



# **COOP ITALIA AND FOOD FRAUD. A CLOSER LOOK AT THE CASE OF EXTRAVIRGIN OLIVE OIL**

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**COOP is a retail company.**

**COOP is a system of Cooperatives sharing the same brand in Italy.**



**COOP ITALIA is the National Consortium of Consumers Cooperatives.**

**The most relevant roles are:**

- Buying and marketing strategies and others activities for all the COOP system;**
- Development, management and control of the Private Label products.**

<http://www.e-coop.it/web/guest/i-prodotti-coop>

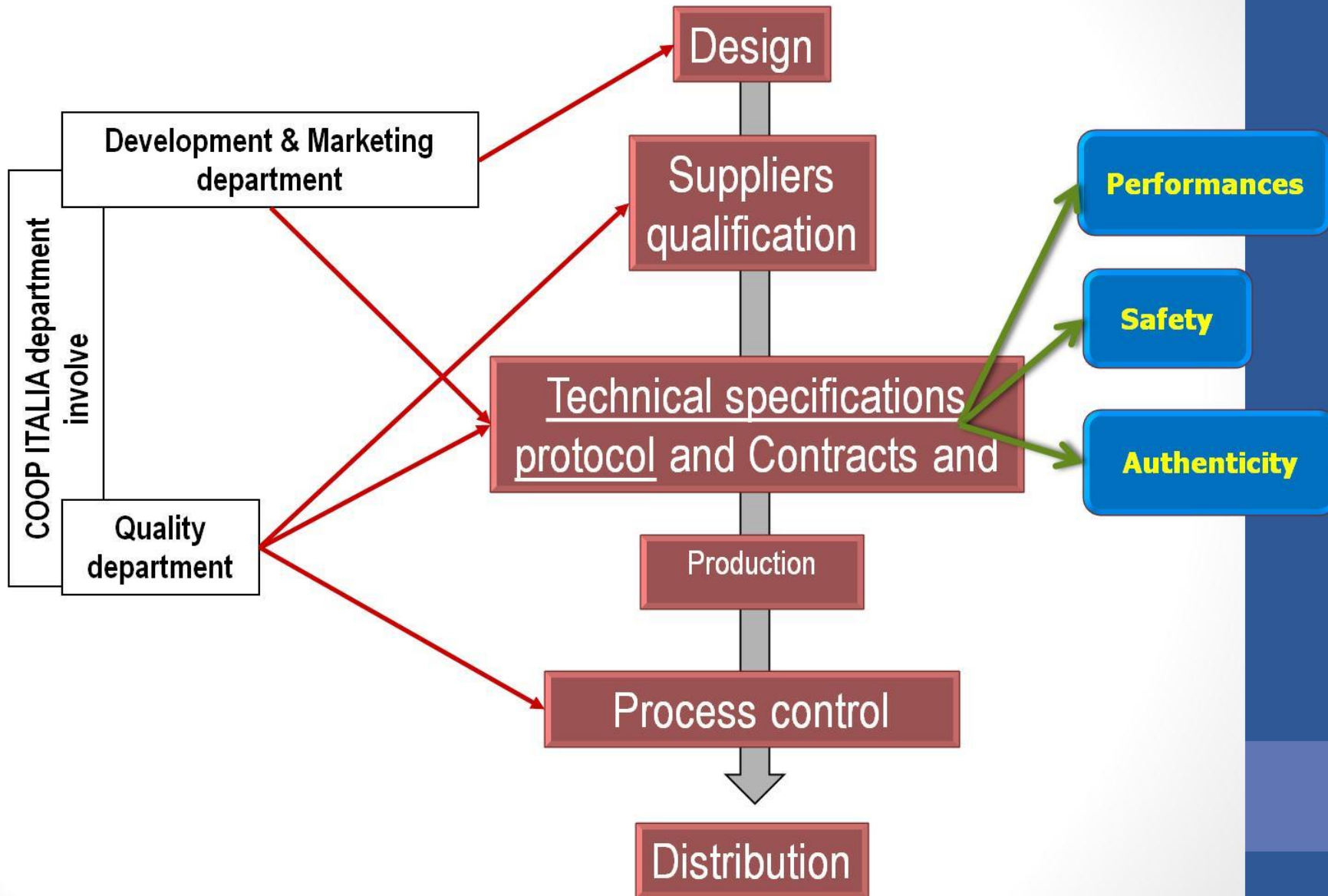


Category	Number of products
Grocery	951
Fresh products	354
Meat and fish	230
Fruit and vegetables	727
Non food	910
<b>TOTALI</b>	<b>3172</b>

