New solutions in TABLE OLIVES chain

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InnoFood SEE Final Conference March 26-27, 2014 Bari, Italy

2012/2013 crop year – Estimated balance

International Olive Council, Key figures on the world market for table olives, 100th session of the IOOC (Madrid, Spain), 19–23 November 2012.

b) Includes extra-Community trade only.

2012 / 13 crop year - Estimated balance - (1 October 2012 - 30 September 2013)

(1,000 TONNES)

	Production	Imports	Consumption	Exports
Brazil	0,0	100,0	100,0	0,0
Canada	0,0	27,0	27,0	0,0
E.U./27	666,0 a)	97,0 b)	627,5	245,5 b)
Croatia	1,0	1,5	2,0	0,5
Egypt				
U.S.A				
Iran				
Israel				
Japan				
Jordan	30,0	1,0	30,5	0,0
Lebanon	20,0	2,0	25,0	5,0
Libya	3,0	4,5	7,5	0,0
Morocco	100,0	0,0	32,0	70,0
Palestine	9,0	0,0	8,0	0,0
Russian Fed.	0,0	68,0	68,0	0,0
Syria	172,0	0,0	132,0	35,0
Tunisia	24,0	0,0	22,0	2,0
Turkey	410,0	0,0	350,0	70,0
Other countries	154,5	111,0	225,5	36,5
TOTAL	**2.315,0**	**583,0**	**2.510,0**	**625,0**

European Production of table olives corresponds to about 670 thousand of tons per year

Spain, **Greece** and **Italy** are the most important european producers with their 450, 130 and 74 thousand of tons per year, respectively

0 Nil or under 300 tonnes

a) Of which:

	Cyprus	Spain	France	Greece	Italy	Portugal
2012/13	2,8	450,0	1,2	130,0	74,0	8,0

b) Includes extra-Community trade only.

