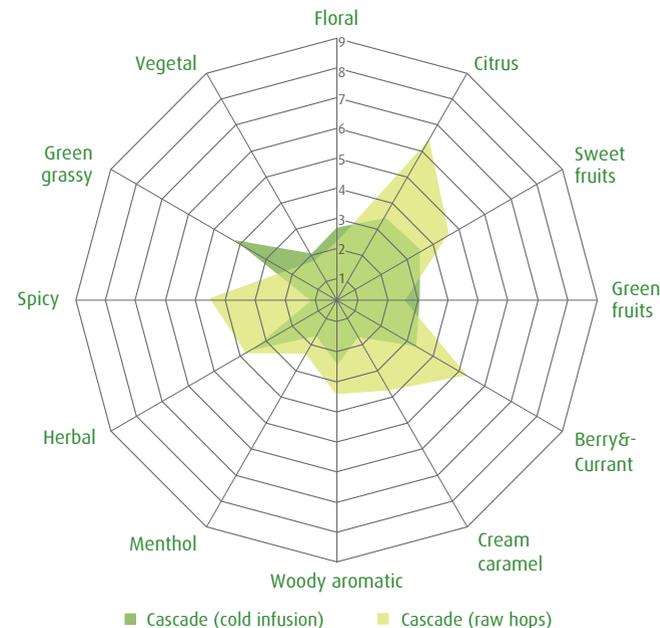
The Cascade cultivar takes its name from the Cascades, a mountain range of volcanic origin in the USA. The Cascade variety was bred in Oregon as part of the USDA breeding programme and released in 1972. The typical features of Cascade are its long, dark-green cones and its relatively low alpha acid content. Cascade has a very pleasant fruity, citrus-like aroma and is the most popular variety among US craft brewers.

### Analytical values

Growing Area	USA
Lineage	It was obtained by crossing an English Fuggle with a male plant, which originated from the Russian variety Serebrianka
Alpha acids*	4.5 – 7.0 %
Beta acids	4.8 – 7.0 %
Total Polyphenols	No data
Total oils	0.7 – 1.4 mL/100 g
Myrcene	45.0 – 60.0 % of total
Linalool	No data
Alpha ø 2018	7.0 %
Oil ø 2018	1.5 mL/100g

The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

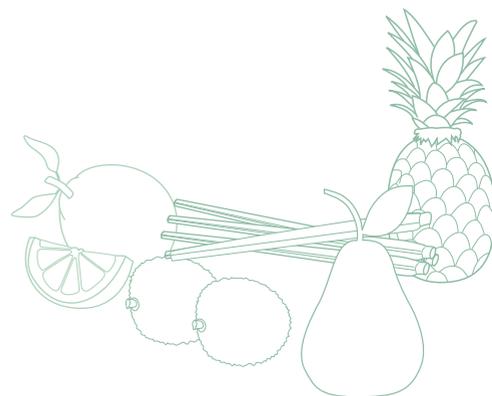
The distinguishing features of this variety are its long, dark-green cones and its low alpha content. In the cold infusion, citrus aromas come strongly to the fore, whereas cream caramel and fruity notes of blackberries and mango predominate in the raw hops. Due to its optimal cultivation characteristics and good resistance to downy mildew, Cascade produces high yields. The Cascade variety is very popular for use in US-American craft beers, particularly for India Pale Ales.

## Crop 2018

Once again this year there is a prominent fruity, lemony aroma mix of passion fruit, lime and plum. In combination with green tomato leaf notes. The cold infusion brings out some lily of the valley notes which are enhanced by sweet fruits such as cherry. There is also an element of ginger in the cold infusion, accompanied by the scent of majoram and tomato leaves as well.



Bergamot  
Lemongrass  
Pineapple  
Lychee  
Pear



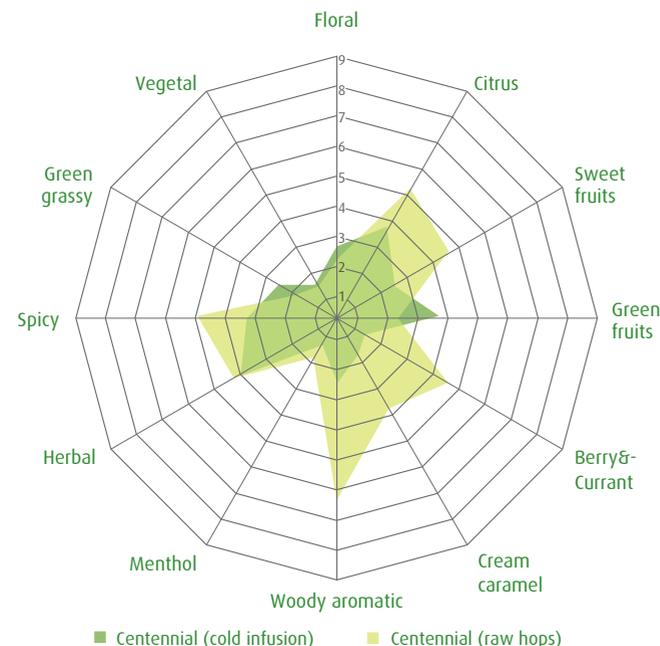
Centennial is a relatively new high-alpha variety. First released in 1990, Centennial is composed of 3/4 Brewers Gold and minor shares of other cultivars, such as Fuggle and East Kent Golding. Sometimes it is also referred to as Super Cascade, but the citrus character that predominates in Cascade is not as strongly noticeable in Centennial.

### Analytical values

Growing Area	USA
Lineage	The genetic composition is 3/4 Brewers Gold, 3/32 Fuggle, 1/16 East Kent Golding, 1/32 Bavarian and 1/16 unknown.
Alpha acids*	9.5 - 11.5 %
Beta acids	3.5 - 4.5 %
Total Polyphenols	-
Total oils	1.5 - 2.5 mL/100 g
Myrcene	45.0 - 55.0 % of total
Linalool	1.0 - 2.0 % of total
Alpha ø 2018	10.5 %
Oil ø 2018	2.6 mL/100g

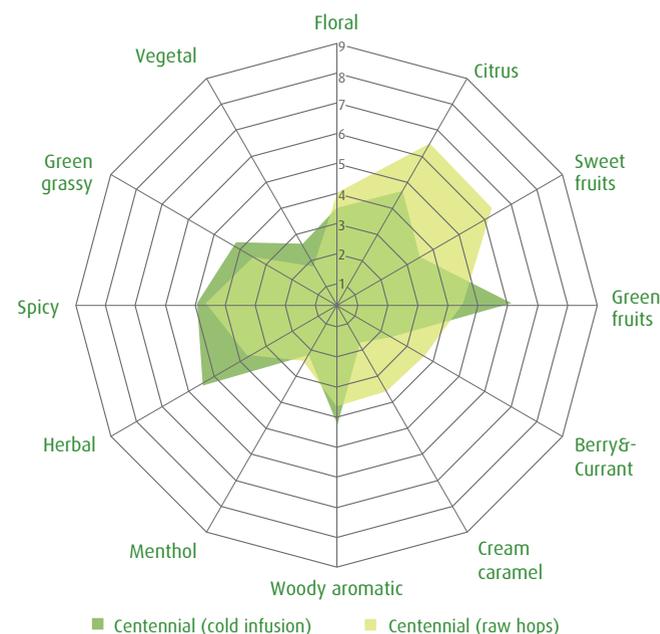
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

In the raw hops, woody-spicy aromas of spruce, barrique, tonka bean, tarragon and aniseed combine with fruity raspberry notes to produce a well-rounded character. In the cold infusion, on the other hand, camomile, tea and citrus overtones form an interesting contrast.



## Crop 2018

With a very sweet-lemony side Centennial presents itself in a very interesting and pleasant manner this year. Bergamot goes hand in hand with lemongrass and ginger - Pineapple, lychee and apricot give a certain balance to these tangy aromas, which are spiced with resinous aromas and curry. The cold infusion goes more into the direction of green fruits like apple and pear combined in a preserve with a splash of lemongrass. Tarragon and pepper add some spice into this mixture.