**COOP ITALIA must guarantees the safety, the performance and the authenticity of COOP Private Label products.**

**COOP Brand Products are produced by hundreds of national and international Suppliers.**

# COOP private label products



## • **COOP Safety, Origin and Food Authenticity**

Significant activities carried out by COOP to ensure the origin, authenticity and monitoring of emerging risks, are:

### ➤ **Fraud identification:**

- Risk assessment of food fraud in the different supply chain;
- Audit, traceability verification and deep knowledge of the supply chain by Product Specialist;
- Conventional and unconventional analysis;
- Involvement of Suppliers to develop innovative methods of analysis.

### ➤ **Monitoring of the Origin of raw materials,** to increase the level of guarantees for the Consumers.

# COOP ITALIA laboratory

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graph LR; A[COOP ITALIA laboratory] --> B[Scientific support on emerging risks and food safety and authenticity]; A --> C[Analytical innovation]; A --> D[National and international partnership and collaboration [i.e. FOODINTGRITY (stakeholder) Ist. Zooprofilattico di Brescia (Italian government institute)]]
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**Scientific support on emerging risks and food safety and authenticity**

**Analytical innovation**

**National and international partnership and collaboration [i.e. FOODINTGRITY (stakeholder) Ist. Zooprofilattico di Brescia (Italian government institute)]**

# COOP ITALIA laboratory

## DNA identification:

- fish species identification,
- animal species identification in meat and dairy products

Food authenticity with DNA analysis

GMOs

Allergens



**Biology area**

Microbiology with DNA markers



**Chemistry area**

Chemical contaminants

Natural, processing and packaging contaminants



**Sensory area**

Sensory tests

Sensory instrumental techniques

# COOP Olive oil products



## Main EVOO products

- 2 type of 100% italiano
- 100% italiano organic
- «Mediterraneo» (from EU)