Evolution of Worldwide Table Olives Production and Consumes

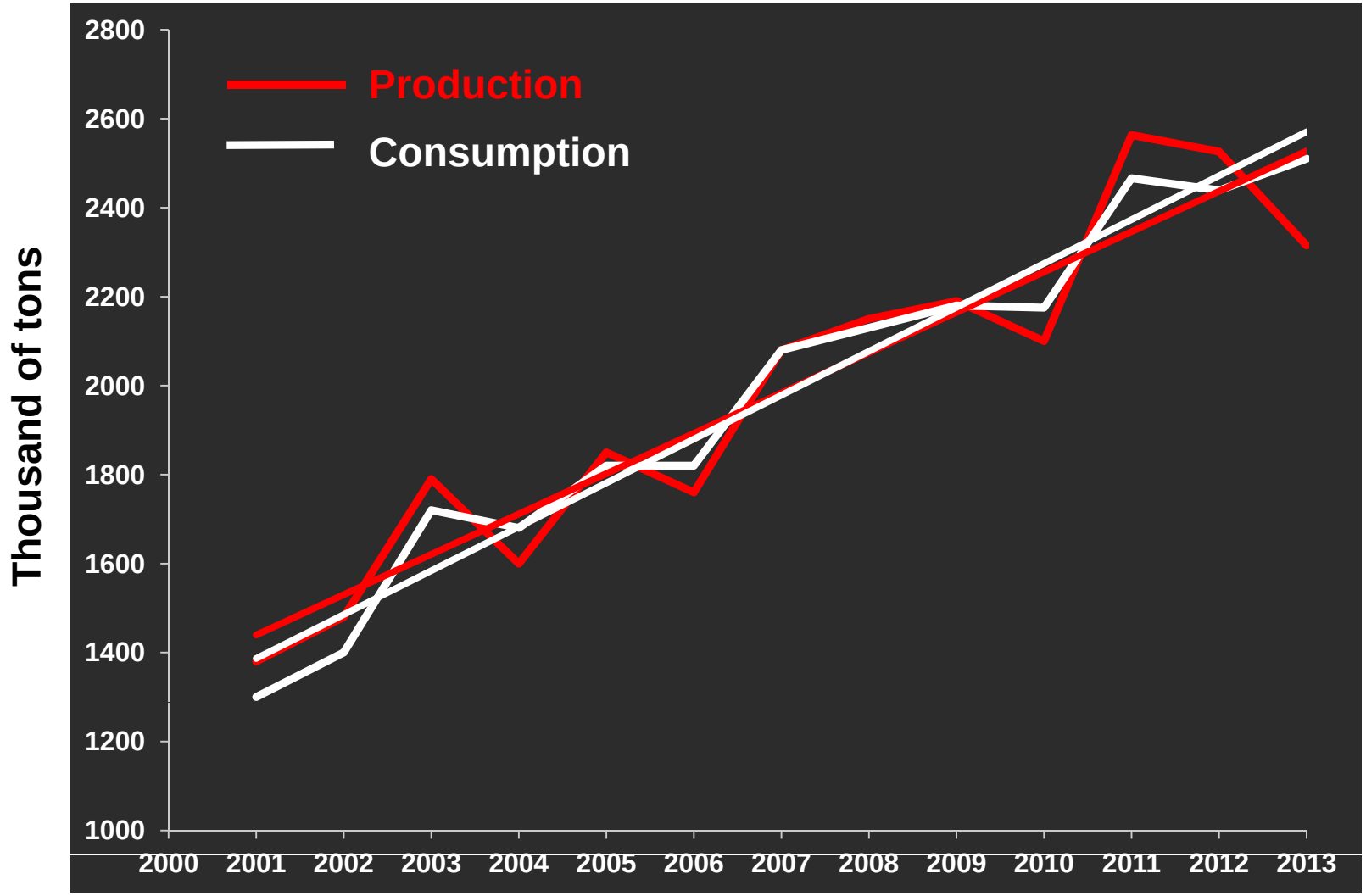


Table olive sector in Italy

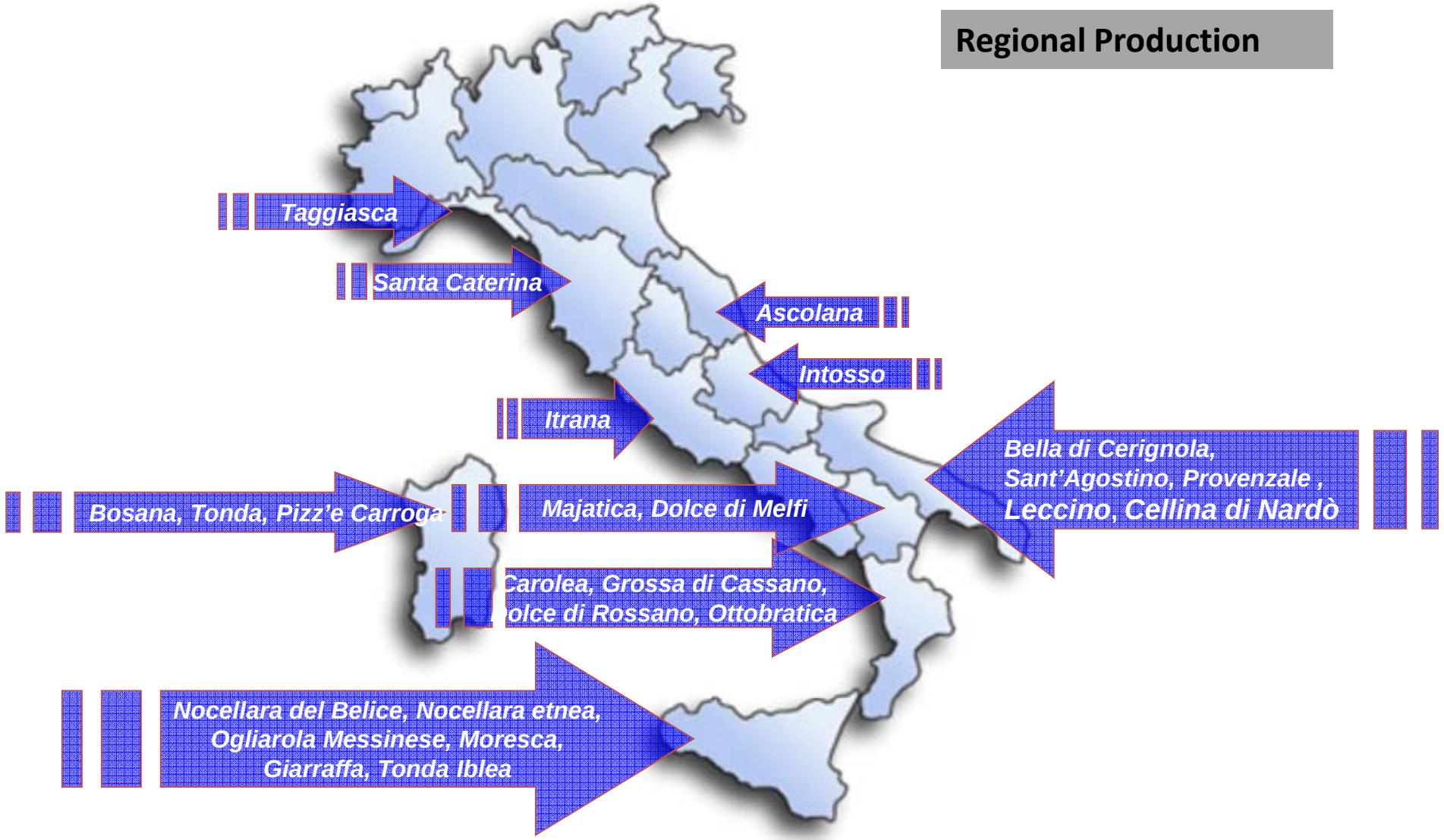


Table olive sector in Italy

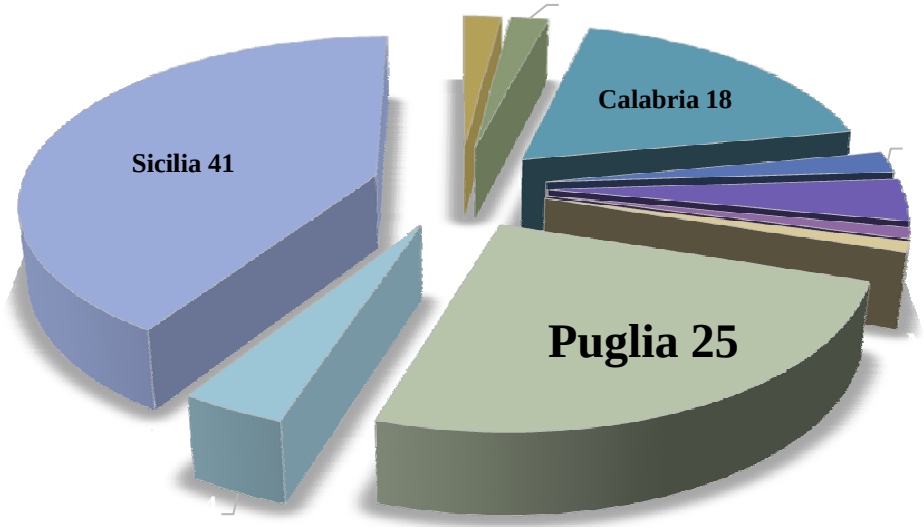
ISTAT Data
Italy: table olive production corresponding to about 70.000 tons per y

Table olives: 2 % of the national olive production

3,8 % European Mean of Producing Countries

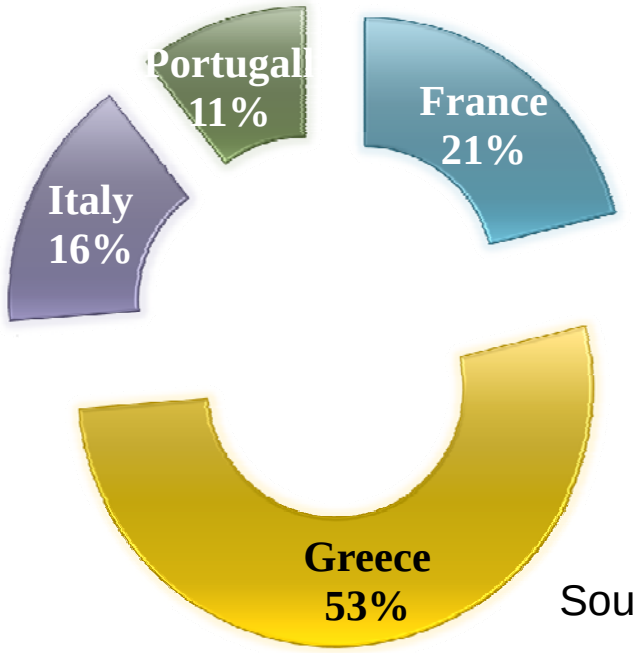
ITALY: High potential for development of the sector table olives

Italian Production



Source: Elaboration Istat Unaprol data

Table olives PDO and PGI in Europe



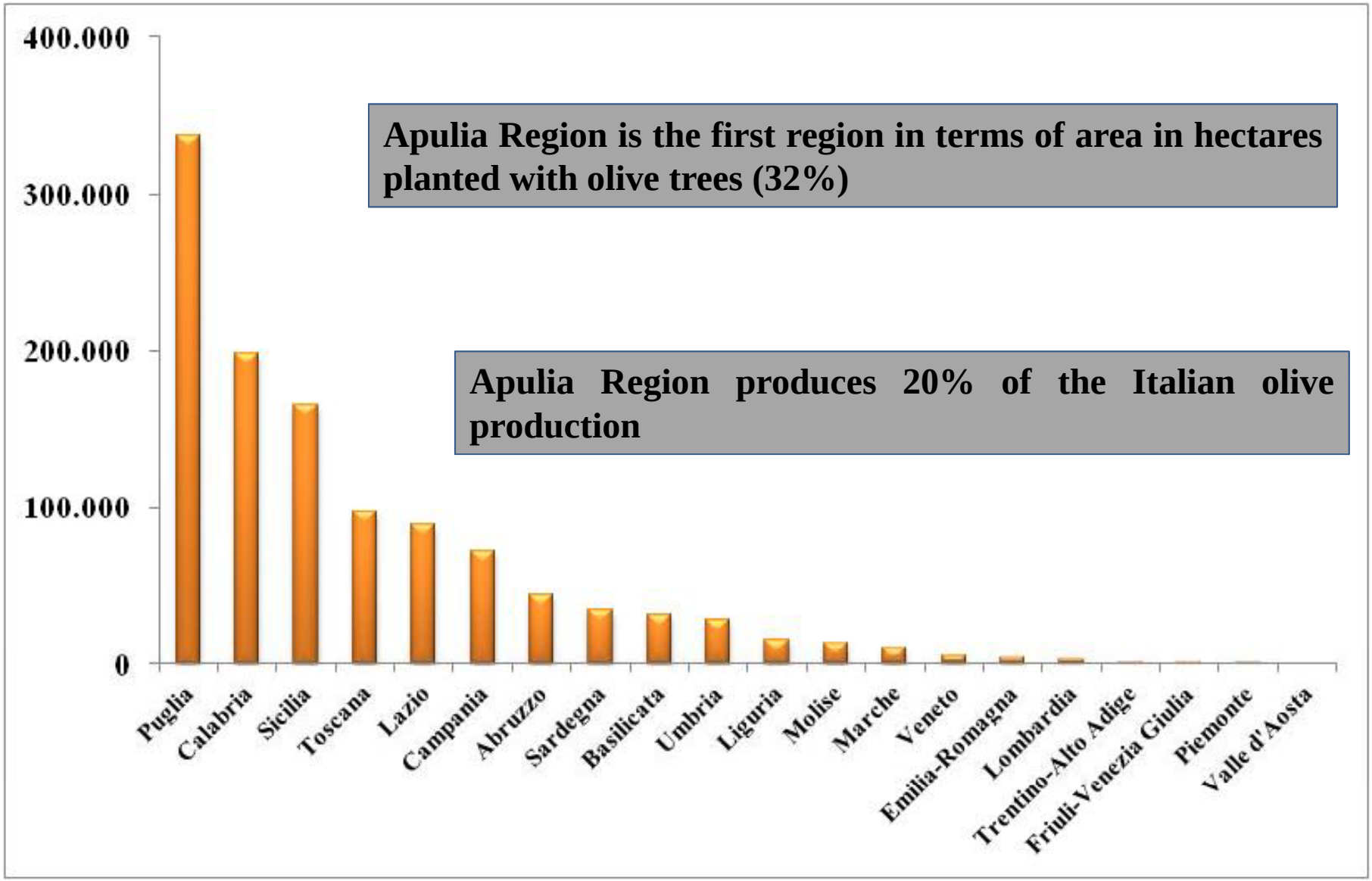
PDO and PGI in UE for table olives

Source: European Commisson

PDO		Cultivar
Marche/ Abruzzo	Oliva ascolana del Piceno	Ascolana tenera
Puglia	La Bella della Daunia	La Bella di Cerignola
Sicilia	Nocellara del Belice	Nocellara del Belice