Kiwi  
Geranium  
Blackberry  
Banana  
Pineapple



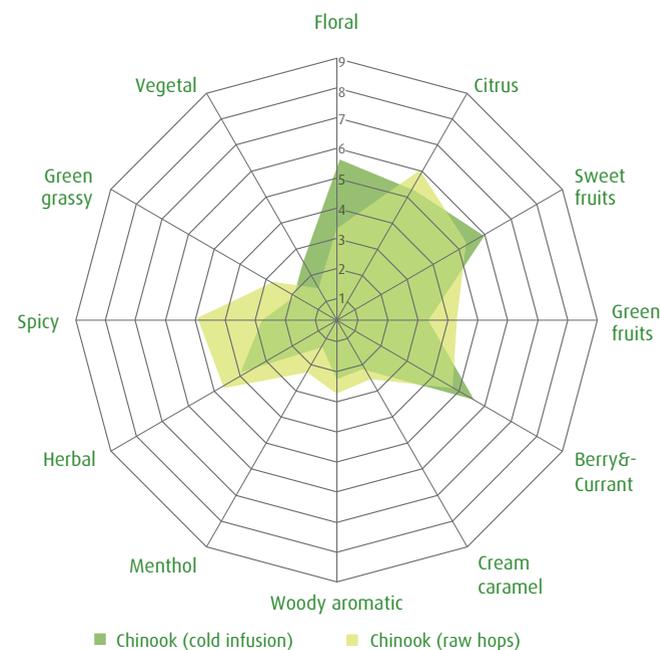
This cultivar takes its name from a Native American tribe indigenous to the region around Washington. It was developed in Washington State within the framework of the USDA breeding programme and was released as a high-alpha variety in 1985. The female parent of this variety is the English Golding.

### Analytical values

Growing Area	USA
Lineage	Cross between Petham Golding and USDA selected male with high alpha.
Alpha acids*	12.0 – 14.0 %
Beta acids	3.0 – 4.0 %
Total Polyphenols	4.5 – 5.5 %
Total oils	1.7 – 2.8 mL/100 g
Myrcene	45.0 – 55.0 % of total
Linalool	-
Alpha $\phi$ 2018	12.9 %
Oil $\phi$ 2018	2.2 mL/100g

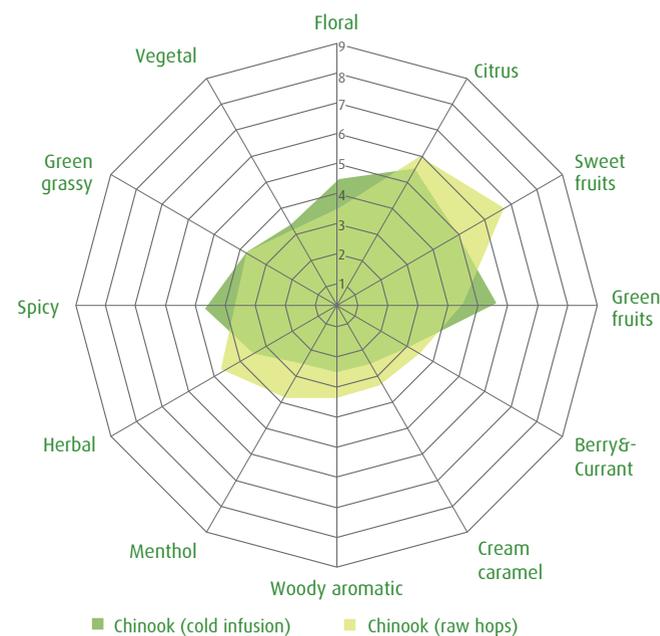
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

In its raw state, this hop has an herbal, almost smoky, character, reminiscent of tarragon, juniper, basil and lavender, held together by a well-balanced citrus and sweet fruit note, including Grapefruit, lime, kiwi and pineapple. In the cold infusion, Berry&Currant, sweet fruits and floral elements predominate – with resinous pine essences completing the sophisticated aroma spectrum.



## Crop 2018

Like in the overall comparison still shows the citrus - sweet fruit - cocktail including lime, pineapple, kiwi and melon. Aromas of thyme and green apple balance the otherwise sweet aromas. In the cold infusion floral, citrus and fruity notes are evenly balanced: blood orange, banana, green apple and blackberries are refreshed by a hint of green bell pepper.



Mango  
Blackberry  
Gooseberry  
Grapefruit  
Pineapple

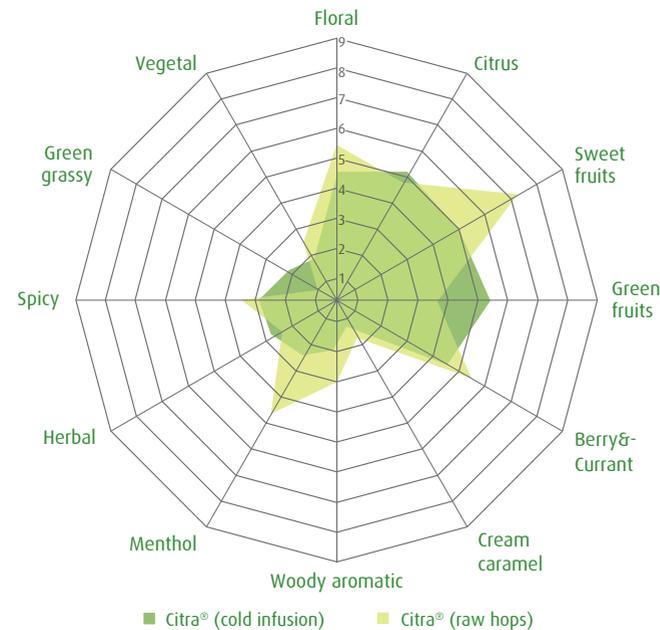


Citra® is an aroma hop variety with a promising future. Developed by Hop Breeding Company LLC, it has unique and captivating flavour characteristics. The Citra® (brand HBC 394 cv.) hop variety originated from a cross between Hallertauer Mittelfrueh and a father derived from U.S. Tettnang. It was released in 2008.

Analytical values	
Growing Area	USA
Lineage	50 % Hallertau; 25 % US Tettnang
Alpha acids*	11.0 – 13.0 %
Beta acids	3.5 – 4.5 %
Total Polyphenols	4.5 – 5.5 %
Total oils	2.2 – 2.8 mL/100 g
Myrcene	60.0 – 65.0 % of total
Linalool	1.0 – 2.0 % of total
Alpha ø 2018	13.0 %
Oil ø 2018	2.7 mL/100g

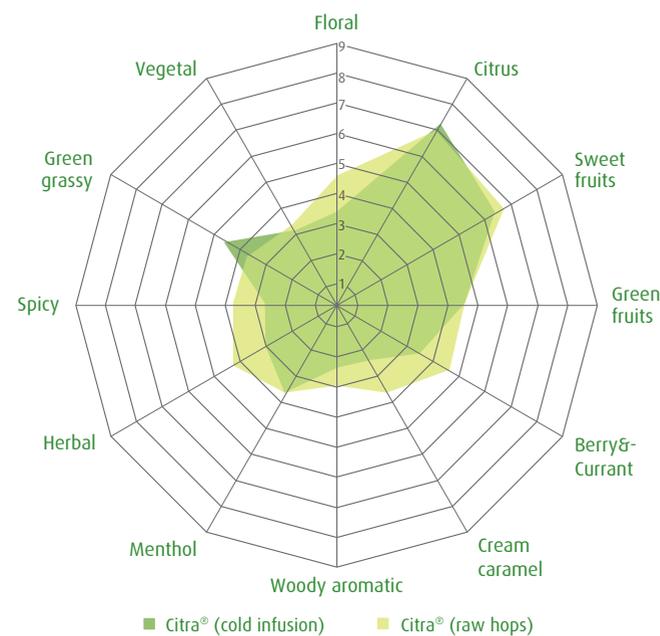
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



### Aroma characteristics

As its name suggests, Citra®'s flavour profile contains citrus fruits, such as lime and grapefruit, which are particularly pronounced in the cold infusion. However, tropical fruit notes of passion fruit, peach, lychee and many others also contribute to its uniquely fruity aroma. In the cold infusion, floral to spicy characteristics predominate, rounding off the flavour profile impressively.



