ISTITUTO DI SCIENZE DELLE PRODUZIONI ALIMENTARI

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

"Utilization of biophenols from Olea Europea products - Olives, virgin olive oil and olive mill wastewater"

"Bio-Olea"

Angela Cardinali

CNR-ISPA

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

BIO-OLEA

The BIO-OLEA is an European Territorial Cooperation project "Bio-Olea " that see Italy and Greece involved in the valorization and management of their common products of *Olea Europea* cultivar and trying to solve the old problem of olive oil chain as the disposal and the reuse of OMWW.

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PROJECT PARTNERS

University of Ioannina (GR)

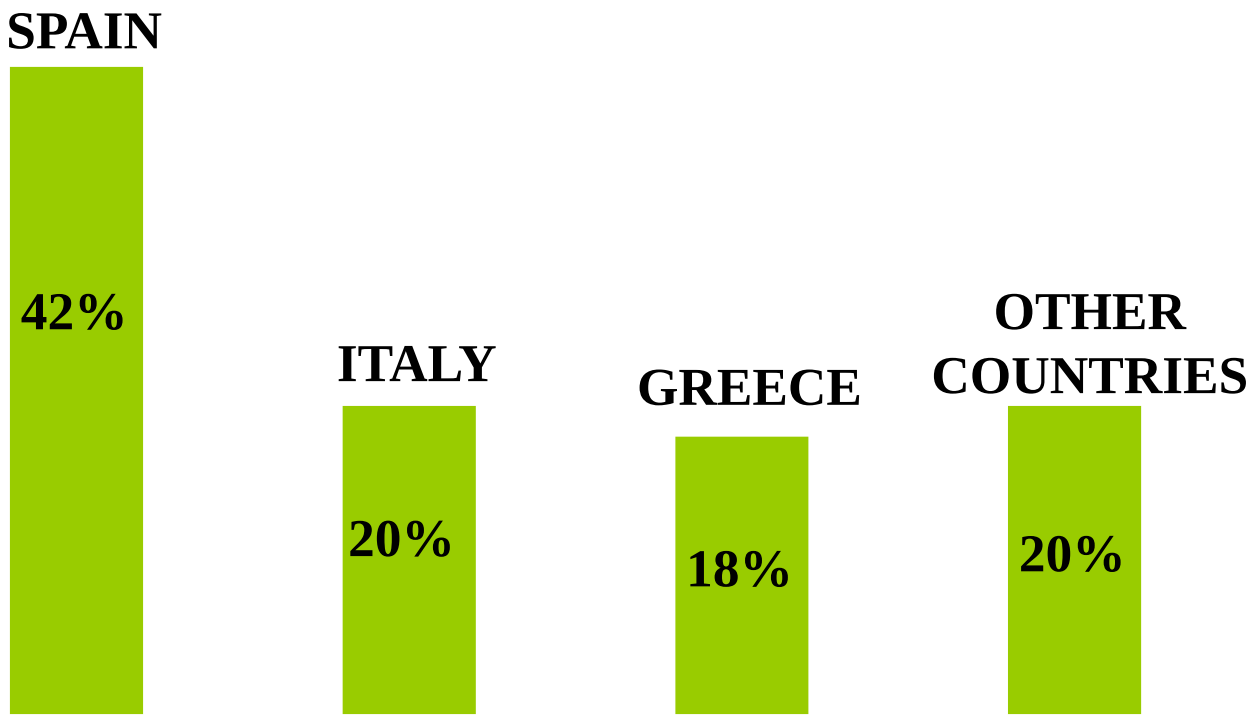
Institute of Sciences of Food Production (IT)

Ionian Island Region (GR)

PROJECT OBJECTIVES

- to create a platform to increase international awareness regarding the work performed by Mediterranean research in the field of Olive Oil productions,
- to increase international awareness about the work performed by Greece and Italian research institutions,
- to promote networking activities and transfer of knowledge and best practices for the insiders.

European Olive Oil Production



Italian situation

- The olives and olive oil are inextricable part of Italian and in particular, Puglia culture,
- Puglia accounts for 40% of the total land in Italy dedicated to cultivating olives,
- over 60 million trees in the region (one for every person in Italy), olive oil is a tradition that inspires more Pugliese pride than any other.

Olive Mill Waste Water (OMWW)

- is a by-products of olive oil processing;

$4x10^6$ ton/year

- OMWW can be an environmental problem because of their high bioactive compounds concentration;

- contain up to 25 times more bioactive compounds then extra virgin oil.

0.5-24 g/L

OMWW

Generally, the OMWWs raised from mills that used a three-phase system.

From this process, a large volumes of water was employed to aid the separation of oil; the resultant OMWW, firstly considered as toxic material, now is a cheap source of antioxidant compounds with several potential applications.

OMWW

The main objective of ISPA-CNR within the BIO-OLEA project, was to "detoxify" the OMWW using a ultrafiltration membrane systems, giving as final products water and a stable mixture of bioactive compounds to be used in multiple applications (cosmetic, food, pharmaceutical, etc.).

Laboratory Scale Membrane System Microfiltrate

Laboratory Scale Membrane System of Ultra- and Nanofiltrate

Laboratory Scale Membrane System situated at ISPA-CNR laboratory, Bari

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Food ingredients,
Cosmetics,
Nutraceuticals

APPLICATION OF OMWW FRACTIONS

FOOD INGREDIENTS

EVALUATION OF ANTIMICROBIAL ACTIVITY OF OMWW FRACTIONS

The fractions were tested *in vitro*, for their antimicrobial activities, against fungi, bacteria and yeasts.