Olive cultivation in Apulia Region

Source: Istat – Confagricoltura Puglia



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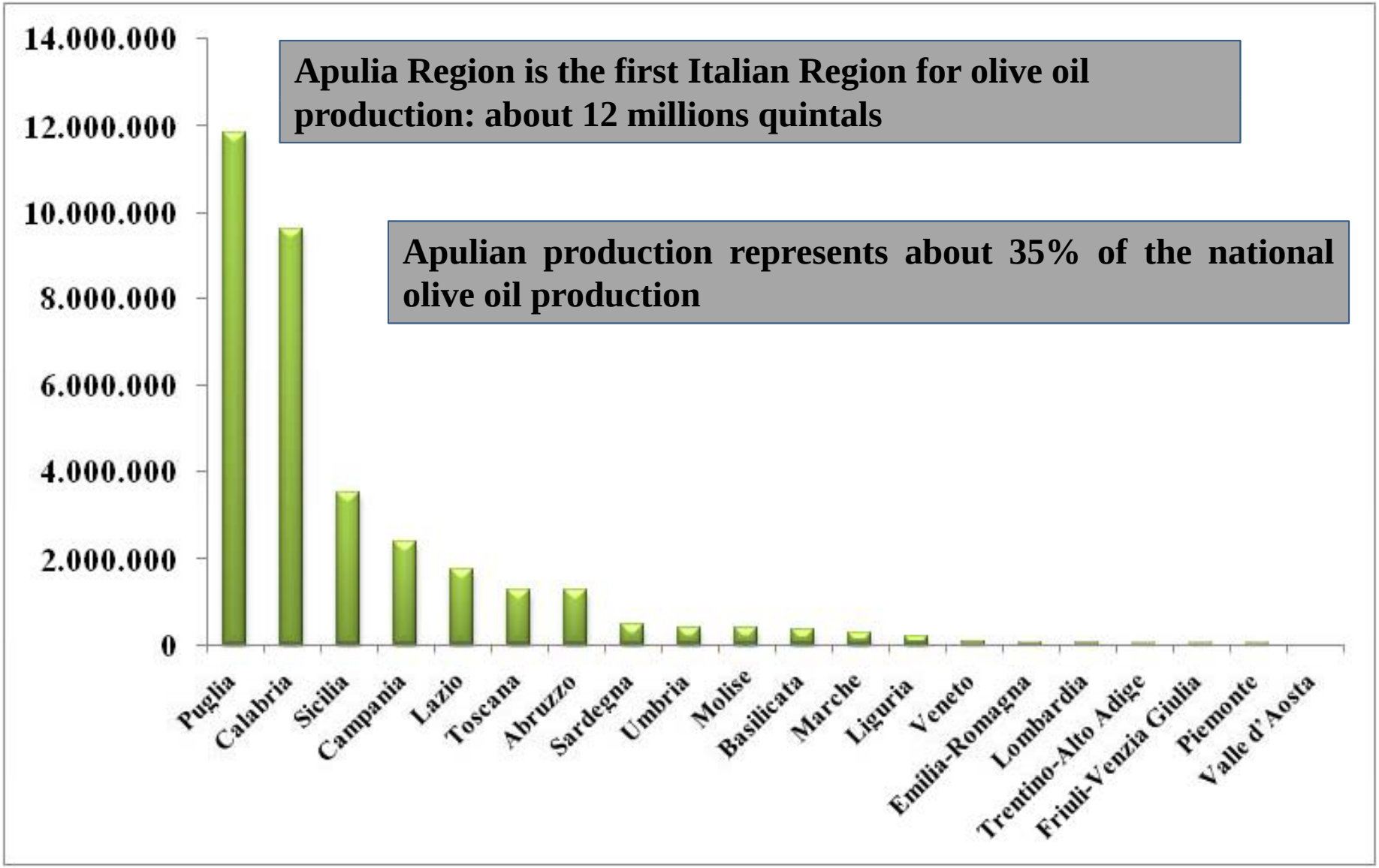

Table olive production

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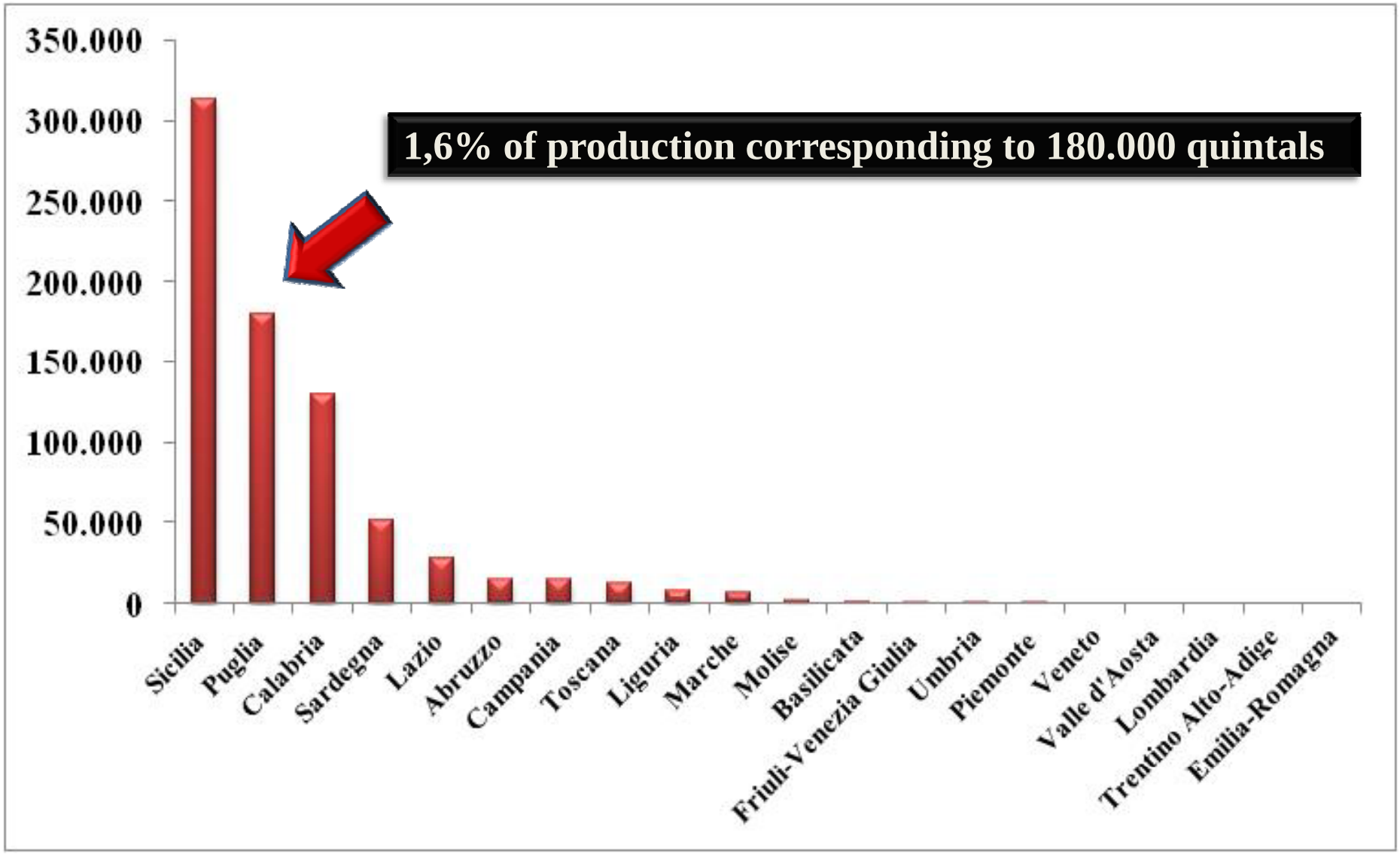


