TECHNIQUE OF HONEY DEGUSTATION AND DEVELOPMENT OF AN OBJECTIVE NOTATION AND CLASSIFICATION SYSTEM TO ESTIMATE ITS QUALITY BY AN ORGANOLEPTICAL ANALYSIS

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All the people who like honey may do an organoleptical analysis. It is a degustation in the noble meaning of this word : as a response to the stimulations of this sweet food, the taster objectively interprets his sensations from a qualitative and quantitative point of view. The sensory examination is a genuine intelectual act requiring knowledge, concentration and training. It appeals to an exceptional but frail, gentle measuring instrument which is submitted to frequent disorders therefore so unstable in responses : man. As far as technology is concerned, the sensory examination of honey is indispensable for the physical, chemical, biological and pollinic analyses. These analyses supply very important but insufficient information to justify, for example, the quality of the polyflora honey being also insufficient to prove that a certain famous labelled one-flora honey is better than another one, of the same botanical origin. We developed a degustation technique and defined a certain number of sensory criteria which allow a better estimation of the quality of a honey.

30—40 grams of honey are poured in a glass container. Choice of container is important. We chose a baloon glass : it is composed of a leg, a stalk and a calix whose round shape keeps the volatile flavours of the honey. The organoleptical analysis has three stages : honey is *looked at, smelled* and *tasted ;* they cause various stimulations concerning four types of fundamental sensations : *visual, olfactory, gustative* and *tactile.*

Visually, the colour, purity, homogeneity and the possible granulation deficiencies are recorded. The *olfactory stimulations* are very complex, the various aromatic components of honey may be recognized by them. The degustation method we propose is the following : we seize the glass by the stalk. We stir the honey with a small plastic spatula while approaching the glass to our nose and breathing slowly several times. After we had got familiar to the strongest flavour we are able to define the secondary flavours. Then we take a few grams of honey from the glass by the spatula and put it in our mouth, dissolving it progressively and pushing it to the back of the mouth cavity. So we perceive the flavours both olfactorily and retronasally, this second phase having to remind, fix and complete the stimulations received directly from the nose. Aromatic perception is either fugitive or persistent ; this aspect must be noted. The *gustative stimulations* are differently and confusely perceived.

Whether there are one or several fundamental tastes of the product, the sweet taste is for honey very strongly perceived ; then come the retronasally perceived flavours and finally, there can be a strong taste which is usually disagreable. All these gustative stimulations called "Mouth sensation" constitute the honey taste. The *tactile stimulation* occurrs only when one crushes a little granulated honey between

the tongue and palate. So the unctuosity or consistency of the crystalline texture of the product is directly estimated, and the presence of granules, their shape and thickness is detected. Global gustative estimation of honey may be performed in two successive degustations ; one to investigate and memorize all the components of the taste itself ; the other for the tactile examination. After examining three or four honey samples we advice that the taster should interrupt degustation and possibly bite a soury juicy apple.

The information received through the sensory examination is processed at two levels : the first, by estimating the defects of the product ; the second by determining its quality.

Both the honey defects and qualities are estimated from a *visual, olfactory, gustative* and *tactile* point of view. Two descriptive cards were made ; one for the main possible defects, the other for the essential qualities of the honey which has adopted, with the necessary changes, the global notation system commonly used in the organoleptical analysis of wines. Mentioned must also be the fact that honey should be estimated both as regards its defects and qualities only within the grade it is included.

Thus a mixed-flora honey will be examined among other mixed-flora honeys ; but a lavender or an acacia honey will never be estimated together but separately.

A. Description of the main possible defects of a honey and the consequences of these defects for the organoleptical estimation of the product

Defects will be estimated in each of the mentioned fields as of *weak, strong enough* or *strong* intensity.

a) *visual defects :*

1. For all honey types, granulated or liquid that means :

— incomplete or heterogenous or visible granulation ;

— post-granulation accidents such as white spots or marmorations appearing on the jar walls, surface foams, phase separations, etc. ;

— suspended impurities within the honey or at the surface ;

— excessive fluidity of the sample, found when the jar is overturned, or bubbles ;

— lack of homogeneity indicated by layers of various colours and shades ;

— honey pouring out of the jar (found in samples taken from the market).

