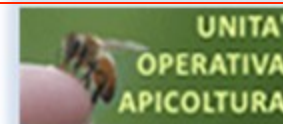




Istituto Zooprofilattico Sperimentale
del Lazio e della Toscana *M. Aleandri*



6° th APIMEDICA & 5 th APIQUALITY INTERNATIONAL SYMPOSIUM

Novotel - Roma Eur

22-25 Novembre 2016

GEOGRAFICAL AND BOTANICAL ORIGIN OF HONEYS. INTERNATIONAL HONEY COMMISSION PROFICIENCY TEST 2015-2016

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Beekeeping Unit

Zooprofilattico Institute of Lazio and Tuscany "M. Aleandri "



**Honey is a natural product,
for its composition and for its
beneficial properties since ancient times
can be used
both as a food
both as a therapeutic product**

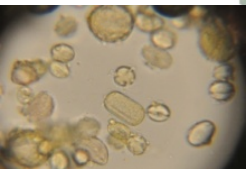


**there are
many types of honey**



The analysis melissopalynological

It allows to recognize the origin of the honey,
both botany
(monofloral honey, wildflower honey, honeydew)
that geographical
(Country / countries of origin)



With this analysis
identify
pollen grains
present in honey
(POLLEN SPECTRUM)



Pollens originate
from flowers where
bees have
collected nectar
(Transformed into
honey)





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The analysis melissopalynological

It is therefore a very important tool

for the

marketing of honey:

Is able to establish if there is

compliance with what is stated on the label

and if we are in the presence of

any commercial fraud





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Why is it important to know the ORIGIN BOTANY honeys?

- * To check the compliance with the statements on the label

- * To check for fraud

- * Because for every type of honey correspond different composition and property

Examples:

honeydew

richer in minerals

acacia's honey

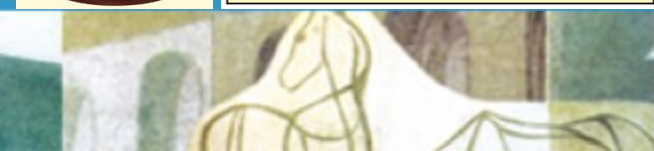
richer in fructose

manuka honey

used for the treatment of wounds in human and animal clinical



MIELE DI ACACIA
MIELE DI AGRUMI
MIELE DI ARANCIO
MIELE DI CARDO
MIELE DI CASTAGNO
MIELE DI CORBEZZOLO
MIELE DI ERBA MEDICA
MIELE DI ERICA
MIELE DI EUCALIPTO
MIELE DI GIRASOLE
MIELE DI LUPINELLA
MIELE DI MELATA
MIELE DI MELATA DI ABETE
MIELE DI RODODENDRO
MIELE DI SULLA
MIELE DI TARASSACO
MIELE DI TIGLIO
MIELE DI TIMO
MIELE DI TRIFOGLIO



ANALYSIS FOR THE BOTANICAL ORIGIN OF HONEY

Melissopalynological qualitative analysis

Count at least 500 pollen grains and the corresponding indicators honeydew



Expression of results:

dominant pollen
>45%

accompanying pollen
16-45%

pollen isolated accompanying
3-15%

pollen isolated
<3%



Melissopalynological quantitative analysis

Number of pollen grains
per 10 grams of honey



Expression of results:

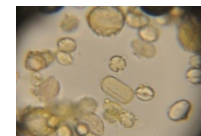
PK/10 g

Representativeness of classes

I	< 20.000	
II	20.000 -- 100.000	
III	100.000 -- 500.000	
IV	500.000 -- 1000.000	
V	>1000.000	



SHEETS
CHARACTERIZATION OF
HONEY



ANALYSIS FOR THE GEOGRAPHICAL ORIGIN OF HONEY

Why is it important to know GEOGRAPHICAL ORIGIN of the honeys?

