# Unifloral Honey

**Gian Luigi Marcazzan** discusses the importance of honey characterisation using sensory methods

verybody who enjoys the flavour of honey is well aware of the great varieties of smell and taste the product can offer. However, it is quite common to hear someone

say: 'I don't like honey, it's too sweet'. 'Well,' I say, 'taste this one' and I hand out a true strawberry tree (Arbutus unedo) honey. If you have already had the chance to taste such honey, you know that it is the most bitter honey you can encounter. There is the same variety for colour, odour, aroma and flavour. The colour of honey may vary from very dark or almost black (eg, honeydew) to very light (eg, acacia). Maybe you prefer a very low odour (eg, clover) or love an intense one (eg, oilseed rape). You may enjoy a rich flavour (eg, buckwheat) or desire a mild one (eg, citrus). Each honey is characterised by a specific colour – this is obvious - but, if you smell and taste each one carefully, it is possible to perceive distinctive organoleptic characteristics that make them unique. There is a honey for all tastes if you can find it!

But how can you be sure that the honey you buy (or sell) is really what is stated on the label? Does the beekeeper know from which flowers his/her bees actually collected the nectar? These are the big questions.

To understand why it is important to characterise honey, it is necessary to clarify the concept of uniflorality – what is meant by the term 'unifloral honey'. I know this may seem obvious, but it is not always so.

## Unifloral Honey

The European regulation (Council Directive 2001/110/EC, of 20 December 2001, relating to honey) states that the product name (honey) 'may be supplemented by information referring to the floral or vegetable origin, if the product comes wholly or mainly from the indicated source and possesses the organoleptic, physico-chemical and microscopic characteristics of the source'. When these criteria are met, we are speaking of 'unifloral' or 'single source' honey. So, if the bees collect nectar from acacia, the beekeeper may sell acacia honey. The result is a honey that has uniform specific characteristics, regardless of the geographic origin or the year of production.

There are dozens of plants that can produce enough nectar or honeydew from which unifloral honeys can be harvested. Most of them have only a limited, local significance and only about a dozen are important to the world honey market. In Italy and Spain, 30–50 per cent of the honey marketed is unifloral. In non-European countries, with the exception of New Zealand manuka honey, unifloral honeys are of lesser importance. Very often, beekeepers don't know the origin of the nectar; other times





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Figure 2. Italian unifloral honey cards

they have the wrong idea of its source. Sometimes, they report on the label the declaration they like the most. It is not uncommon to find very different looking products all with the same name on the shelves. All of the samples shown in Figure 1 are named marruca honey (Jerusalem thorn, *Paliurus spina-christi*).

# Honey Characterisation

We now know that sensory characteristics vary remarkably from one honey to another, depending on the nectar source, and these characteristics are fairly constant for the same source.

Figure 1. Samples from the market – all are labelled marruca honey. It can be understood simply from their appearance that only a few of these jars contain the product claimed

Colour is one of those characteristics. We cannot taste the honey shown in Figure 1, but we can look at it and see the colour. It varies from very light yellow to very dark, with gradation through shades of amber and brown. It is obvious already, from the colour, that most of the samples are misrepresented by the description on their labels.

The botanical description on the label of the jar cannot be either a fantasy or assumption of the beekeeper or seller. The product when declared as 'single origin' (unifloral) should match specific organoleptic, physico-chemical and microscopic characteristics. For this reason, it is of utmost importance to characterise the huge variety of honey types we can obtain. Honey characterisation gives meaning to the naming of honey. How can you name honey if you do not know its characteristics? How can an inspector evaluate the correctness of the botanical declaration reported on a label if there is no characterisation?

It makes no sense to allow botanical declarations on the label if you do not have the tools to investigate and check their correctness. Honey characterisation is important for promoting and adding value to the product, but it is very important also for the protection of the producers and consumers. The consumer is ready to spend more money on products which meet certain expectations.

The European regulation unfortunately provides only general information on characterisation; it does not specify the characteristics of each type of honey. For this reason, in Italy, we have done a huge amount of work over the years to produce unifloral honey cards. At the Council for Agricultural Figure 3. Example of sunflower honey card (extract from *Apidologie*, **35**, [2004] S38–S81 Main European unifloral honeys: descriptive sheets. doi: 10.1051/ apido:2004049)

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#### SUNFLOWER HONEY (HELIANTHUS ANNUUS L. - ASTERACEAE)

Sunflower is largely cultivated for the oily seeds in many European countries, above all in Eastern and Southern ones, where it represents to bees an important source of nectar and pollen. The extension of cultivation and consequently the production of uniforal honey varies from year to year according to the European agricultural policy.