An heritage of biodiversity

Bella di Cerignola

Peranzana

Pasola

Termite di Bitetto

Cellina di Nardò

BIO-OLEA Project

OMWWs

- Bioactive ingredients
- Cosmetic applications
- Antimicrobials

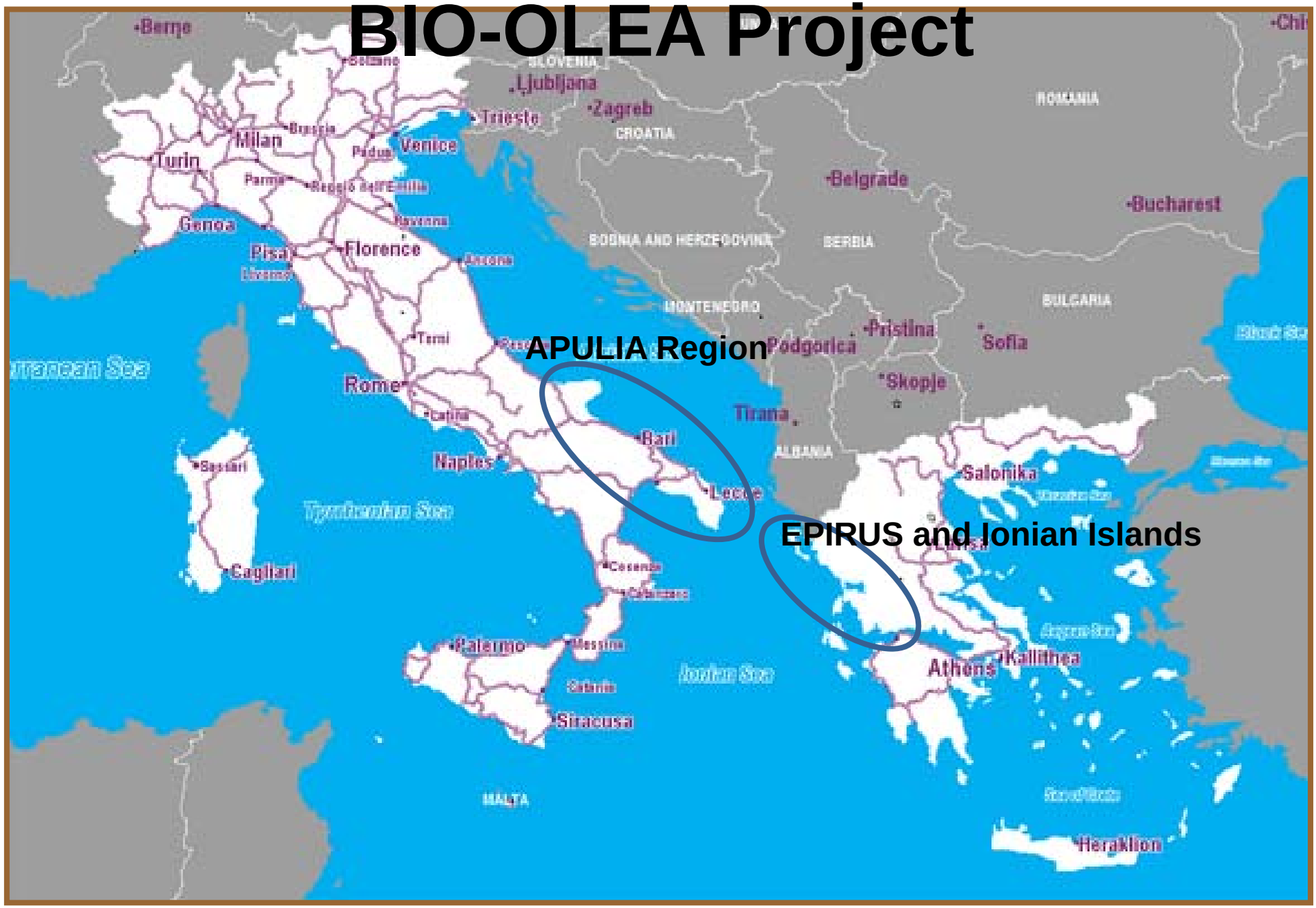
OLIVE OIL

- Processing conditions for VOO with optimum quality characteristics

TABLE OLIVEs

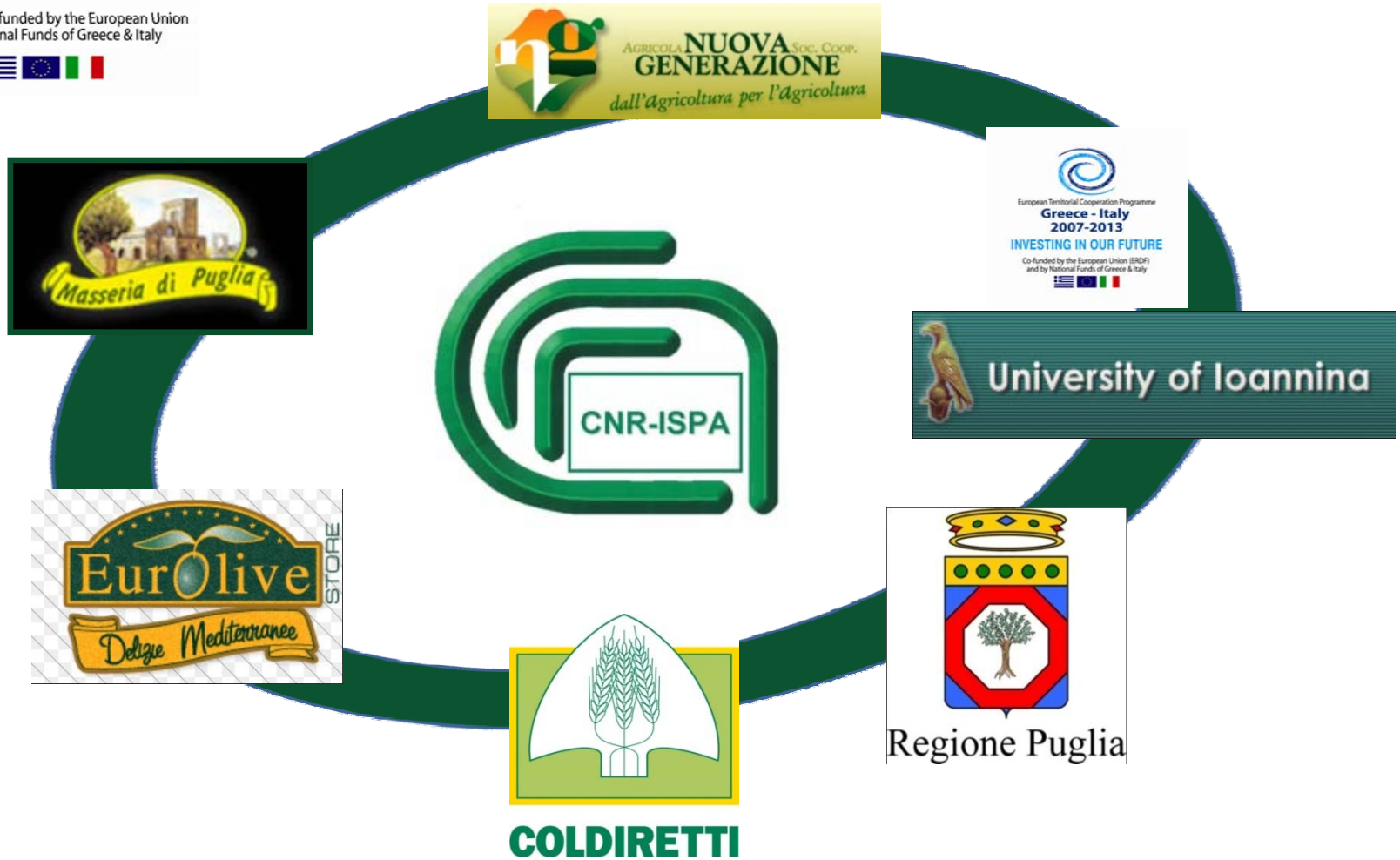
- Study of the process
- Isolation and characterization of microorganisms

BIO-OLEA Project

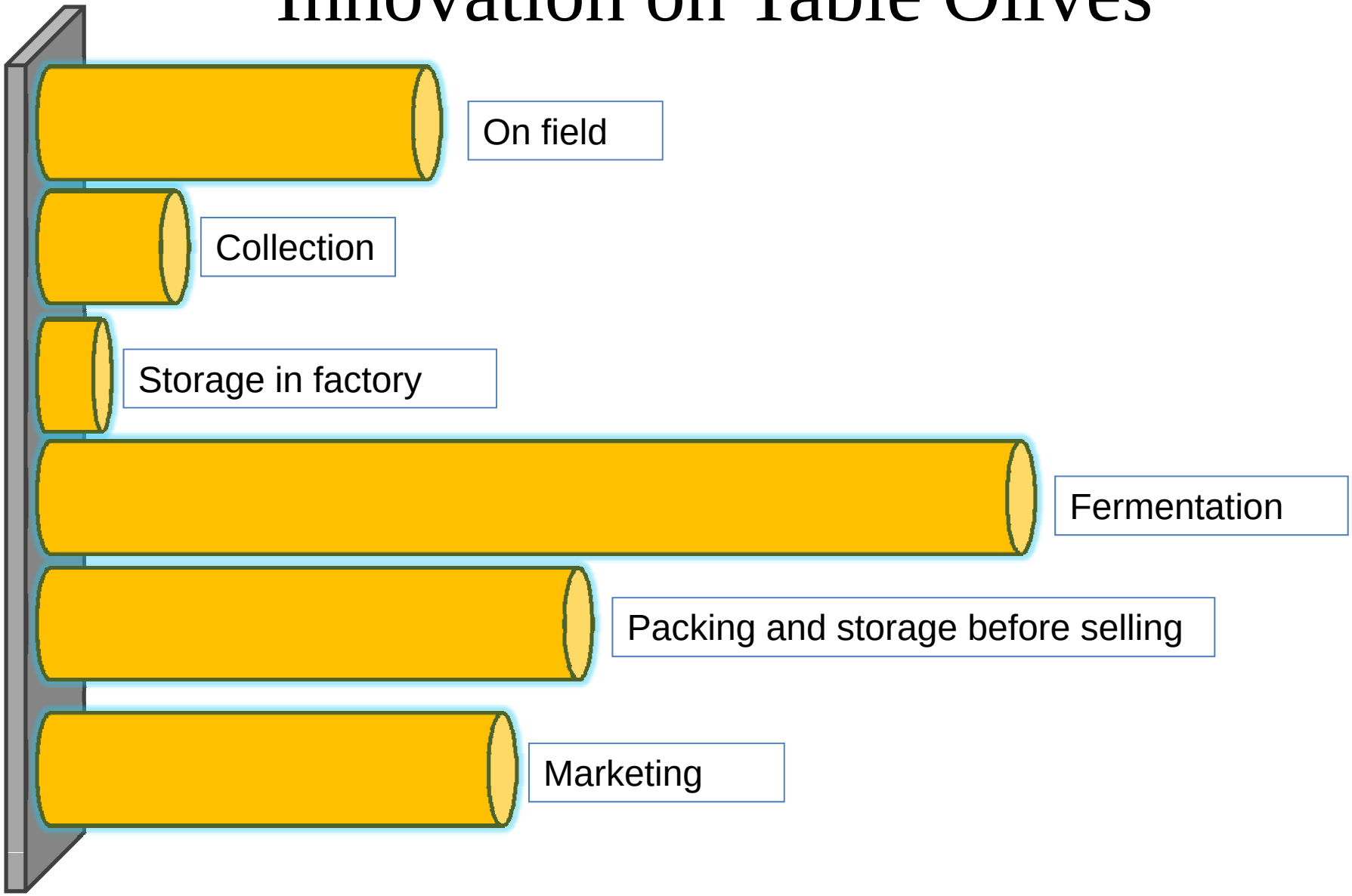


PARTNERS

European Territorial Cooperation Programme
Greece - Italy
2007-2013
INVESTING IN OUR FUTURE
The project is co-funded by the European Union and by National Funds of Greece & Italy