### Crop 2018

And the same procedure as every year: the name still says it all – the aroma is stuffed with citrus aroma components like grapefruit and lime. But the raw hops have more to them than just citrus, adding notes of pineapple, apricot, lychee, gooseberries and blackberry. A hint of geranium and basil rounds off the overall impression. The cold infusion reveals fruits such as pineapple and mango – with a strong note of lemongrass and grapefruit.



Ginger  
Leek  
Fennel Seeds  
Celeriac  
Tomato Leaves

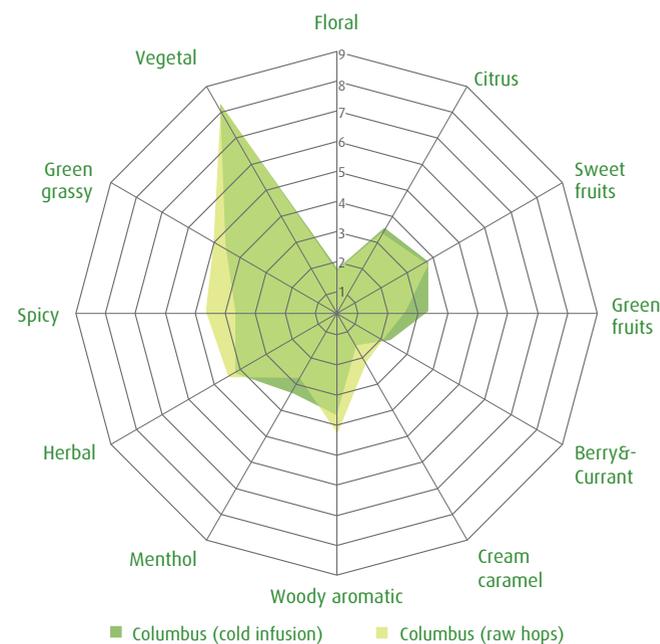
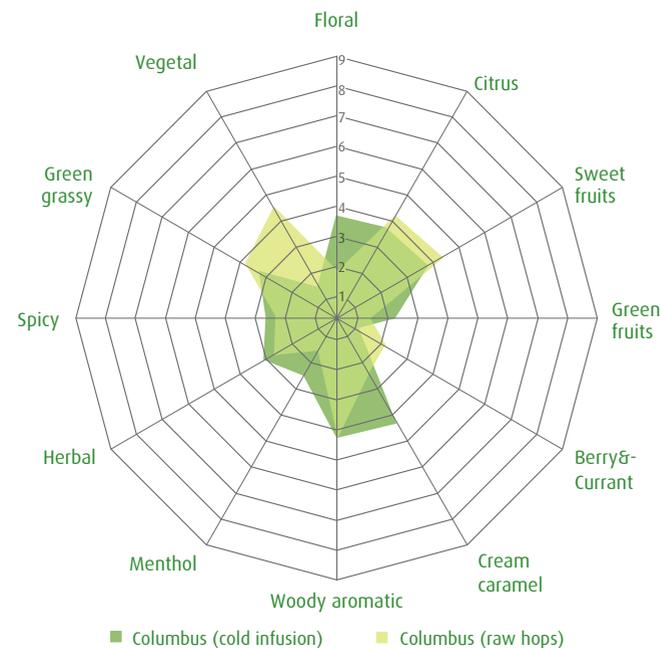


CTZ (Columbus, Tomahawk and Zeus) is the most widely grown variety combination in the USA. The current Super High Alpha varieties, have the same female parent as Nugget, making them at least half sisters to Nugget.

Analytical values	
Growing Area	USA
Lineage	Daughter of Nugget
Alpha acids*	15.0 – 17.0 %
Beta acids	4.5 – 5.5 %
Total Polyphenols	No data
Total oils	2.5 – 3.5 mL/100g
Myrcene	50 - 60 % of total oil
Linalool	17 % of total oil
Alpha ø 2018	16.0 %
Oil ø 2018	3.0 mL/100g

The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

The outstanding feature of these cultivars is their high aromatic density. In the raw hops, sweet fruit and floral, cool, citrusy and ethereal characteristics interact perfectly, thus giving the hops their special flavour profile. In the cold infusion, the predominant aroma is an intoxicating citrus, accompanied by spicy aniseed and fennel notes. Cool floral characteristics round off the aroma with plenty of promise.

## Crop 2018

Columbus gives a very vegetal mixture of various leek, onion- and garlic like aromas, mixed with celeriac and herbs and spices like lovage, fennel seeds and juniper. In combination with some citrusy aromas like ginger and bergamot; this variety is quite promising.



Fennel  
Strawberry  
Grapefruit  
Guava  
Gooseberry

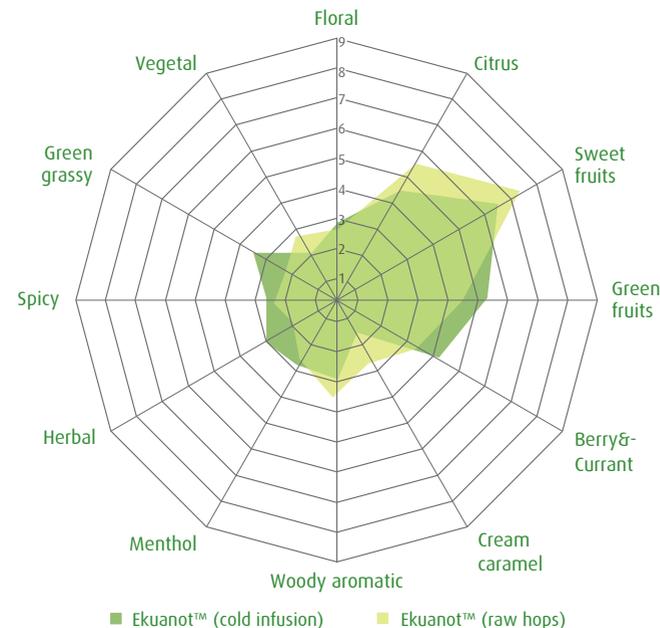


Like the two very successful varieties Citra® and Mosaic®, Ekuanot™ (HBC 366) was also bred by the Hop Breeding Company. The name Ekuanot is evocative of "equinox", the term used for the two days of the year on which day and night have the same number of hours. This hop variety has a certain similarity to the equinox in that it appears lighter as a young plant in a very light green. The older it gets, the darker its green – day and night, light (green) and dark (green) are evenly matched.

Analytical values	
Growing Area	USA
Lineage	No data
Alpha acids*	14.5 – 15.5 %
Beta acids	4.5 – 5.5 %
Total Polyphenols	No data
Total oils	2.5 – 4.5 mL/100g
Myrcene	No data
Linalool	No data
Alpha ø 2018	15.1 %
Oil ø 2018	4.5 mL/100g

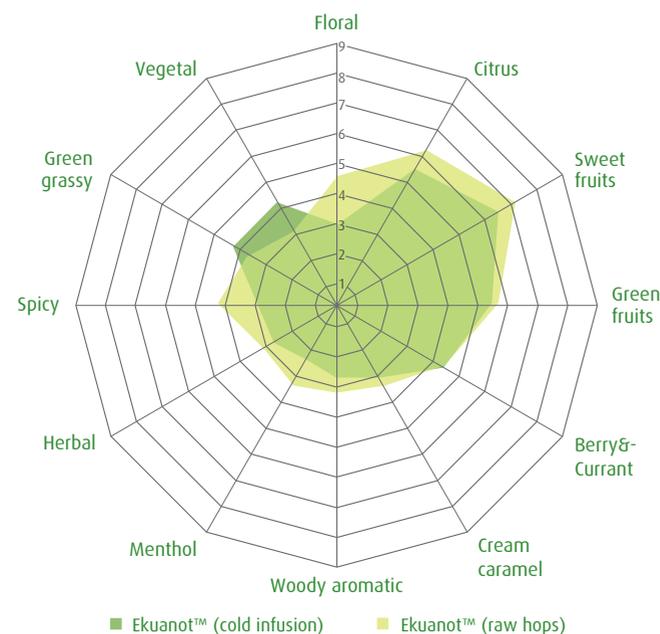
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

Both the raw hops and the cold infusion are fruity to the core and reminiscent of an exotic cocktail. Grapefruit, lemongrass and mandarin lend tangy accents to ripe guava, lychee, mango, pineapple and passion fruit. Green fruits, such as gooseberries, apple and grapes, round off the flavour profile. In the cold infusion, these are joined by fine notes of blackberry and cassis.