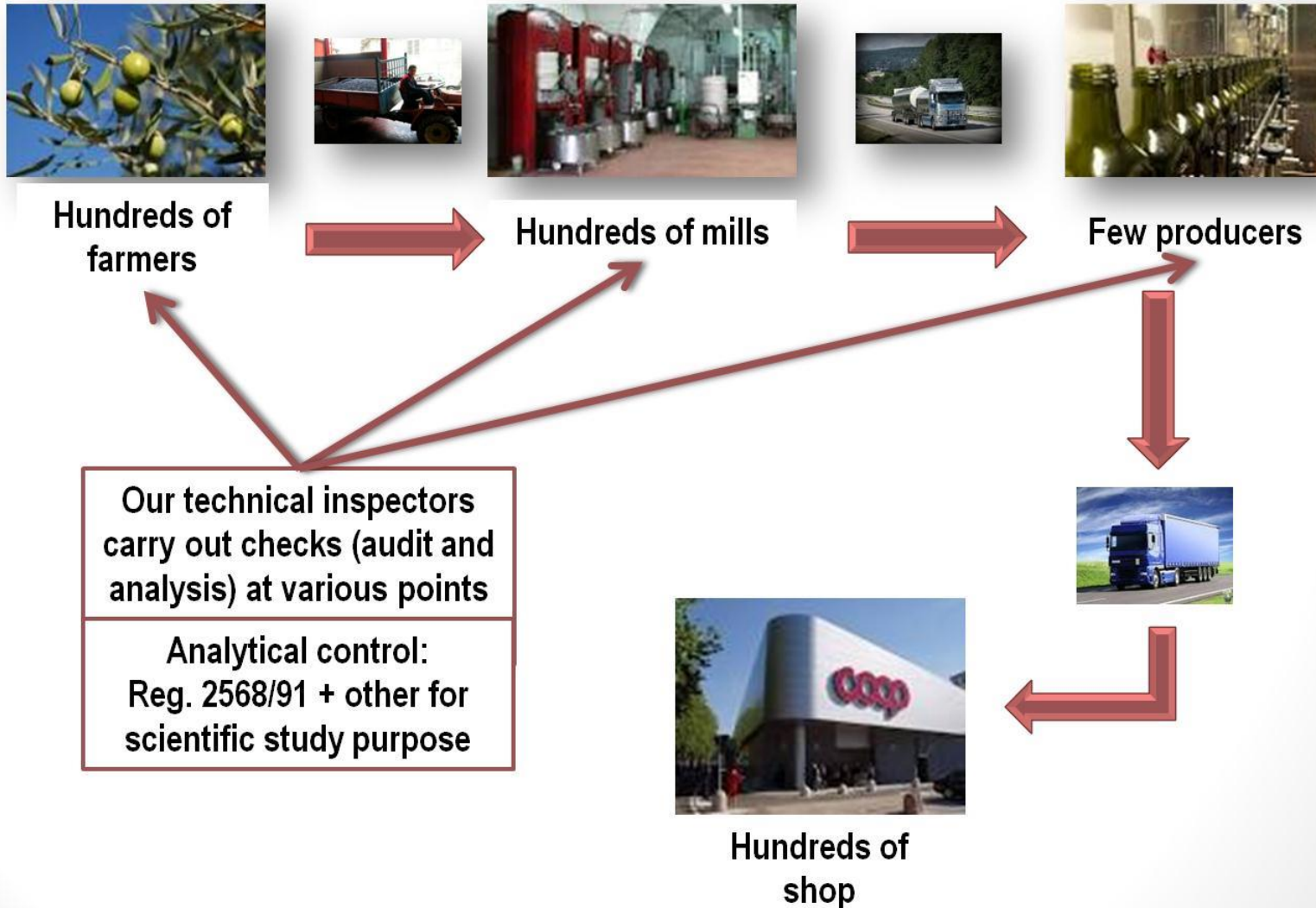


## 4 regional + 3 particular EVOO

- 100% italiano non filtrato
- olive taggiasca 100% italiano
- nuovo raccolto
- toscano IGP
- Umbria Colli Martani DOP fior fiore
- Terra di Bari DOP fior fiore
- Val di Mazara DOP fior fiore



# COOP Olive oil chain

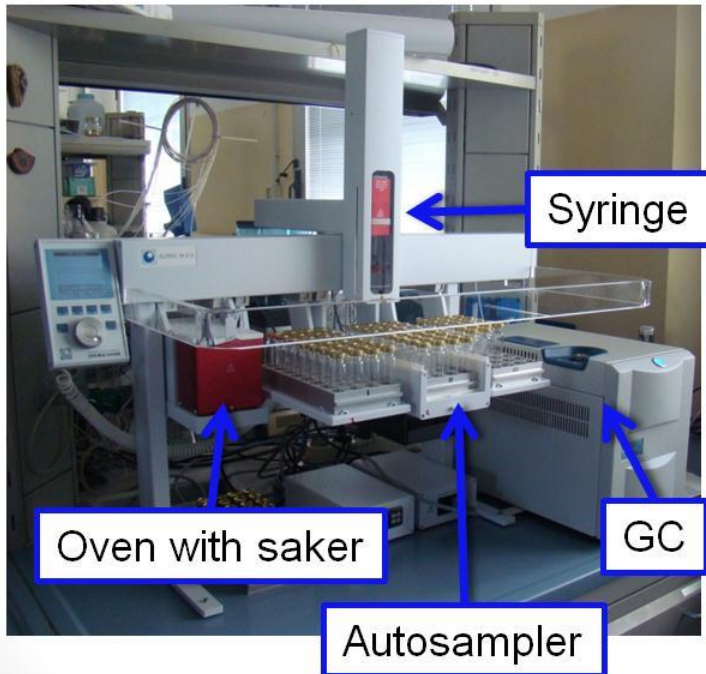


# A chemical approach to authenticity: fingerprinting of volatile compounds

- Fingerprinting is an important untargeted analytical approach to food authenticity.
- In particular, the aromatic profile is an interesting tool to characterize a food product.
- This type of approach can be applied to different food matrices.



**Heracles II** is a FAST gas- chromatograph with double columns and FID detectors; it works as an “advanced electronic nose” defining a global profile of volatile compounds present inside the product.