Innovation on Table Olives



Overview

Table olives

- **High content of tipicality and tradition**
- **High potentiality of improvement of the quality**

Process of **DEBITTERING**

METHODS

Spanish- or Sevillan-style

Californian-style

Dehydrated/ shriveled olives

Greek-style

Critical elements and problems of many factories producing table olives

Fermentation to produce typical and traditional Greek and Italian products

- Quality and safety level of the final product decided by producers according to their personal criteria and empirically
- Processes are now spontaneous, not fully predictable and strongly influenced by the physical-chemical and microbiological conditions
- Lacking of physical-chemical or microbiological controls to objectively monitor the fermentation process

Objectives

PRODUCT

Selection of autochthonous microbial starters

Improvement of organoleptic and sensorial characteristics

Preservation of the health and nutritional features

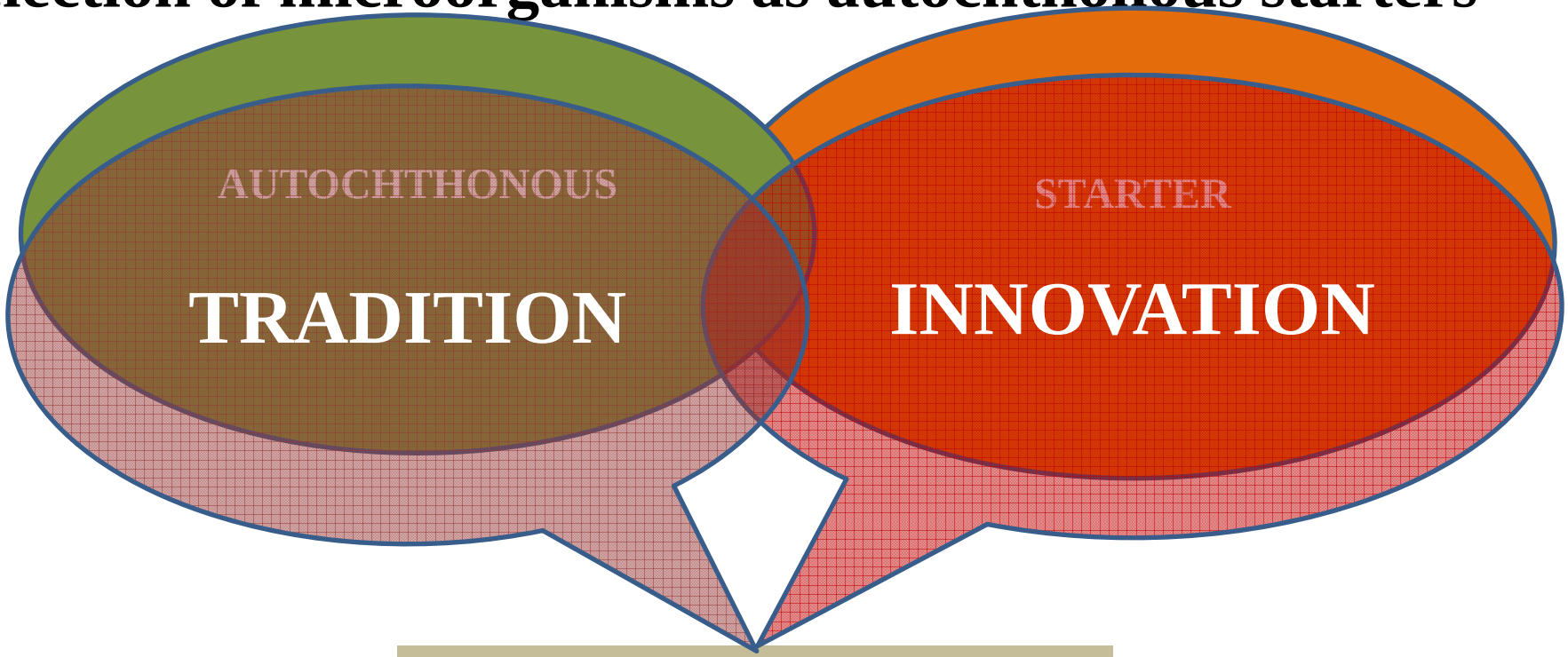
BIOTECHNOLOGIES

PROCESS

To work in **not restrictive process conditions**

Standardization of the production process: Identification of **chemical descriptors**

Selection of microorganisms as autochthonous starters



AUTOCHTHONOUS STARTER

Control of the process
Standardization
Rapid intervention and correction
Reduced time of productiom
Valorization of organoleptic and sensorial features of the cultivars

Selection of authochtonous microbial starter able to drive the fermentations

[Patent MI 2013A002063]

Set up of a selection protocol

1. First step: growth on model brines
2. Second step: presence of positive characteristics and absence of negative features
3. Third step: identification at molecular level. GRAS species
4. Fourth step: validation of technological traits at laboratory scale
5. Fifth step: test on a pilot scale in industry
6. Sixth step: test on a factory scale

Bleve G., Tufariello M., Durante M., Perbellini E., Mita G., Ramires A.F., Grieco F., Logrieco A.F. Metodo per la produzione di olive da tavola fermentate. Brevetto MI 2013A002063. Dep. 11/12/2013

YEAST and BACTERIA identification
[Patent MI 2013A002063]

YEASTS

Cellina di Nardò

Debaryomyces hansenii
Pichia anomala
P. membranifaciens
Debaryomyces carsonii
Candida tartarivorans

Leccino

Saccharomyces cerevisiae
P. membranifaciens
Zygosaccharomyces mrakii
C. boidinii

Conservolea

D. hansenii
P. anomala

Kalamàta

S. cerevisiae
D. hansenii
P. membranifaciens
Guehomyces pullulans

Bacteria

Cellina di Nardò

Lactobacillus plantarum (3)
Swaminathania salitolerans (5)
Kocuria (1)

Leccino

Lb. plantarum

Conservolea

Lb. plantarum (6)
Lb. pentosus (3)
A. senegalesis (1)

Kalamàta

Leuconostoc mesenteroides (3)
Lb. plantarum (9)