2. For one-flora honeys and possibly for a type recognized as mixed-flora honey we must add :

— an abnormal colour. Here we must point out that when intensity of colour is over or under the highest or the lowest indice established for this type of honey, it is considered inferior irrespective of the mark obtained at other examinations. Colour indice is measured by the Pfund or Levibond colorimeter.

b) *Olfactory defects*

— parasite odours such as smoke, old sack, phenol, overheated honey which appear accidentally or because of the natural deterioration of the product.

2. For one-flora honeys, added must be :

— when the natural odour perceived is not that of the honey type examined ;

— when the natural odour specific to the honey type examined is too feeble.

In the first case the product loses one class, in the second one it has also a gustative defect which involves a penalty as to its quality.

c) *Taste defects*

1. These may be :

— bad tastes because of foreign matters or which appeared as a consequence of chemical or biological changes of the product, for example, a subsidiary smoke taste, excessive acidity because of fermentation, a caramel aroma due to heating, bitterness (except of course the honeys for which this taste is specific).

2. For the one-flora honey, following must be added :

— when the flavours and aromas are foreign to the honey type examined ;

— when the aromas and flavours specific to the honey type examined are not sufficiently well perceived. In the first case the product loses one class, in the second it is considered with a taste defect and a penalty for quality is applied.

d) *Tactile defects*

There are the defects of honey granulation and essentially refer to:

— on the one hand, to the whole cohesion of the crystalline structure — for example a very strong granulation when honey is difficult to be taken out ;

— on the other hand, to the same type of granulation (fine, medium size, coarse, agglomerated granules ; spheric, edged crystals . . .).

We finish this chapter with a few general remarks regarding the way of estimating intensity of defects. In the same class of defects (visual or tactile for example) a honey may show three diferent defects of weak intensity which summed up form a strong intensity defect ; it is included in one or another class and sometimes, if there are visual and tactile defects, in both classes. Otherwise a defect may be immediately classified as a defect of strong enough or strong intensity and this in one or two classes according to the level and degree of perception. Only one strong intensity defect may finally make the honey which is considered as oneflora lose one class ; for example, if its colour is not included in the list of colours or when the smell and taste of the honey are not those of the product referred to.

B. Description of the essential honey qualities ; how do they interfere in the organoleptical analysis.

First of all we must say that a honey with no defect is a high grade product. In order to estimate its quality we must examine the following characteristics :

a) *Aspect*

A perfectly liquid, very finely granulated honey or a cream honey are high grade honeys from this point of view.

b) *Smell*

From this point of view, honey is estimated and classified depending on intensity of the perceived flavours (weak, strong) ; on its character (fineness, vulgarity, etc.) ; on its origin (flower, fruit, etc.) ; finally on its agreable character but this is a subjective information.

c) *Taste*

From this point of view, estimation and classification of honeys is first made according to *fineness* and *intensity of flavours,* their persistance on the back of the mouth after ingestion of the product ; this flavoury persistance may be measured in seconds. Intensity of the sweet taste, always very high but different from one honey to the other may also be determined. The special qualities of taste such as a more or less bitter taste, a remnant typical natural taste can also be estimated. When these special sensations correspond to the accepted taste norms for a certain honey type, the estimation found by the taster will be positive and will support its quality even though the sensation perceived is not agreable for him. During the second time the tactile gustative sensation is required. Estimated are the consistency and unctuosity of the crystalline mass of the honey and this will be perceived more or less agreably by the taster.

A general important remark

In order to estimate the quality of a honey by the organoleptical analysis the product involved must be perfectly known. The main olfactory and especially the gustative characteristics must be well perceived, recognized, identified and memorized. This is possible only by a permanent investigation on and training with one-flora honeys of known origin and with well-defined physical-chemical characteristics. Mixed-flora honeys are much more difficult to estimate especially as to their olfactory and gustative characteristics ; in this case a global, non-selective estimation of these sensations will be made except determination of possible defects.