### Distinctive features

- Prelievo: 5 ml of headspace
- Absorption trap to concentrate the sample injected
- 2 columns of different polarity
- high performance GC
- Analytical time for one sample: 100 s
- 2 Flame Ionization Detectors

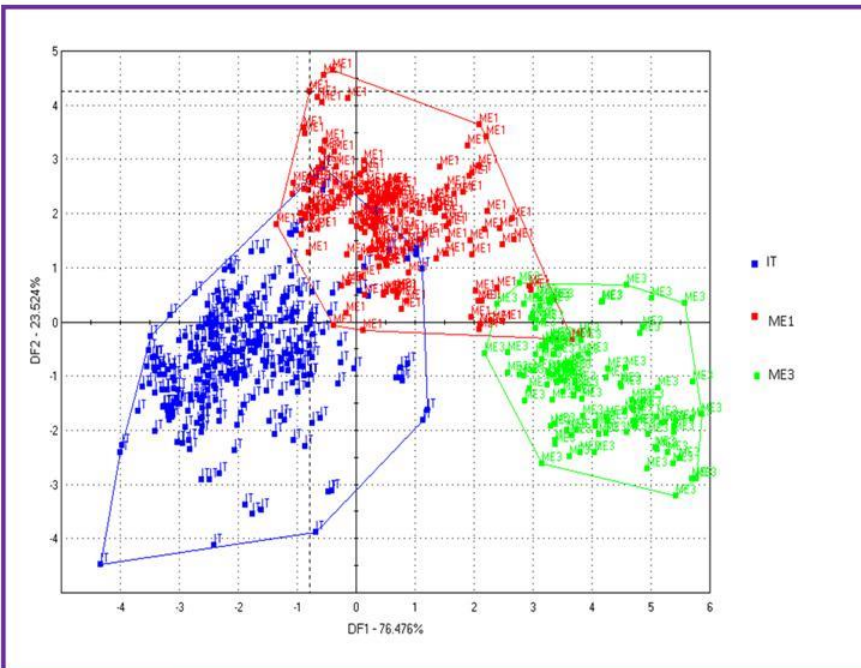




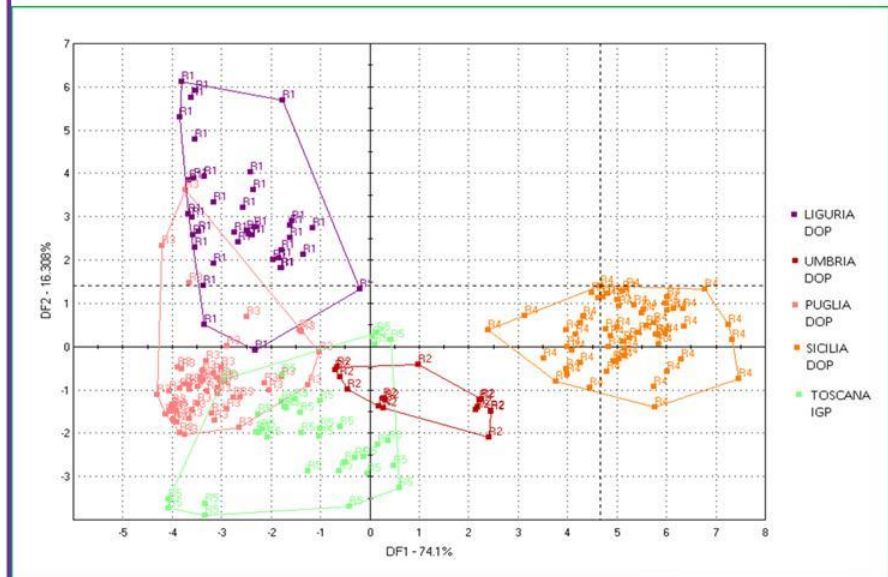
# Geographical origin identification of extra virgin olive oil

- 1 step:** analysis of samples (more than 100 samples for typology);
  - 2 step:** multivariate analysis to select sample and create a predictive model;
  - 3 step:** analysis of unknown samples and assignment to a predictive statistical model
- Total samples analyzed at 2016 about 1500.