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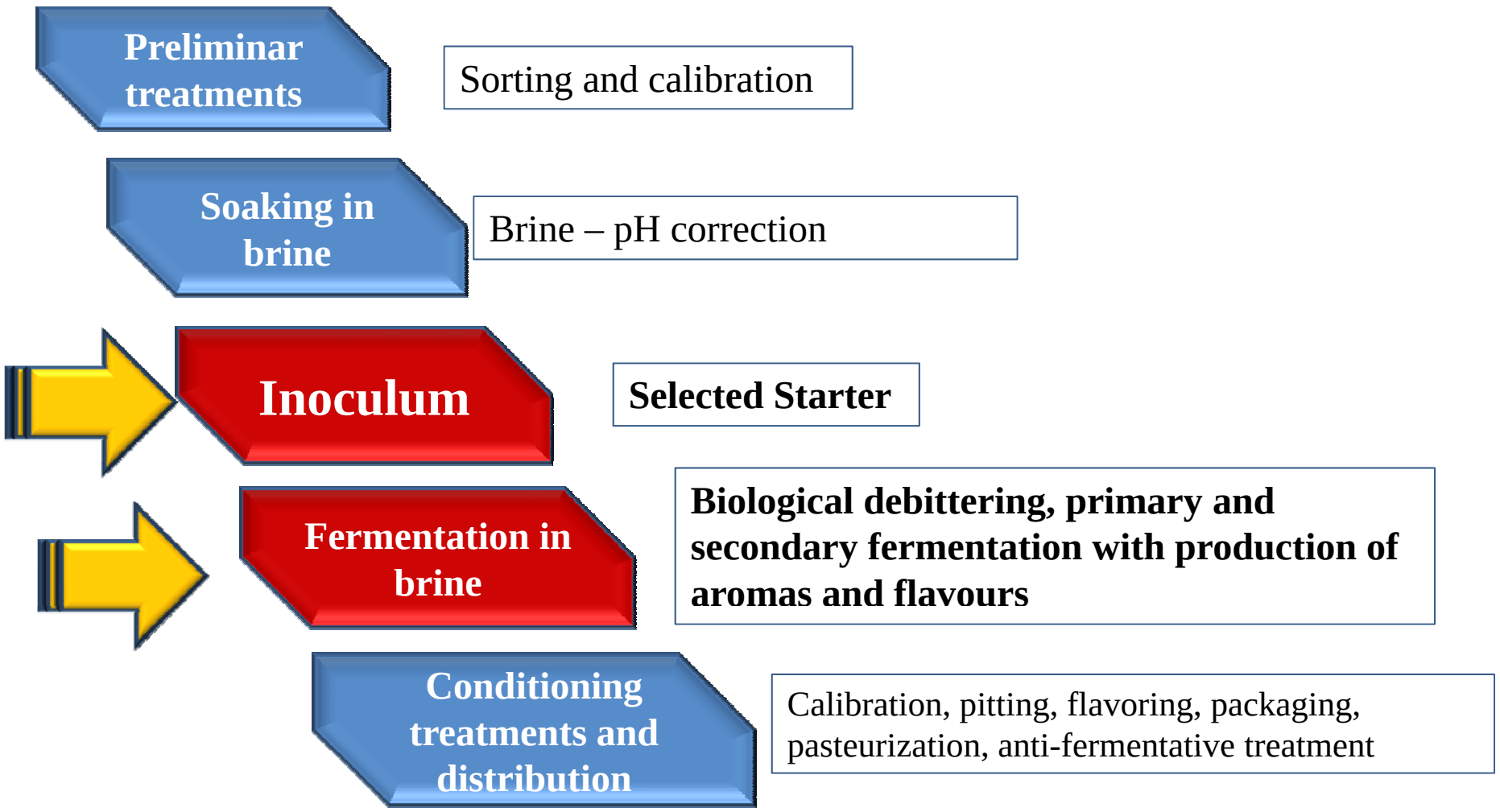
Fermentations performed using selected authochtonous microbial starters



Fermentations performed using selected authochtonous microbial starters [Patent MI 2013A002063]

Production of microbial starters

Pilot-scale fermentations

1 step:
Fermentation by selected autochthonous YEASTS

2 step
Fermentation by selected autochthonous LABs

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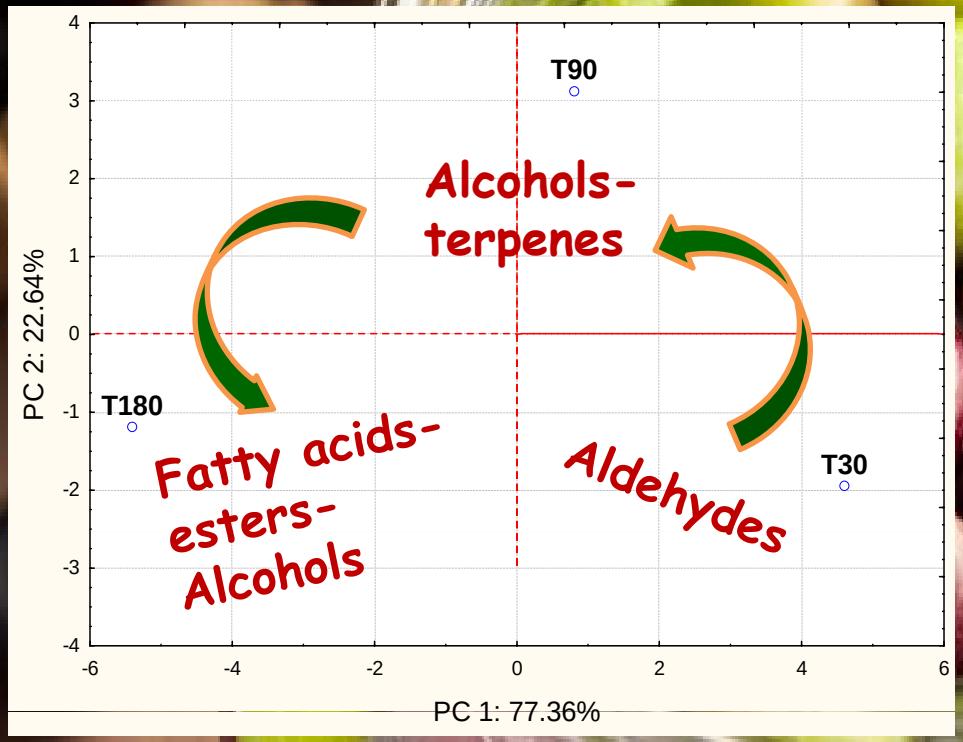
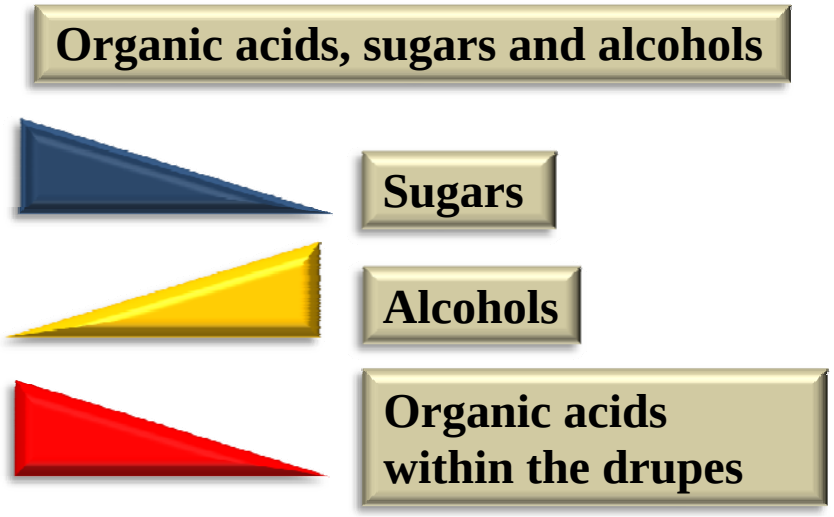
Identification of chemical descriptors suitable to monitor the correct progress of fermentations [Patent MI 2013A002063]



USE of AUTHOCHTONOUS MICROBIAL STARTER
Improvement of sensorial characteristics of the product

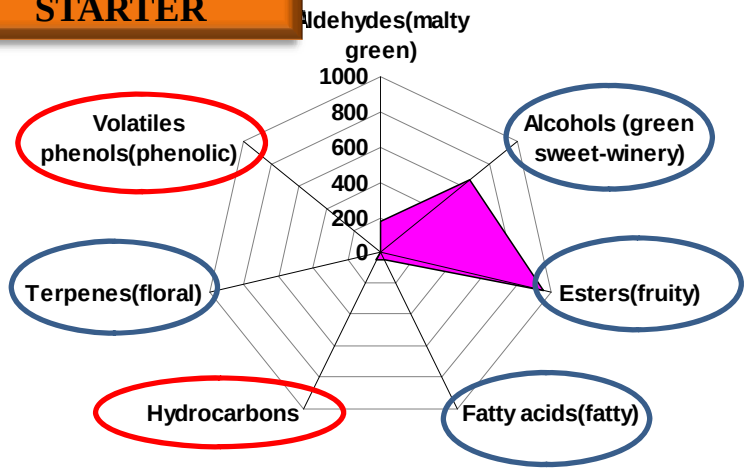


The use of starters mimics the natural fermentation reducing the process time

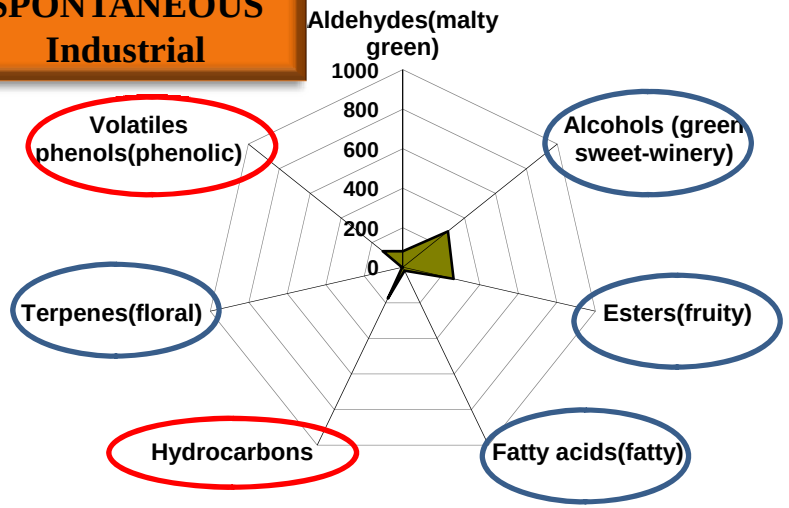
Bleve G., Tufariello M., Durante M., Perbellini E., Mita G., Ramires A.F., Grieco F., Logrieco A.F. Metodo per la produzione di olive da tavola fermentate. Brevetto MI 2013A002063. Dep. 11/12/2013