## Crop 2018

The dominant note in both the raw hops and the cold infusion is the sweet guava and passion fruit, augmented with refreshing grapefruit and gooseberry rounded off with a hint of fennel seeds. The cold infusion has a similar character, with guava and grapefruit, but joined here by tomato leaves and strawberry.



Mango  
Gooseberry  
Pineapple  
Lime  
Watermelon



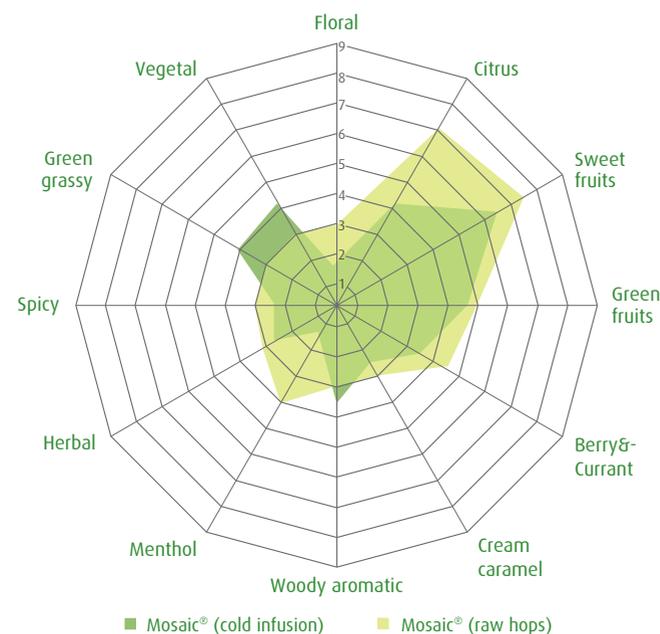
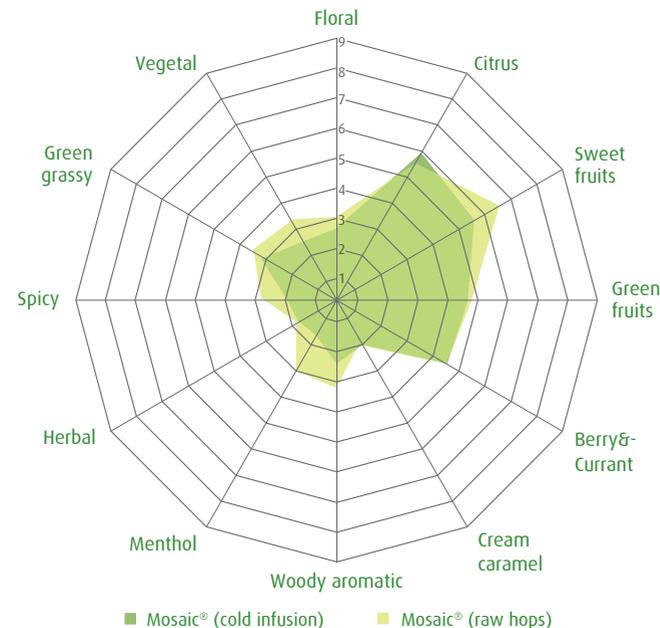
Mosaic® is an aroma hop variety developed by Hop Breeding Company, LLC and released in 2012. Mosaic® is the daughter of the Simcoe® (YCR 14 brand) variety and a Nugget-derived male.

Analytical values

Growing Area	USA
Lineage	Daughter of YCR 14 Simcoe® brand hop variety and a Nugget derived male
Alpha acids*	11.5 – 13.5 %
Beta acids	3.2 – 3.9 %
Total Polyphenols	No data
Total oils	1.0 – 1.5 mL/100g
Myrcene	47.0 – 53.0 % of total
Linalool	No data
Alpha ø 2018	12.0 %
Oil ø 2018	2.0 mL/100g

The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.

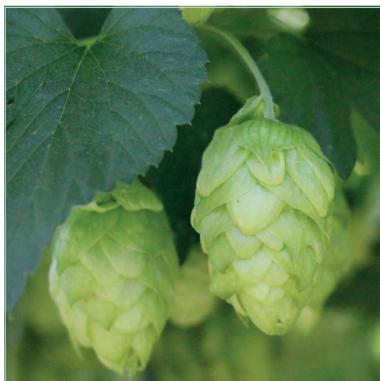


Aroma characteristics

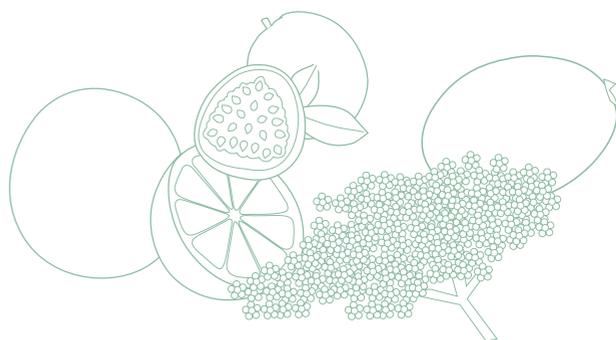
The cold infusion is dominated by the flavour of pear, gooseberry, mandarin and tinned peaches combined with jasmine, apple and cherry blossom. In the raw hops the overall flavour profile is defined by citrus notes of lime and mandarin, green fruits such as gooseberry, vegetal and green aromas such as onion, tomato leaves and red pepper, and cassis and peach. These are complemented by spicy notes of curry, chilli and myrrh.

Crop 2018

Like in the former years the raw hops of this variety present a fruity mosaic of passion fruit, mango, pineapple, water melon, gooseberries and strawberries finely accentuated by a strong citrus note of grapefruit and lime. The cold infusion presents itself with even more sweet note since lacking the heavy citrus aroma. Passion fruit, mango and quince are here present as well as some grassy and celeriac notes.



Mango  
Elderflower  
Coconut  
Grapefruit  
Passion fruit



Sabro™ brand HBC 438 was developed by the Hop Breeding Company and released in 2018. Sabro's pedigree is the result of a unique cross pollination of a female neomexicanus hop. With a robust brewing performance, Sabro™ proves to be a strongly expressive hop that translates its flavor incredibly well into beer.