## BLEND ITALIANO vs UE vs UE+noUE



## COOP LABEL POD and PGI



# WHAT ELSE?

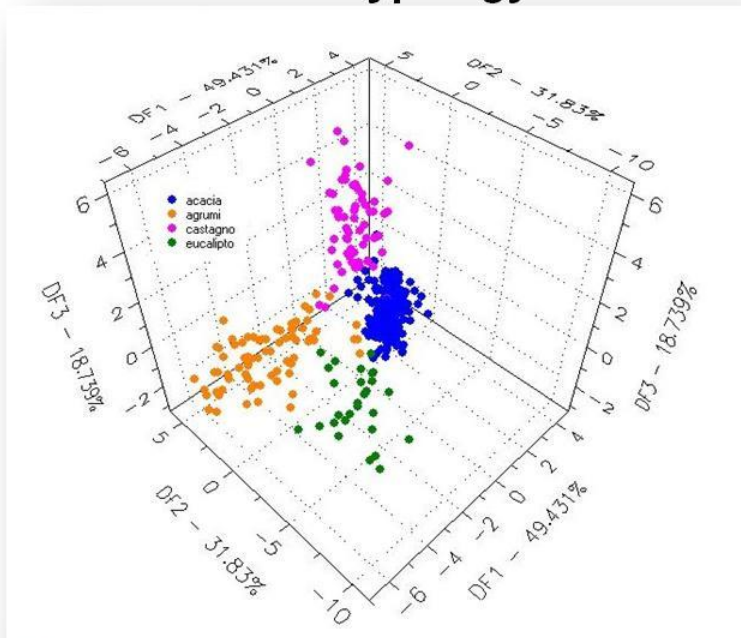
- **Extra virgin olive oil sensory defect**
- **Mozzarella cheese DOP vs noDOP**
- **Coffee origin (India, Brasile, Etiopia etc.)**
- **Coffee blend (Arabica and Robusta)**
- **Goat milk mixed with Cow milk**
- **Fish: fresh vs. defrosted**



# Geographical origin identification and botanical typology of honey

- 1 step:** analysis of standard samples (more than 100 samples for typology);
- 2 step:** multivariate analysis to create a predictive model;
- 3 step:** analysis of unknown samples and assignment to a predictive statistical model

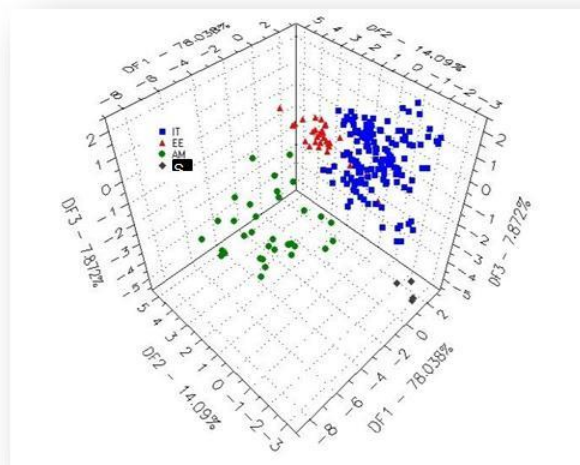
## Botanical Typology



DFA of volatile compounds fingerprinting of honey samples of different botanical origin. Acacia (blue), Citrus (orange), chestnut (pink), eucalyptus (green).