USE of AUTHOCHTONOUS MICROBIAL STARTER
Improvement of sensorial characteristics of the product

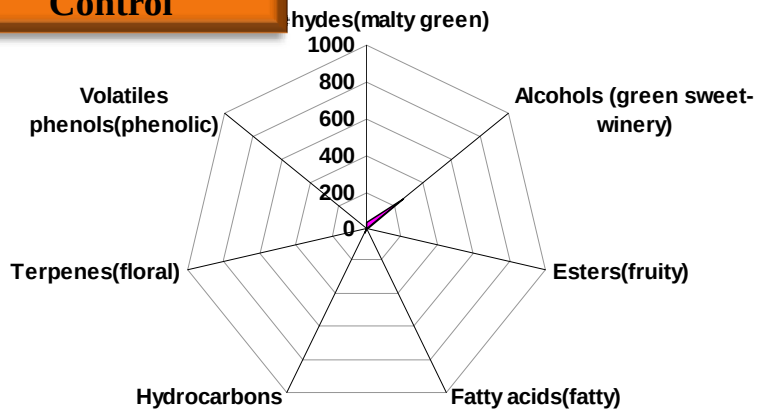
STARTER



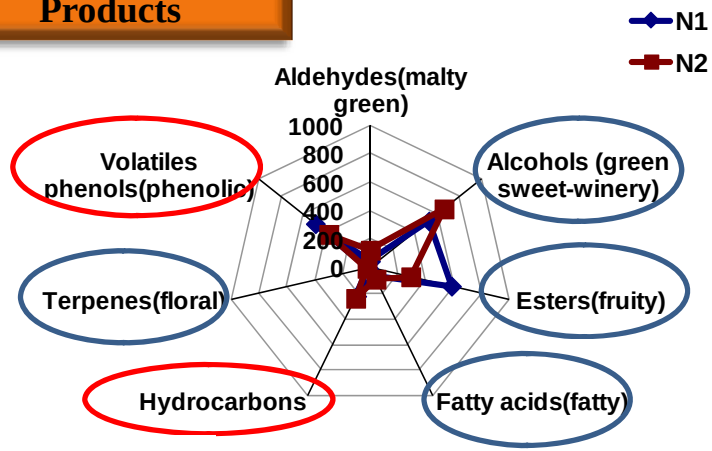
SPONTANEOUS Industrial



SPONTANEOUS Control



Commercial Products



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New aspects of table olives valorization

Sensorial traits

- Color
- Texture
- Aroma
- Flavour

Nutritional characteristics

- Source of fibers
- Source of monounsaturated fatty acids
- Source of bioactive molecules:
  - Phenolic compounds
  - Isoprenoids (Vitamines, carotenes)
  - Triterpenic acids

BIOPHENOLS, ISOPRENOIDS and TRITERPENIC ACIDS in OLIVES

Pre-clinical and early clinical studies

Pharmacological activities

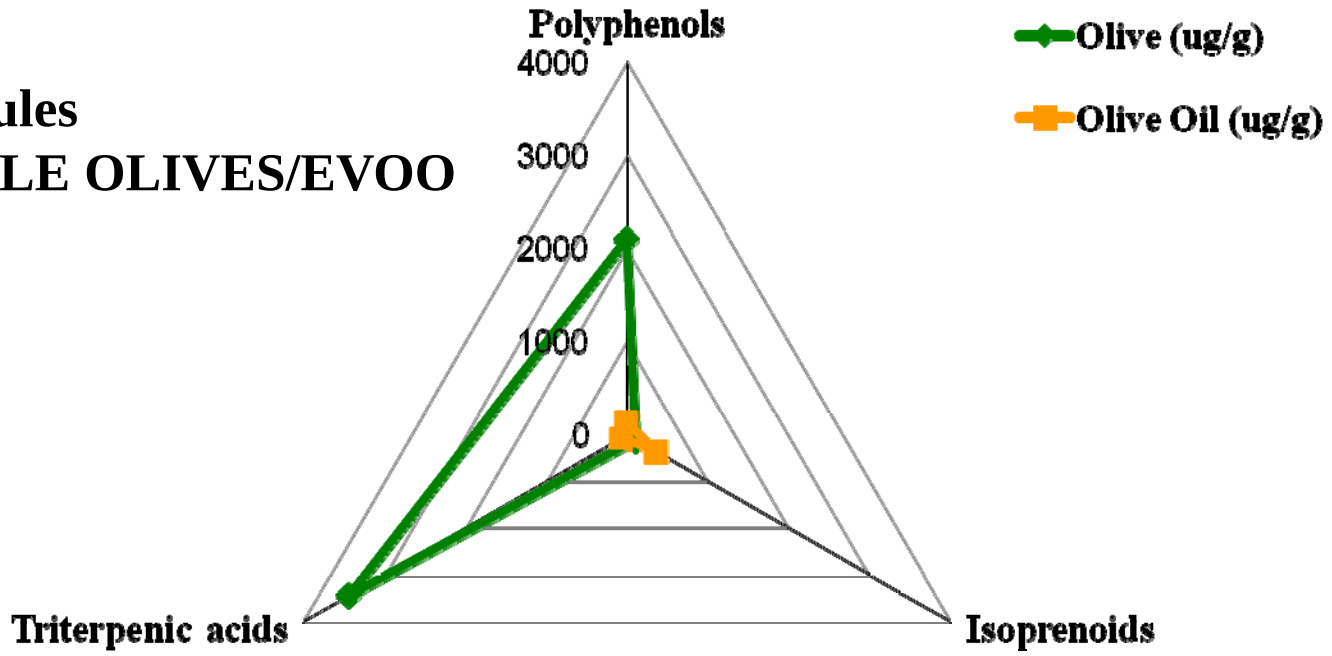
- Antioxidant
- Antiinflammatory
- Immunomodulant
- Antimicrobial and chemotherapic
- Anticancer and chemopreventive
- Prevention of cardiovascular diseases
- Prevention of gastro-intestinal diseases

Positive effects on

- Endocrine system
- Respiratory system
- Central Nervous system

High potential for the prevention and treatment of diseases and to promote human health