* To check the compliance with the statements
on the label

* To check for fraud

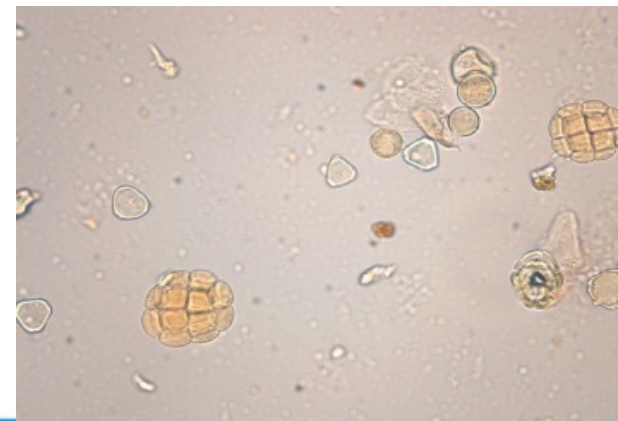
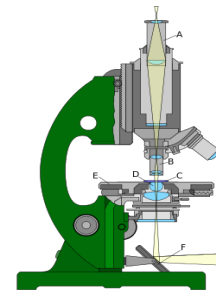
Some pollen indicators reveal the major
geographical areas of origin honey

(East Europe, China, Italy, Central America, etc.)

Others may show us the real origin of the honey
from areas where there are natural protected
areas and not polluted



Compare pollen spectrum of honey
with pollen spectra known, typical of
each region



International Commission Honey IHC

The International Honey Commission
(**International Commission Honey - IHC**)

It was formed in 1990 to
standardize and harmonize

The analytical procedures for the control of honey
all over the world,
taking into account the Codex Alimentarius Standard Methods
Honey and EU Directive



OBJECTIVES

- work out better and new analysis methods of honey and the other bee products
- inform members of the group on current aspects of quality and control of honey and other bee products
- work out standards for other bee products besides honey
- work out quality criteria for specific honeydew honeys





Istituto Zooprofilattico Sperimentale
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President:

Gudrun Beckh (Germany)

Vice-presidents:

Teresa Sancho (Spain)

and

Ligia Bicudo de Almeida Muradian (Brasil)



Each year organizes an IHC
proficiency testing scheme
(Ring Test)
**for laboratories that perform
the melissopalynological analysis**





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In this way:
reinforce the technical and expertise
of the participating laboratories.
It is evaluated
harmonization between the methods
and the results provided





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The Ring Test
is coordinated by

Dr. Maria Dimou

Laboratory of Apiculture and Sericulture Aristotle

University of Thessaloniki, Greece

and

Dr. Panagiota Gotsiou

Mediterranean Agronomic Institute of Chania, Greece



Ring test IHC 2016

They attended in the ring-test

54 analysts from

51 different laboratories (22 accredited)

located in

Europe and West Asia



Austria, Belgium, Croatia, Cipro, France, Germany,
Greece, Hungary, Italy, Netherlands, Poland,
Portugal, Russia, Serbia, Spain, Switzerland, Turkey



Each laboratory received from

Dr. Paulo Antonio Russo Almeida of laboratorio Apicola da UTAD della Universidade de Tràs os Montes e Alto Dauro in Portogallo (Ring Test 2016)

and from

Prof. Maria Carmen Seijo Coello from the Faculty of Science of the University of Vigo in Spain (Ring test 2015)

a

sample of 100 grams of honey

labeled with a code for each participant.

The sample was stored at temperature
between 10 and 20 ° C until analysis.