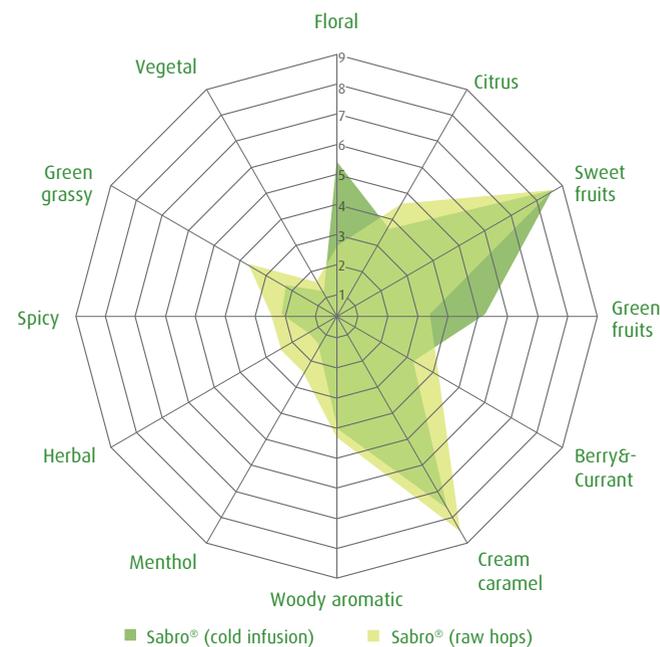
Analytical values

Growing Area	USA
Lineage	Neomexicanus female
Alpha acids*	12.0 – 16.0 %
Beta acids	4.0 – 7.0 %
Total Polyphenols	No data
Total oils	2.5 – 3.5 mL/100g
Myrcene	51.0 – 68.0 % of total
Linalool	No data
Alpha ø 2018	14.5 %
Oil ø 2018	2.3 mL/100g

The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.

This variety has not yet been evaluated. You can use the current 2018 crop as a guide for the aroma characteristics.

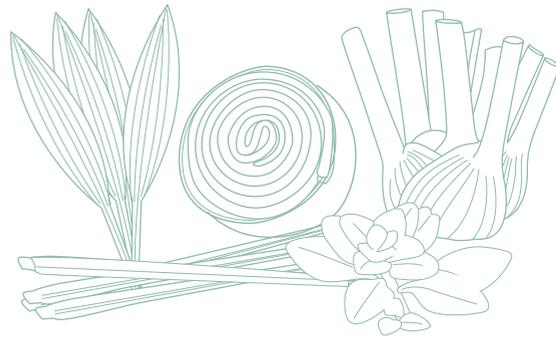


Crop 2018

Sabro is an incredibly intense, yet very balanced hop variety with very unique and distinct flavours such like coconut and exotic tropical fruit juice. Aromas of passion fruit and mango meet tangy grapefruit and are then balanced by sweet coconut and vanilla. in the cold infusion a pleasant elderflower gives a certain spice to the exotic fruit cocktail.



Lemongrass  
**Onion**  
 Wild Garlic  
 Fennel  
 Oregano

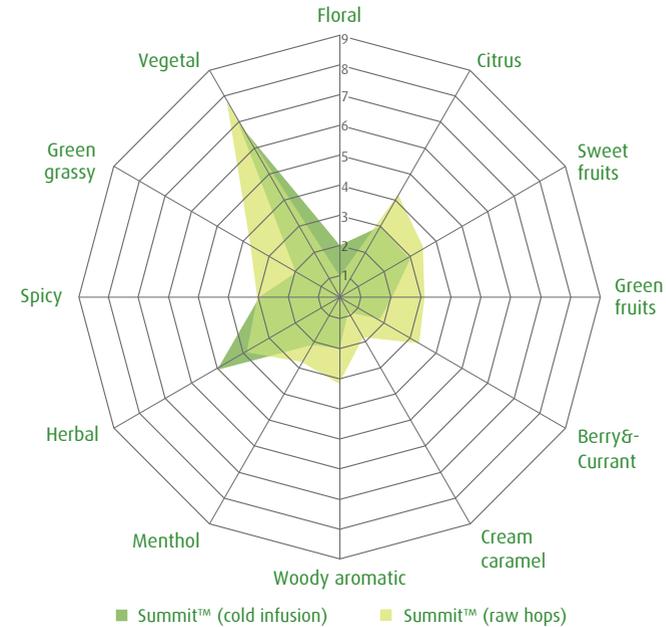


Summit™ is a dwarf high alpha variety bred by the American Dwarf Hop Association and released in 2003. This hop variety has an unusually high alpha acid content, excellent storage stability and powdery mildew resistance.

Analytical values	
Growing Area	USA
Lineage	It was bred from the variety Nugget
Alpha acids*	16.0 – 18.0 %
Beta acids	4.0 – 6.0 %
Total Polyphenols	No data
Total oils	1.5 – 2.5 mL/100g
Myrcene	35.0 – 50.0 % of total
Linalool	No data
Alpha ø 2018	17.6 %
Oil ø 2018	2.0 mL/100g

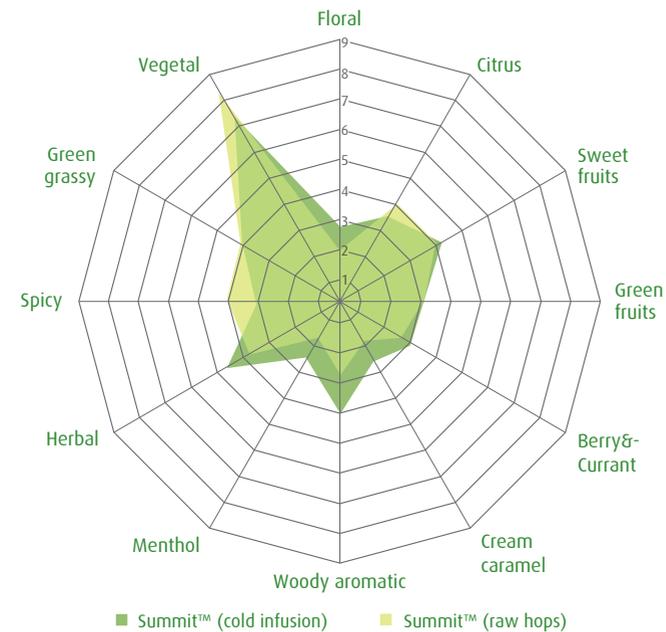
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

In cold infusion Summit™ is characterised by spicy/herbal properties such as eucalyptus and pepper combined with an exceptional vegetal overtone of celeriac, lovage and wild garlic. The raw hops also display green, vegetal and spicy components such as tomato leaves, onion, aniseed and marjoram, coupled with woody notes of incense and sulphur. Citrus elements such as grapefruit, fruity cassis and floral lily-of-the-valley subtly round off the overall picture.



## Crop 2018

Summit is probably the hop variety with the most vegetal notes. From onion to wild garlic, to fennel, celeriac – they are all present here. The aroma of the cold infusion is rounded off by a pizza-like oregano note, coupled with green bell pepper. The raw hops, on the other hand, also feature citrus aromas such as lemongrass.



Mango  
 Red Currant  
 Pink Grapefruit  
 Rhubarb  
 Lilac



The Cascade cultivar takes its name from the Cascades, a mountain range of volcanic origin in the USA. The Cascade variety was bred in Oregon as part of the USDA breeding programme and released in 1972. The typical features of Cascade are its long, dark-green cones and its relatively low alpha acid content. Cascade has a very pleasant fruity, citrus-like aroma.

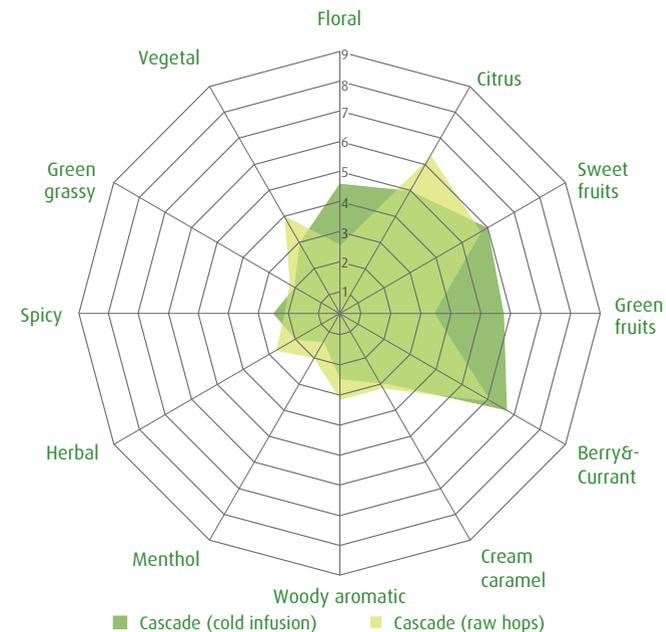
### Analytical values

Growing Area	Australia
Lineage	It was obtained by crossing an English Fuggle with a male plant, which originated from the Russian variety Serebrianka
Alpha acids*	6.8 %
Beta acids	3.4 %
Total Polyphenols	No data
Total oils	0.95 mL/100g
Myrcene	72.1 % of total
Linalool	No data
Alpha $\phi$ 2018	7.3 %
Oil $\phi$ 2018	1.6 mL/100g

The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.