Bioactive molecules
Fermented TABLE OLIVES/EVOO

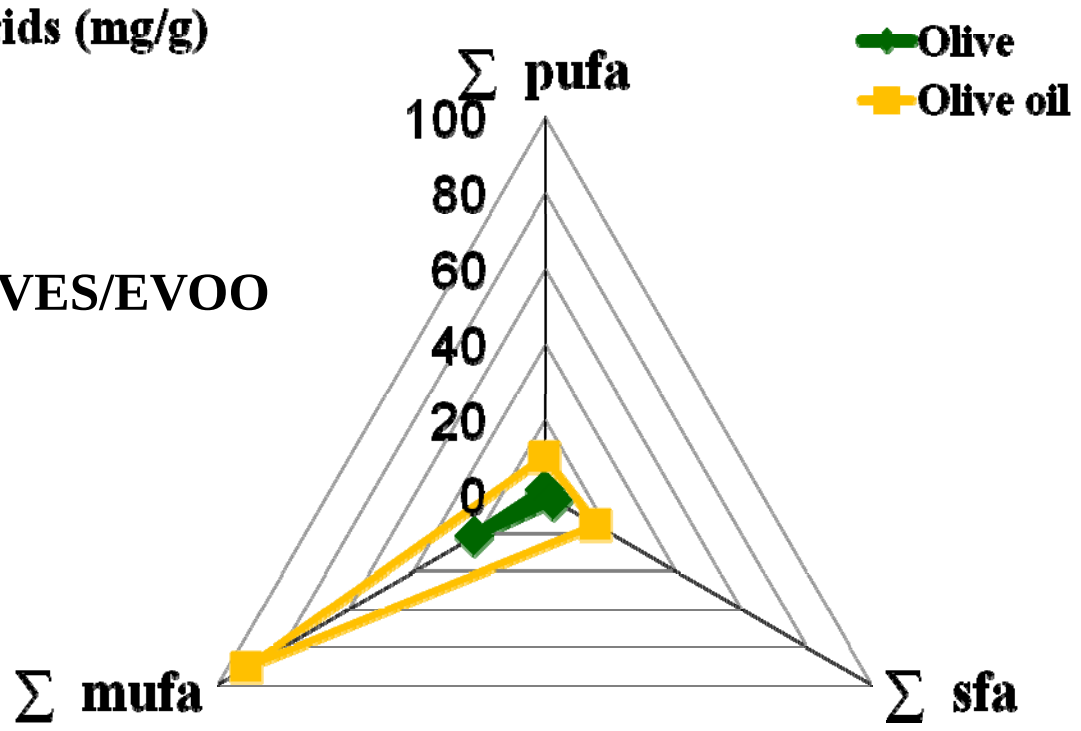


Isoprenoids
~ 3 fold in EVOO higher than in TABLE OLIVES

Polyphenols
~ 15 fold in TABLE OLIVES higher than in EVOO

Triterpenic acids
~ 48 fold in TABLE OLIVES higher than in EVOO

Bioactive molecules
Fermented TABLE OLIVES/EVOO

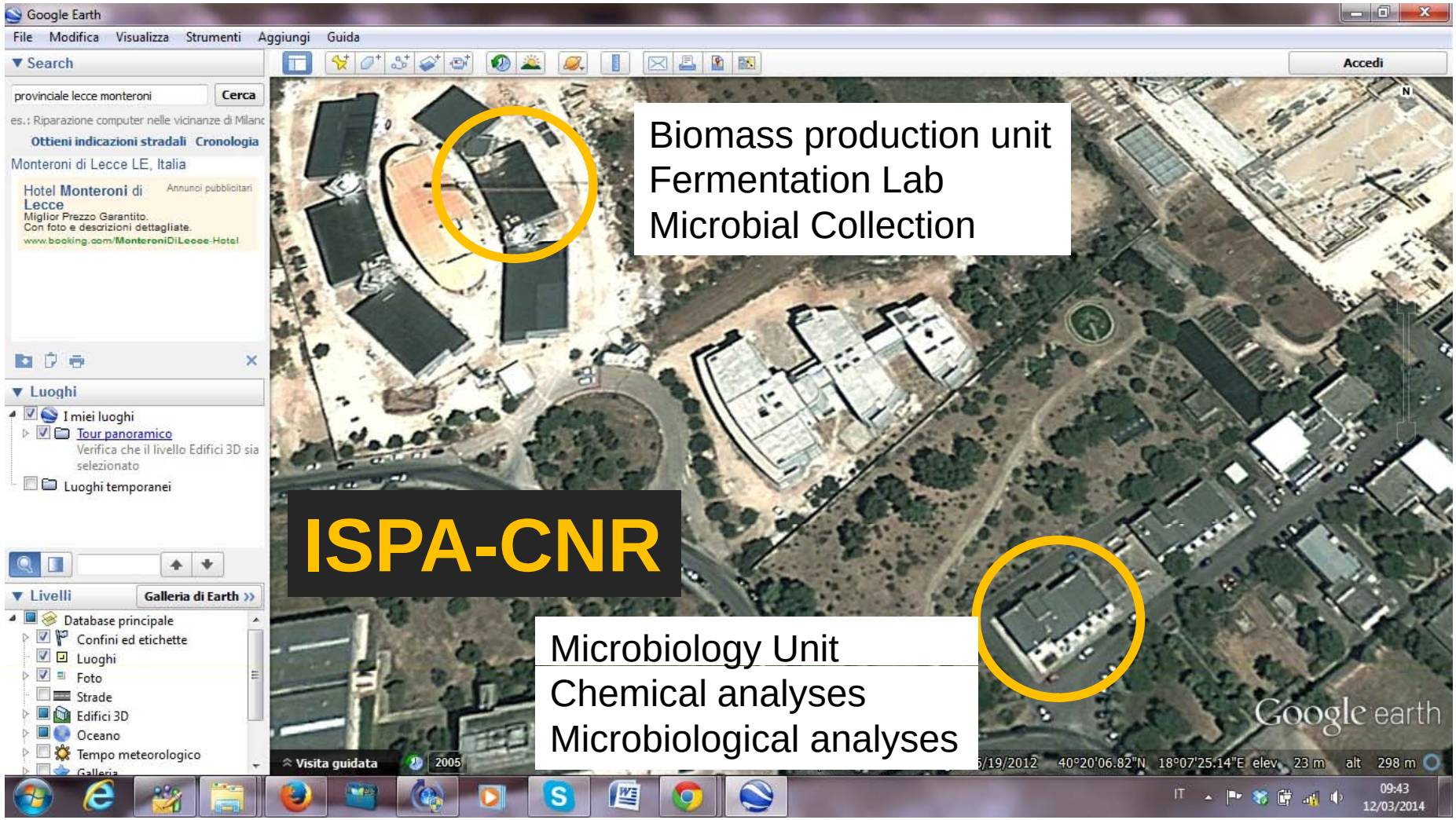


Fatty acids
~ 4 fold in EVOO higher than in TABLE OLIVES

pufa/sfa >0.4 for Olives and EVOO
Lopez et al. (2006) JAFC 54, 6747-6753

International Excellence CENTRE for TABLE OLIVES

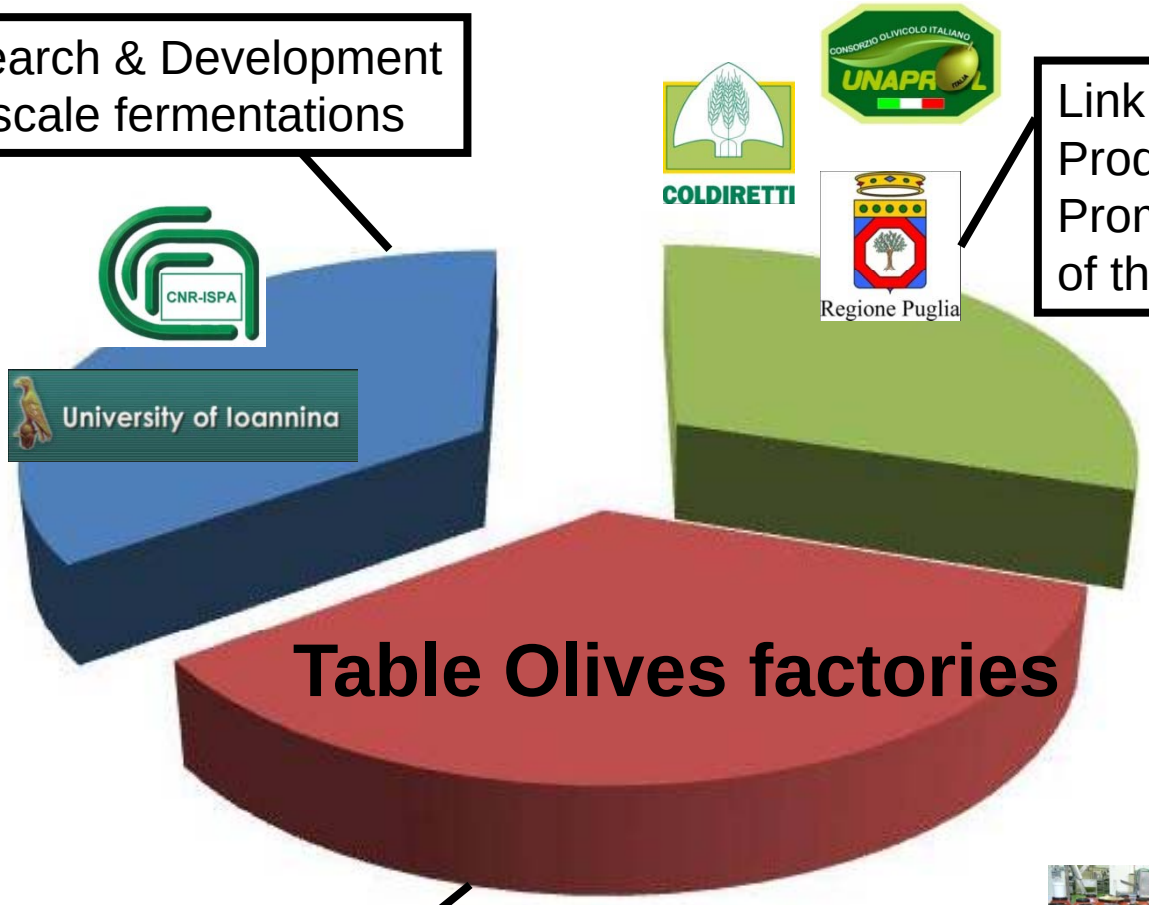
International Excellence CENTRE for TABLE OLIVES



International Excellence CENTRE for TABLE OLIVES

Research & Development
Lab scale fermentations

Link between Research and Producers
Promotion and valorization of the research products



Pilot and factory scale fermentations
Production of new products

International Excellence CENTRE for TABLE OLIVES

Objectives

- Valorization of table olives cultivars and microbial biodiversity
- Innovation along the production chain
  On field, collection of olives, storage and pre-treatment, fermentation and treatment, packaging and storage before selling, marketing, quality and safety tests and improvement
- To search and attract fundings for table olive and olive sector R&D
- Transfer of knowledge and best practices to Regional, National and Mediterranean Factories
- Creation of a platform to increase international awareness about the work performed by Mediterreanean research institutions on table olives and to promote networking activities and transfer of knowledge and best practices