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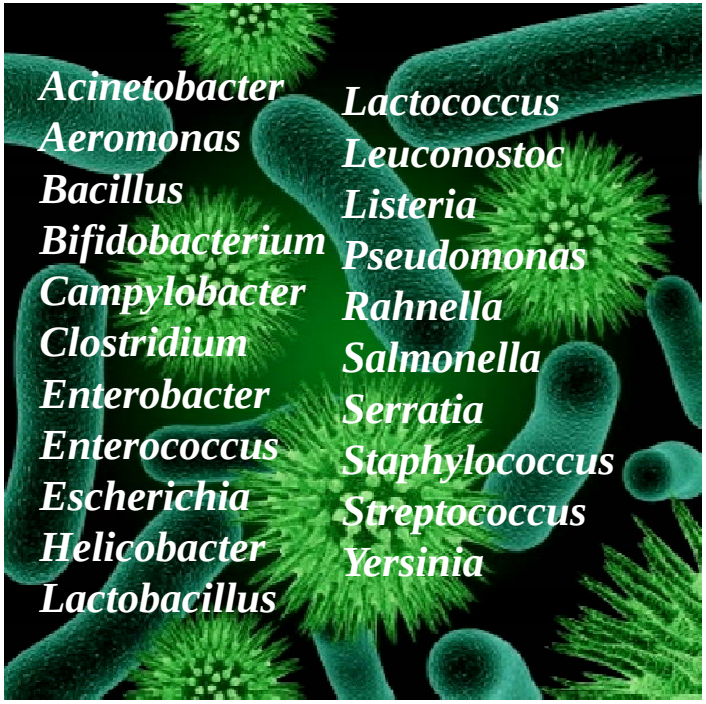


fermentative and pathogenic yeasts

pathogenic bacteria

pathogenic and toxigenic fungi

Aspergillus

Botrytis

Colletotrichum

Penicillium

Fusarium

ANTIMICROBIAL ACTIVITY

RESULTS

- total inhibition of *Aspergillus flavus* growth in the samples amended with OMWW fractions was recorded.

- OMWW may be a promising natural source of bioactive compounds useful in food safety control.

APPLICATION OF OMWW FRACTIONS

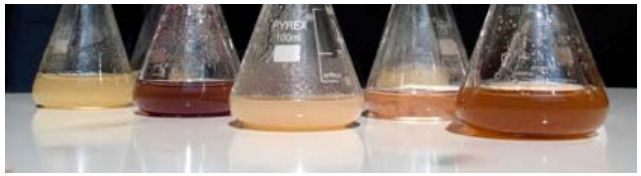
COSMETICS

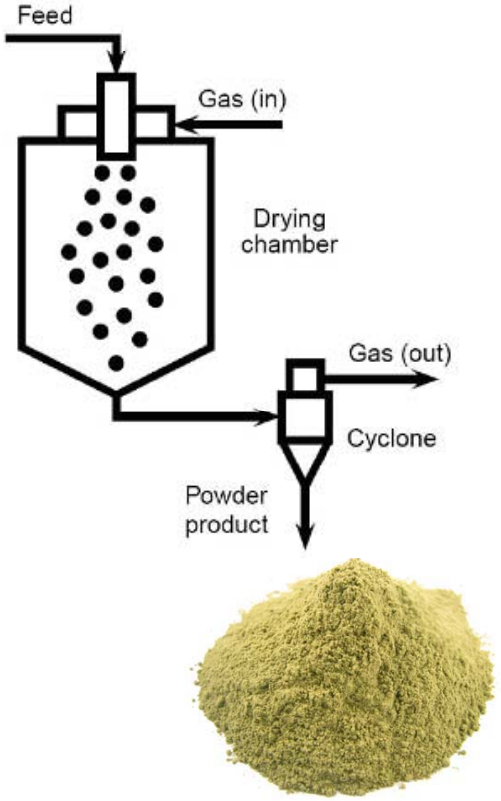
Possible utilizations of OMWW fractions for creams, gels, lotions ecc.

COSMETICS

Important step for reaching this objective is to formulate the liquid fraction to stable dry products, by using **spray drying system**

STABILIZATION PROCESS OF OMWW FRACTIONS





COSMETICS

RESULTS

The OMWW fractions tested have:

- protective effect on skin cell cultured (keratinocides) against UVA-rays (365 nm), stimulating the detoxifying activity,
- "anti-aging" activities comparable to Vitamin E,
- anti-inflammatory capacity against bacterial infections.

APPLICATION OF OMWW FRACTIONS

NUTRACEUTICALS

Possible utilizations of OMWW fractions as food supplements by the evaluation of their protective effect against oxidative damage of Low-Density Lipoproteins (LDL)

NUTRACEUTICALS

RESULTS

- All the cultivars analyzed showed a high potential of LDL oxidation inhibition.

CONCLUSIONS

BIO-OLEA project was a good opportunity to:

- share scientific information,
- transfer some innovative aspects on the management of OMWW with aim of the antioxidants recovery and their application in cosmetics, alimentary, and diseases prevention.

CONCLUSIONS

- transform the water, considered as a environmental problem, into a cheap source of natural bioactive compounds,

- develop strong and useful collaborations with University of Ioannina, for further project proposal.

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PARTNERSHIP

CNR-ISPA

UNIVERSITY OF IOANNINA

bioOlea

Di Molfetta Frantoiani

Il Vero di Santeramo — Olio Extra Vergine di Oliva

ArterraBioscience

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THANK YOU FOR ATTENTION

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