For each participant was given a module with the relevant identifier to write the results

was asked to:

define 4 different forms of pollen specifying the percentage

perform qualitative analysis

perform the quantitative analysis (optional)

define the botanical origin of the honey

define the geographical origin of honey (optional)

calculate the percentage of starch in honey (optional)



The Ring test was evaluated on 3 levels:

- 1) Correct identification of the pollen types**
- 2) Classification of the pollen type as nectar or not**
- 3) Correct interpretation of results for botanical origin and geographical origin**



- With the results of all the participants it was made the statistical analysis by calculating the parameters: the median value, average, ds, a soundness standard, deviation, assigned value, standard assigned value increase, the target value, standard deviation, reproducibility, z- score.
- The value assigned to each parameter was calculated from the average value of the results that were presented by the participants.
- The z-score were considered satisfactory if less than or equal to 2



Ring Test IHC 2016

Pollini to identify and count	z-score melissopalynological qualitative analysis of 52 participants Satisfactory z-score: < equal 2	Botanical origin derived from participants	Geographical origin derived from participants
<i>Echium</i>	51 1 Satisfactory > 2 <3	Lavender honey: 56% of participants with only one analysis melissopalynological 51% of participants with melissopalynological analysis, physical chemical and sensory: in 4 cases the purposes of determining botanical changed Multiflora: 40% Echium: 2% Other: 2%	Country of origin (Portugal) was correctly identified by 17% analysts. The remaining 83% said wider geographical origin but still relevant and correct (Mediterranean area, the Iberian Peninsula, southern Europe)
<i>Lavandula pedunculata</i>	48 3 1 Satisfactory > 2 <3 > equal 3		
<i>Cytisus</i>	41 11 Satisfactory > 2 <3		
<i>Anarrhinum bellidifolium</i>	40 9 2 Satisfactory > 2 <3 > equal 3		



Ring Test IHC 2015

Pollini to identify and count	z-score melissopalynological qualitative analysis of 52 participants Satisfactory z-score: < equal 2	Botanical origin derived from participants	Geographical origin derived from participants
<i>Cytisus/Ulex</i> type	41 7 2 Satisfactory > equal 3	<u>Multifloral:</u> 68% of participants with only one analysis melissopalynological 67% of participants with melissopalynological analysis, physical chemical and sensory: in 9 cases the purposes of determining botanical changed Chestnut: 6 % Rubus: 4 % Eucalyptus: 4 % Other: 18 %	Country of origin (Spain) was correctly identified by 52% % analysts. The remaining 48% said wider geographical origin but still relevant and correct (Mediterranean area, the Iberian Peninsula, southern Europe)
<i>Castanea</i>	47 3 Satisfactory > equal 3		
<i>Eucalyptus</i>	46 4 Satisfactory > 2 <3		
<i>Cytisus/Ulex</i> type & <i>Rubus</i>	44 5 1 Satisfactory > 2 <3 > equal 3		



References used primarily

Melissopalynological analysis:

Armonized methods of melyssopalinogy – W. Von Der Ohe, L. Persano Oddo, M. L. Piana, M. Morlot, P. Martin (Apidologie 2014)

Botanical characterization:

Main European honeys: descriptive sheets – L. Persano Oddo, R. Piro (Apidologie 2014)

Geographic characterization:

Textbook of melyssopalinogy – G. Ricciardelli D' Albore (1997)



Considerations

**RATING
BOTANICAL ORIGIN
AND OF
GEOGRAPHICAL ORIGIN**



**EXPERTISE AND PROFESSIONAL
EXPERIENCE ACQUIRED IN TIME**

combined use

**MELISSOPALYNOLOGICAL
ANALYSIS**

SENSORY ANALYSIS

ANALYSIS OF CHEMICAL PHYSICS

**It allows you to overcome any doubts
due to the presence of pollen
“iporappresented” or
“iperappresented”
that can cause problems in
the interpretation botanical origin**





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Ring test IHC 2015-2016: CONCLUSIONS



**The Ring Test put in evidence analyst skills
though sometimes it has come to the same results
but with different botanical characterization**

**It is believed that a further improvement
the skills can be done through:**

Use of :

- reference pollen collection,
- POLLnet database
- standardized list of the species of pollen
- online database for the possible combinations of the most common pollens by country, region, continent, etc.
- organization of workshops, etc.



Thank you for your Kind Attention

*We Thank Dr. Maria Dimou, Dr. Panagiota Gotsiou
and the International Honey Commission
for the valuable work done*