This variety has not yet been evaluated.  
 You can use the current 2017 crop as a guide for the aroma characteristics.



### Crop 2018

A typical Cascade aroma with its Pink Grapefruit - but with a Australian complexity. In the raw hops additionally to the Pink Grapefruit come many sweet fruits like Mango and Passion Fruit paired with red currants. The cold infusion shows more flowery (lilac) and green fruit (rhubarb) aroma than the raw hops with a sweet finish of pineapple and strawberries.



Lemon  
Cassis  
Green bell pepper  
**Geranium**  
Peach

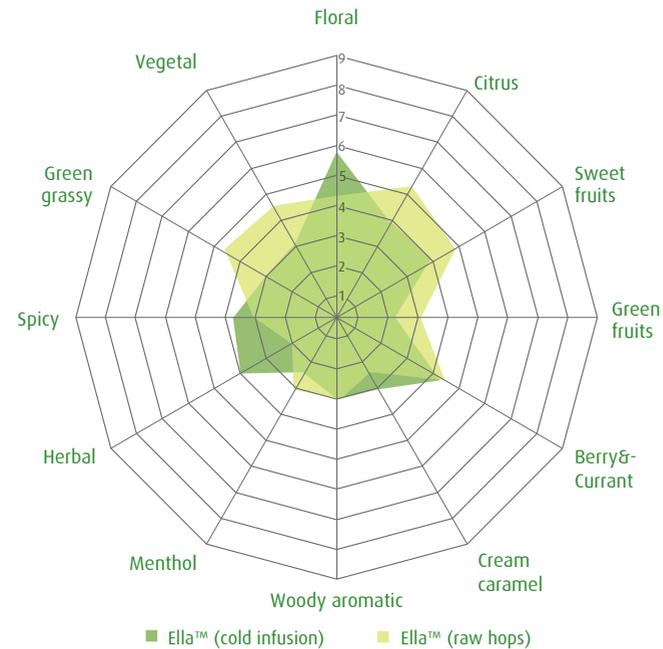
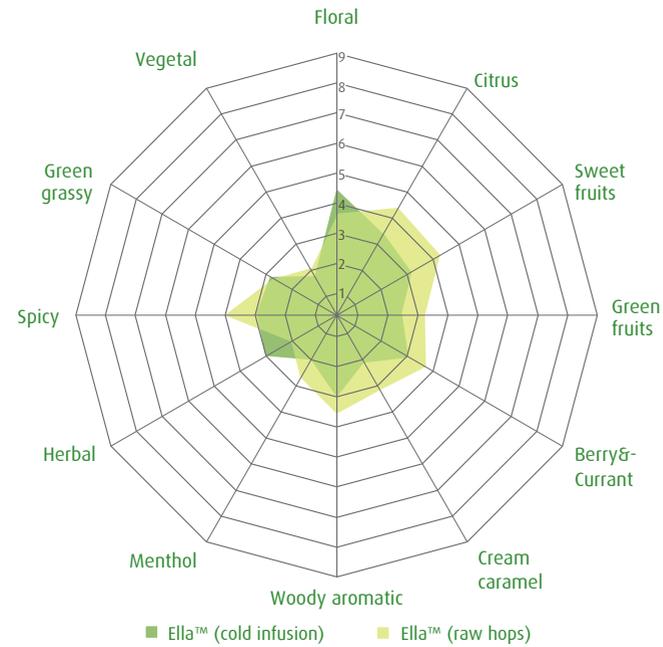


Ella™ is a new aroma variety with strong growth characteristics. It produces medium-size cones and is a medium to late-maturing variety. Although Ella™ is reminiscent of noble European varieties, it differs significantly from them in its characteristics and offers an interesting contrast to the many modern hop varieties that are characterised by citrus and tropical fruit aromas.

Analytical values	
Growing Area	Australia
Lineage	Australian breeding material
Alpha acids*	13.3 – 16.3 %
Beta acids	4.0 – 4.5 %
Total Polyphenols	No data
Total oils	2.4 – 3.4 mL/100g
Myrcene	40-50 % of total
Linalool	0.2-0.7 % of total
Alpha ø 2018	14.8 %
Oil ø 2018	2.5 mL/100g

The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.

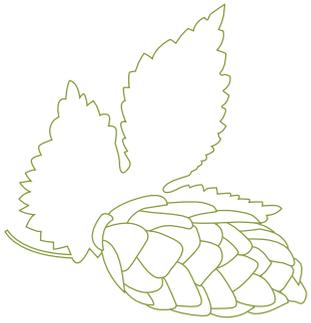


Aroma characteristics

The distinctly floral aromas of this variety are unrivalled. In the raw hops there is a predominance of aromas ranging from spicy and woody to vegetal, such as fennel, tarragon and lavender. This stands in marked contrast to the floral notes and nuances of mint and melissa in the cold infusion. Distinct overtones of grapefruit, citrus and bergamot complete the overall impression.

Crop 2018

The aroma of the raw hops of this crop has retained its floral character. The most prominent aroma is geranium, followed by lemon and fruits such as peach and Berry&Currant like cassis. A delicate trace of green bell pepper adds a particularly interesting note to the raw hops. The delicate geranium and cassis note is also the central feature of the cold infusion, combined here with the tang of Ginger and Mango.



Passion fruit  
Rose hip  
Camomille  
Red currant  
Nutmeg



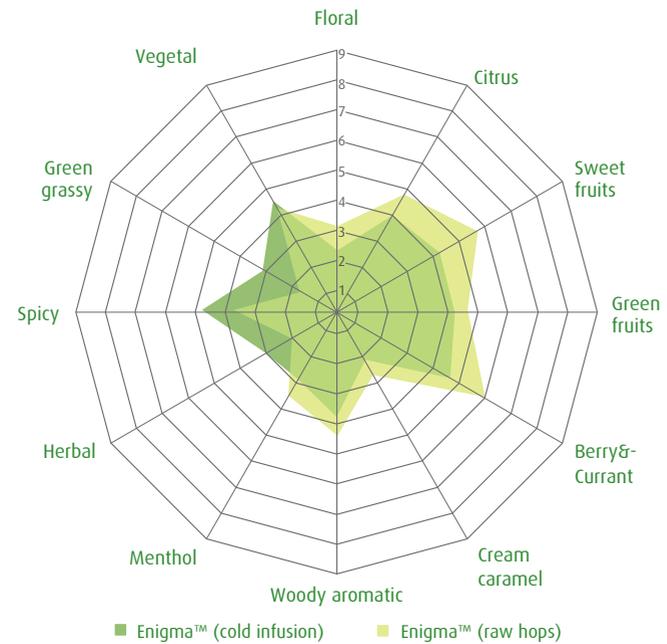
Enigma™, a hop variety from our hop breeding programme, is the latest variety from Hop Products Australia. Enigma™ is a descendant of Tettnang and was released in 2014.