At present the unifloral denomination does not add market value to this honey, and in some countries it is not labelled as unifloral or it is blended with multifloral honeys.

The unifloral honey has a quick and often hard crystallisation, due to the high glucose content.

A big variability was recorded in the Helianthus pollen content, from less than 20% to more than 90%, with a PG/10 g value mostly below 30 000. The morphology of flower and pollen grains do not justify any under-represented behaviour, but different varieties or cultivars may have a variable pollen production. Apart from its bright yellow colour, Helianthus unifloral honey is characterised by slightly



high proline and acidity values and by a typical sugar spectrum, with a high glucose content, leading to a high F+G and a low F/G ratio. G/W ratio is quite elevated, but not at the highest levels, because of an often high water content. Low values were also recorded for sucrose and other o ligosaccharides (Persano Oddo et al., 2000).

Sensory description		
Visual assessment	Colour intensity: medium	
	Colour tone: bright yellow	
Olfactory assessment	Intensity of odour: weak	
	Description: floral - fresh fruit (fruity), warm and vegetal	
Tasting assessment	Sweetness: medium	Acidity: strong
	Bitterness: absent	Intensity of aroma: weak to medium
	Description of aroma: floral - fresh fruit (fruity), warm and vegetal	
	Persistence/aftertaste: short	
	Other mouth perceptions: when crystallised with very small crystals, refreshing (like "fondant")	
Physical characteristics	Crystallisation rate: quick Other: crystallisation with hard crystals (hardly soluble) is frequent	

Research and Economics (CREA), we began characterising honey in the early 1970s, when the first European honey regulation was enacted. Since then, we have produced 22 honey cards and the work is still going on with 'minor' products – those we term 'rare' or 'uncommon' honeys. The characteristics of these honey types are reported in some Italian publications (Figure 2). You can find the characteristics of the main European unifloral honeys published in the international magazine, *Apidologie* (Figure 3). On the honey card, you will find information regarding the plant, its



Figure 4. This student of honey sensory analysis concentrates on the aroma of the honey geographical distribution, its importance for honey production, the general characteristics of the honey derived and the specific organoleptic, chemical, and microscopic characteristics.

## Variations

With the characterisation of honey, it is important to evaluate many samples produced over 3–5 years and in different areas. In this way, all the natural variations for the type are included. Eventually, we obtain a 'picture' of the type of honey which allows us to recognise (and use a correct description on the label) and to evaluate it.

We still perform the traditional investigations that are complex and take time, but researchers are looking for faster and cheaper methods for characterising and checking honey.

Honey characterisation is very important to investigate the quality and to verify botanical descriptions; unfortunately, it is not always useful for preventing or investigating fraud in honey – at least very sophisticated methods – but it can help. The falsification of unifloral honey is more difficult (eg, it is difficult to reproduce the characteristics of buckwheat honey) and, in general, deep knowledge of honey composition gives clues that may give rise to suspicion



Figure 5. A lecture during a class on honey sensory analysis

when checking honey, so that we can deepen our investigations.

Finally, I would like to draw attention to something I am very proud of – our courses (Figure 4, Figure 5). I am proud of them, first of all, because they are my main activity, but not only for this reason. I am also convinced that all those who manage honey in some way or another should take a course on sensory analysis of honey. We provide participants with much important information that forms the basis for understanding honey and its qualities. Sensory analysis today in Italy is considered essential in the evaluation of honey. It is used as an analytical tool for the quality control of honey in relation to the evaluation of botanic origin. Furthermore, sensory analysis permits the recognition of defects like fermentation, off odour (eg, of smoke), metallic taste and other characteristics that common routine analyses do not. It is the only analysis that gives us information on how consumers perceive the product; it is used by beekeepers to produce a better product and it is used by consumers when choosing the food they prefer. Sensory analysis is the most powerful means that can be used to promote and add value to the product, for minimal cost.  $\Box$ 

### Further Information

Honey Tasting Course www.beesources.com/en/honey-tastingcourse-3/



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