C. Notation

Notation must be made according to an accurate constant method of separation, identification and measuring so that results are reasonably interpreted. It is recommendable to use for this an ordinal scale the gradations of which should indicate inferiority or superiority ratios without the intrinsic mathematical value. We fixed up a scale with seven levels corresponding to the following names :

1. extra
2. superior
3. convenient
4. limit
5. second-rate
6. inferior
7. very bad.

The notation card (Table 1) includes :

Table 1

NOTATION CARD OF HONEY TYPES

date of degustation
place of degustation
name of taster

No. of commission

Scale of ordinal notation

1. extra
2. superior
3. convenient
4. limit
5. second-rate
6. inferior
7. very bad

Scale of defect intensity

× weak ×× strong enough ××× strong

(encircle the number of crosses which corresponds to the intensity level found)

No. of samples	Defects				Particular Qualities Defects	Ordinal mark
	Visual	Olfactory	Gustative	Tactile		
	XXX	XXX	XXX	XXX		
	XXX	XXX	XXX	XXX		

— marks and terms defining the quality of the product ;
— a code for the estimation of defect intensity ;
— identification co-ordinates : date, place, name, numbers ;
— seven columns for : number of the sample which is anonimous.

* possible mention, in four columns, of the defects noted in the visual, olfactory, gustative and tactile fields. For this, the number of crosses which correspond to the intensity level perceived is encircled, that is ; one cross for a weak intensity defect, two crosses for a strong enough intensity defect, three crosses for a strong intensity defect ;
* identification of special qualities and defects ;
* ordinal value on the seven graduation scale. This index card needs little wording, is simple, polyvalent and faithful. It may be used in a simple differentiation sensory analysis or in a more complicated estimation sensory analysis. Being individual, it allows an objective estimation of the product but at the same time requires competency from the analysts who, if they are good tasters and understood the system well, should supply homogenous estimations.

We finally point out that the jury is made of an uneven number of tasters ; degustation follows in a perfect silence without any communication among the tasters in order to avoid distraction or influences. The index card should be interpreted in advance by conventionally establishing the eliminatory criteria of acceptance or classification. Various systems of data processing may be used : the one we chose is the classification according to rank. The mark given to a honey will be the product of the classifications made by various members of the jury. So,

Table 2

RECAPITULATIVE INDEX CARD OF THE JURY

Honey type : lavender — Number of jury members : 5
jury no : 3

No. of sample	Number of repeated individual marks							Total ranks	Classification
	1	2	3	4	5	6	7		
401	I	IIII						9	5th
402	IIIII							5	1st
403		II	III					13	7th
404			I	II	II			eliminated	
405	II	III						8	3rd
406	III	II						7	2nd
407		III	II					12	6th
408	II	II	I					9	4th
409				II	II	I		eliminated	
410		II	II	I				14	8th

N.B.
in case of ex-aequo the square value is calculated

No. 401 : $1\times1=1$			$4\times4=16$	17	5th
No. 408 : $2\times2=4$	$2\times2=4$		$1\times1=1$	9	4th

if a honey was estimated by five persons who granted the 2nd rank three times and the 3rd rank twice, the final mark will be three by two, plus two by three that is 12.

In this case the best honey in this class will be that obtaining the lowest mark. This practical system needs a recapitulative index card of the jury (Table 2) which allows a quick classification and processing of results. This index card may also be used for a hedonic, that is a subjective and affective notation, this changing the terms of the ordinal scale.

Conclusion

The sensory analysis of honeys, like those applied to many other foods, makes the early estimation of the results of the physical, chemical and pollinic analyses completer and suptler.

It also proves to be an excellent pedagogical approach of the honey technology. It contributes in a quick improvement of honey quality, in a better knowing of the honey by the producer, in acquiring decisive commercial arguments, a more accurate wording.

The degustation technique we propose is an attempt susceptible to be developed and improved. The method was checked during official contests and, with the help of a previously trained degustation jury, proved to be objective, simple, quick and repeatable.

But the practice of honey degustation implies a previous training of degustations. We already organized courses in this field. The future taster must be taught simple notions of anatomy, physiology, psychology, methodology and honey technology ; he must be sure that by an adequate practice, he must make an important effort of memorizing and training. In order to reach a high level of competency, the taster must follow a certain moral, technical and practical discipline.