### Analytical values

Growing Area	Australia
Lineage	From our Australian breeding program - descendant of Tettnang tettnanger
Alpha acids*	13.5 – 16.5 %
Beta acids	4.8 – 6.4 %
Total Polyphenols	No data
Total oils	2.4 – 3.0 mL/100g
Myrcene	24-36 % of total oil
Linalool	0.3-0.6 % of total oil
Alpha ø 2018	17.2 %
Oil ø 2018	3.3 mL/100g

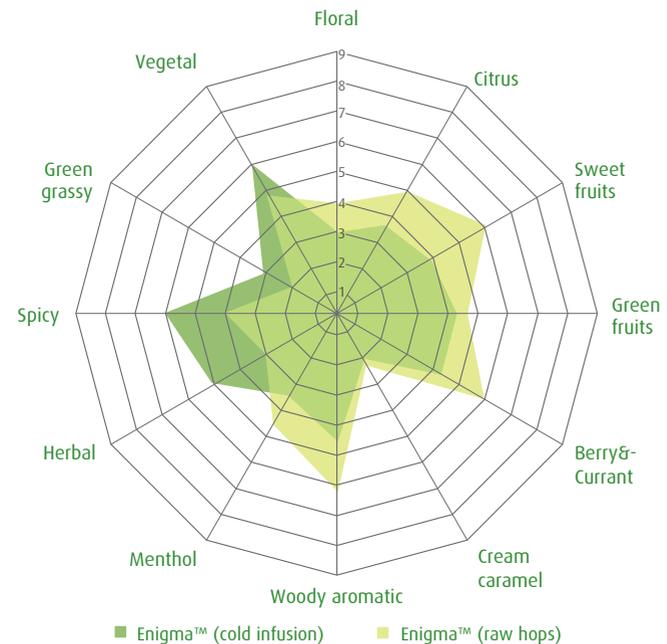
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

These raw hops are just as intense as a good glass of red wine: full-bodied, elegant and fruity. Temptingly cloaked in tangy berries such as cassis, blackberry and gooseberry, with an exotic scent of quince, passion fruit and pineapple. The cold infusion is further enriched with tangy citrus notes and so exudes a summery charm.



## Crop 2018

The raw hops in this year's crop excell in their aroma. From passion fruit to rose hip - from camomille to bergamot , combined with a tang of resin and sage. The cold infusion surprises with the warmth of nutmeg in a fruity cocktail of red currant, gooseberry and passion fruit.



The Australien hop variety Galaxy is a high alpha dual purpose seedless cultivar with a marked and unique hop aroma. Bred by Hop Products Australia and currently grown in Victoria and Tasmania. Due to its impressive flavours the variety Galaxy should be classified as a flavour hop.

# Pineapple Cherry Cassis Menthol Gooseberry

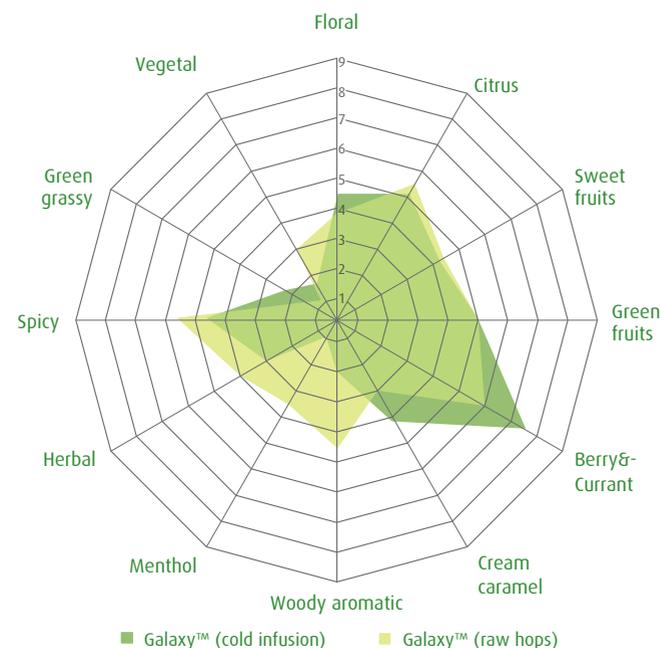


## Analytical values

Growing Area	Australia
Lineage	25 % Perle + AUS breeding material
Alpha acids*	11.0 – 16.0 %
Beta acids	5.0 – 6.5 %
Total Polyphenols	No data
Total oils	2.4 – 2.7 mL/100 g
Myrcene	33.0 – 42.0 % of total oil
Linalool	0.2-0.6 of total oil
Alpha $\phi$ 2018	17.7 %
Oil $\phi$ 2018	4.2 mL/100g

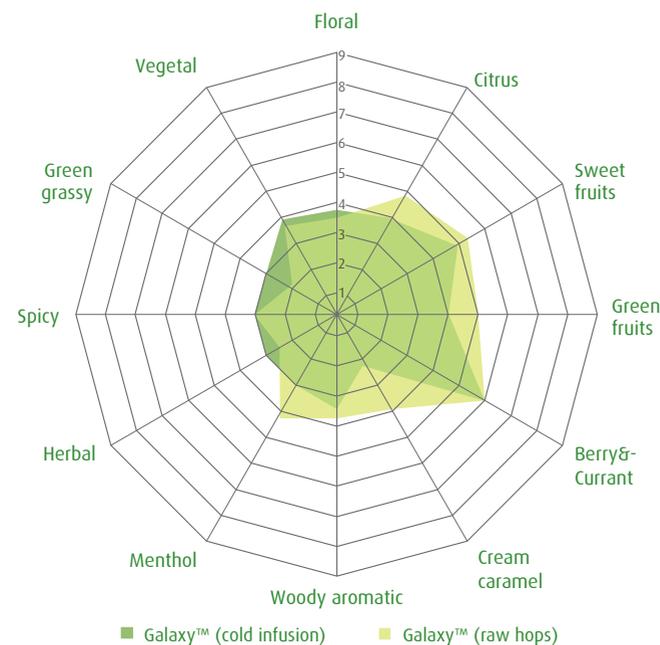
The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

It contributes prominent citrus, passion fruit and peach aromas when it is added to the boil late. In the raw hops, the aroma is defined by spicy components, such as aniseed and fennel, in a fruity combination with cassis, blueberry, blackberry and raspberry. In addition, notes of gooseberry also come to the fore, particularly in the cold infusion.



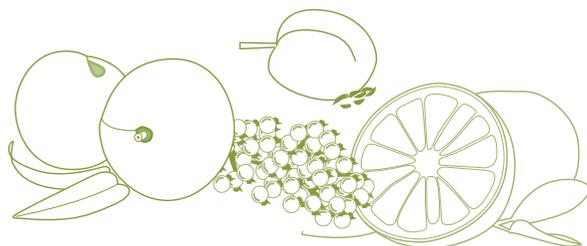
## Crop 2018

Again: the raw hops and the cold infusion are almost identical here. Geranium, blood orange, pineapple, cherry and cassis set the tone, augmented by a delicate trace of menthol and wild garlic. The fruit components are even more noticeable in the raw hops, where they are joined by gooseberries.



Topaz™ was originally selected as a seedless high alpha hop mainly for extract production, but recent work has shown it to have excellent flavour potential.