## Multi Flower honey

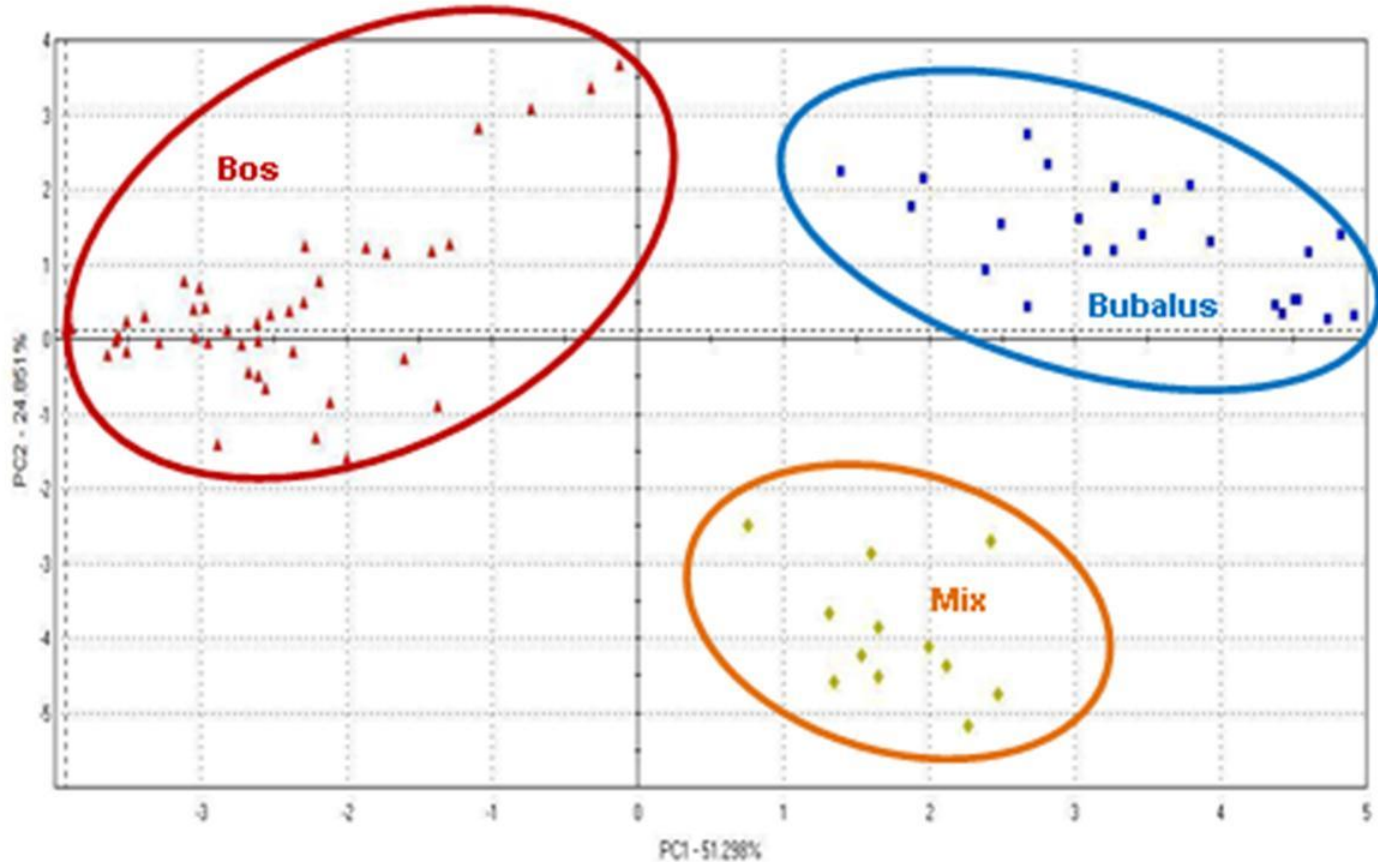
## South America vs Europe



DFA of volatile compounds fingerprinting of multiflower honey samples of different geographical origin. Italy (blue), East-Europe (red), south-America (green), Spain (grey).



# Identification of mozzarella cheese from different animal species



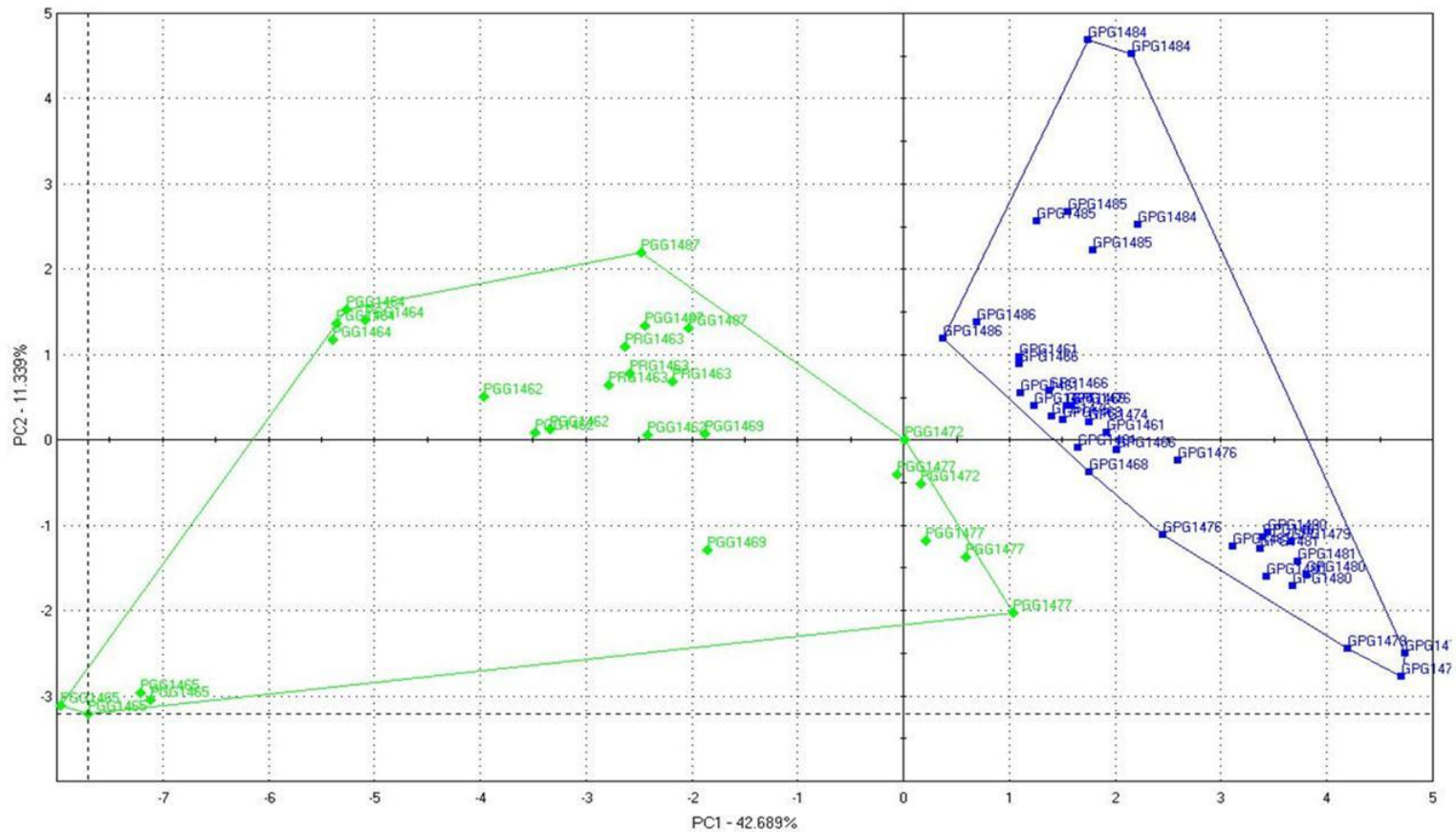
PCA analysis of mozzarella. Cow mozzarella (red), Bubalus mozzarella (blu) and mix (orange).



# Grated cheese identification

## PARMIGIANO REGGIANO- GRANA PADANO

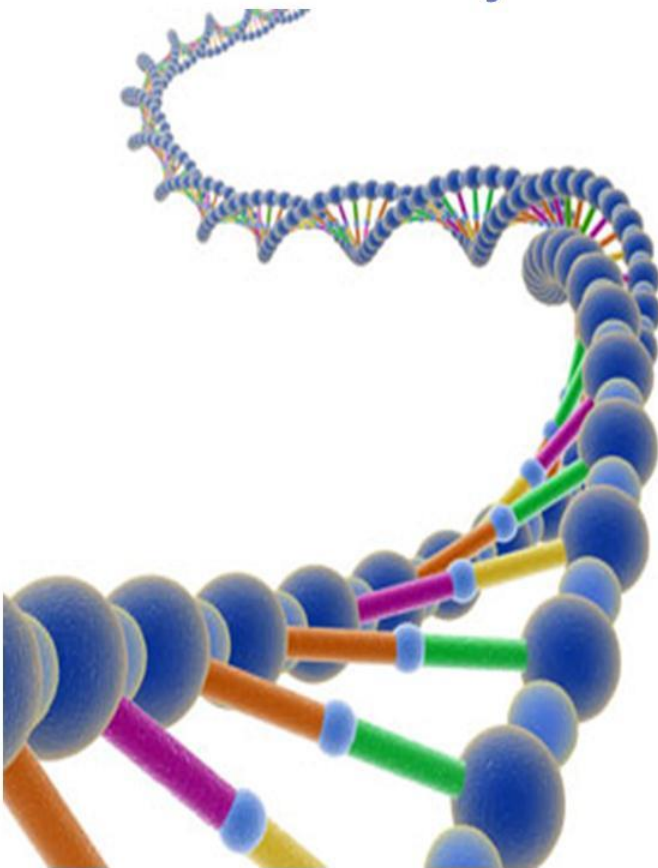
Discrimination index = 33





# Multidisciplinary approach

DNA analysis



Volatile compounds  
fingerprinting



# DNA analysis

## Specie/cultivar identification