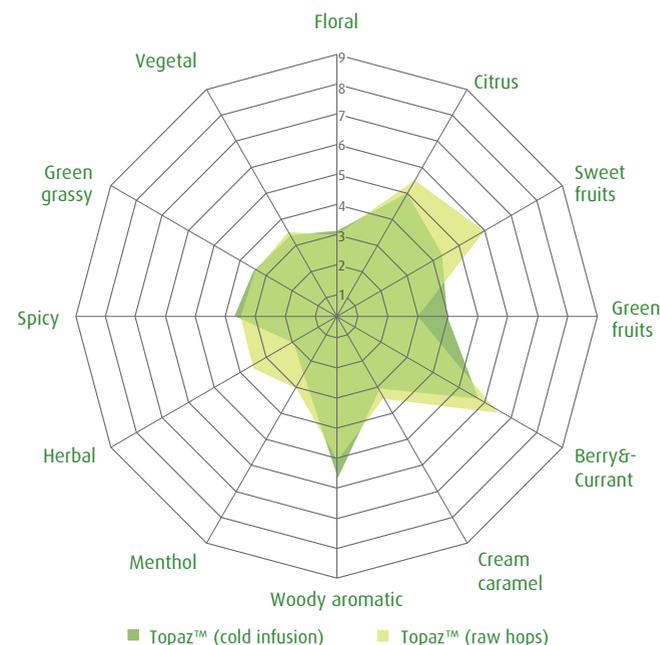
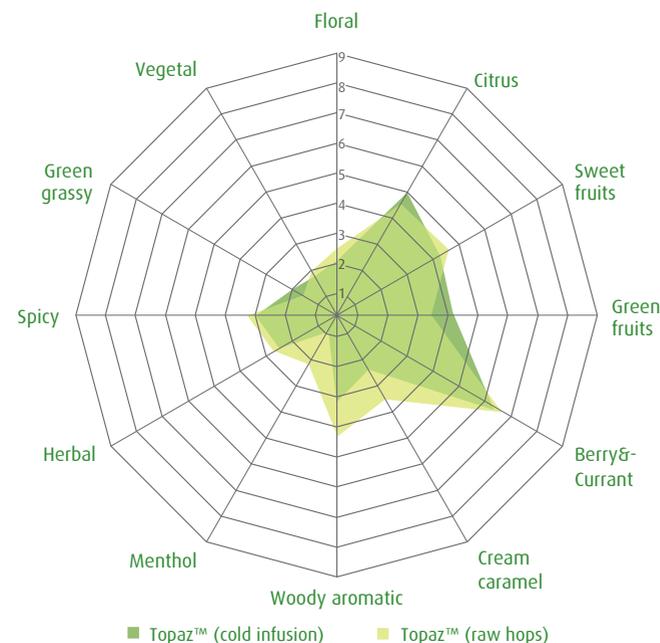
Tobacco  
Cassis  
Blood Orange  
Stone Fruits  
Candied Orange



Analytical values	
Growing Area	Australia
Lineage	Australian breeding material
Alpha acids*	15.5 – 18.0 %
Beta acids	6.0 – 7.0 %
Total Polyphenols	No data
Total oils	1.7 – 2.2 mL/100g
Myrcene	25.0 – 43.0 % of total
Linalool	No data
Alpha ø 2018	18 %
Oil ø 2018	2.1 mL/100 g

The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

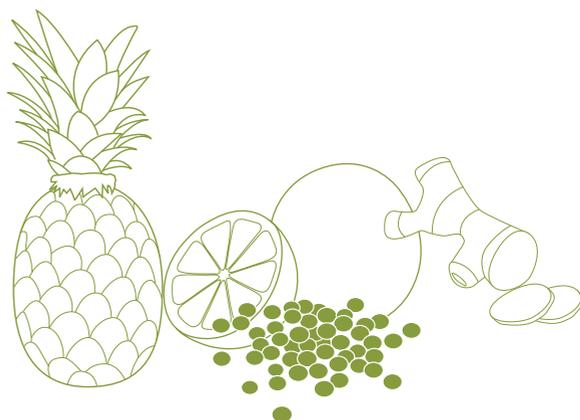
This cultivar has the characteristic earthy notes of old English hop varieties. The flavour profile in both the raw hops and the cold infusion is characterised by fruity aromas of blackberries, gooseberries, blueberries and currants, complemented by sweet passion fruit notes and woody tobacco nuances.

## Crop 2018

In the raw hops, an intense aroma of cassis is combined with woody notes, grapefruit and apricot. The green bell pepper gives the flavour profile an edgy character. The cold infusion also has a high berry content, with a strong citrus character such as candied orange. This aroma is combined with the warm notes of tobacco.



Pepper  
Pear  
Pineapple  
Ginger  
Yarrow



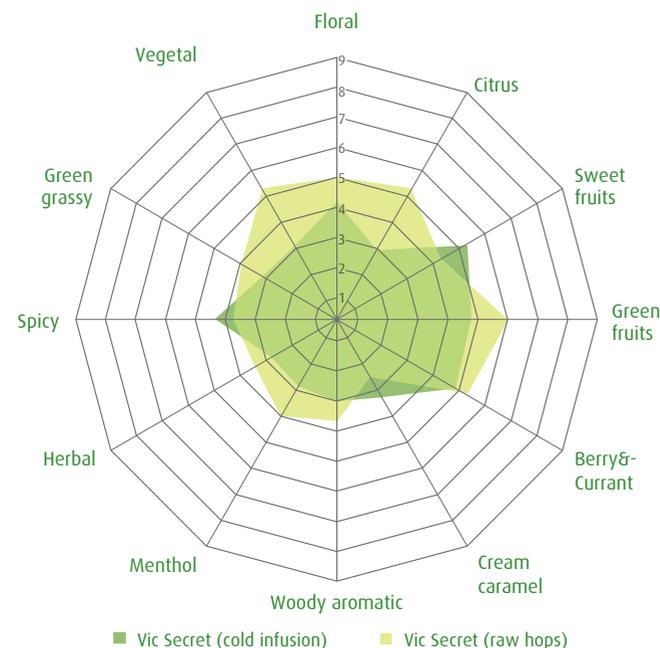
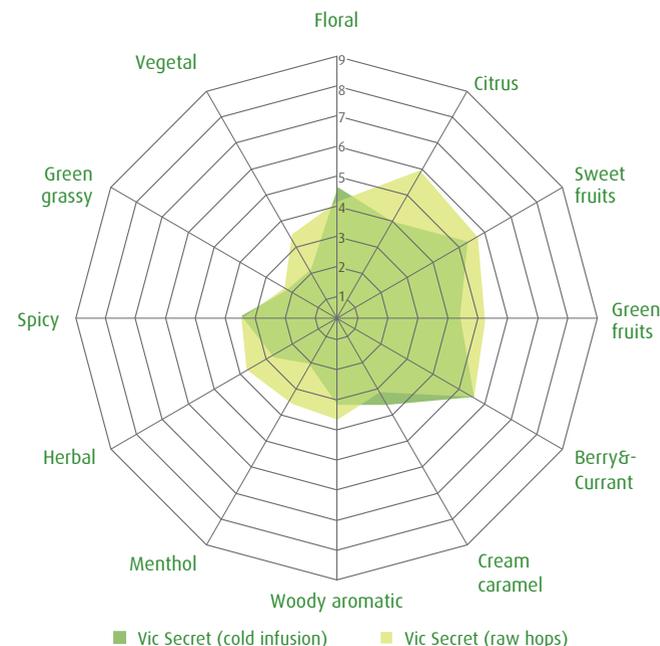
The story of Vic Secret goes back to the year 2000: it was planted as a seedling and advanced through the breeding programme with great strides until the moment everyone had been waiting for finally arrived with its release in 2010. This cultivar has only been in commercial production since 2013 and is still an insider's tip, as its name suggests.

### Analytical values

Growing Area	Australia
Lineage	Australian high alpha acid female and a male developed at Wye College
Alpha acids*	14.0 – 17.0 %
Beta acids	6.0 % – 7.0 %
Total Polyphenols	No data
Total oils	2.2 – 2.8 mL/100g
Myrcene	38.0 – 41.0 % of total
Linalool	0.2 – 0.6 % of total
Alpha $\alpha$ 2018	17.8 %
Oil $\alpha$ 2018	3.6 mL/100 g

The analytical values are typical for the variety at the time of harvest, but may vary according to crop year, growing region, grower and degree of ageing.

\* The alpha content is determined by means of spectrophotometric analysis.



## Aroma characteristics

Both the raw hops and the cold infusion of this cultivar are strongly characterised by green fruits, such as gooseberries and quince, sweet candied fruits, citrus notes of grapefruit and Berry&Currant, such as strawberries. Pineapple and passion fruit are also particularly prominent. The overall aroma profile is rounded off with intense floral notes of rose and apple blossom.

## Crop 2018

The secret lies in the excellent composition of lemony freshness and ripe fruits. The raw hops are characterised by a tangy aroma of yarrow embedded in the sweetness of ripe pear, cassis, honey melon and fresh ginger. The cold infusion is an equally well-composed fruit mixture of passion fruit, gooseberry, cassis and grapefruit. Rounded with an aroma of lily and pepper.