

Investigation of Edible Olive Oils with Light and Neutron Probes



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**analysis/service at ISIS@MACH and ISIS
through NEUTRON GATE**

... in brief

USERS contact
ISIS@MACH scientists

MARIA PAULA MARQUES (PI)

ACCESS approved to
ISIS@MACH

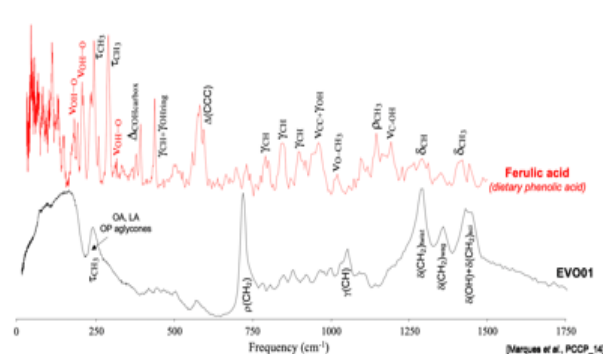


USERS apply for access to ISIS@MACH through NEUTRON GATE, to ISIS

peer review
(FAP's)



NEUTRON GATE



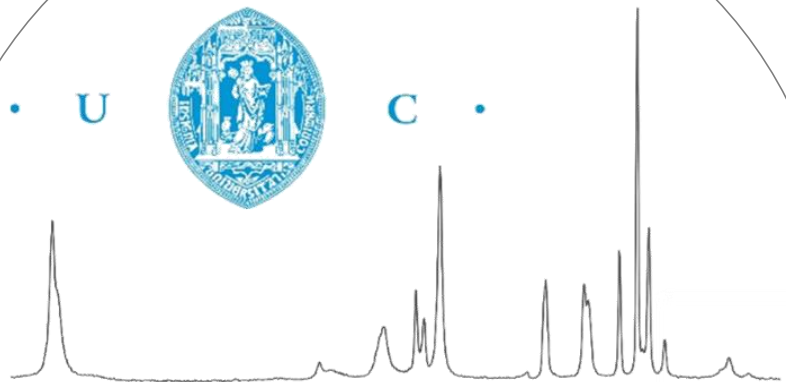
get data

experiments on **EVOO's**
N. DI DANIELE(PI)



local contact of
ISIS @MACH and ISIS

samples to ISIS



Química-Física **Molecular**

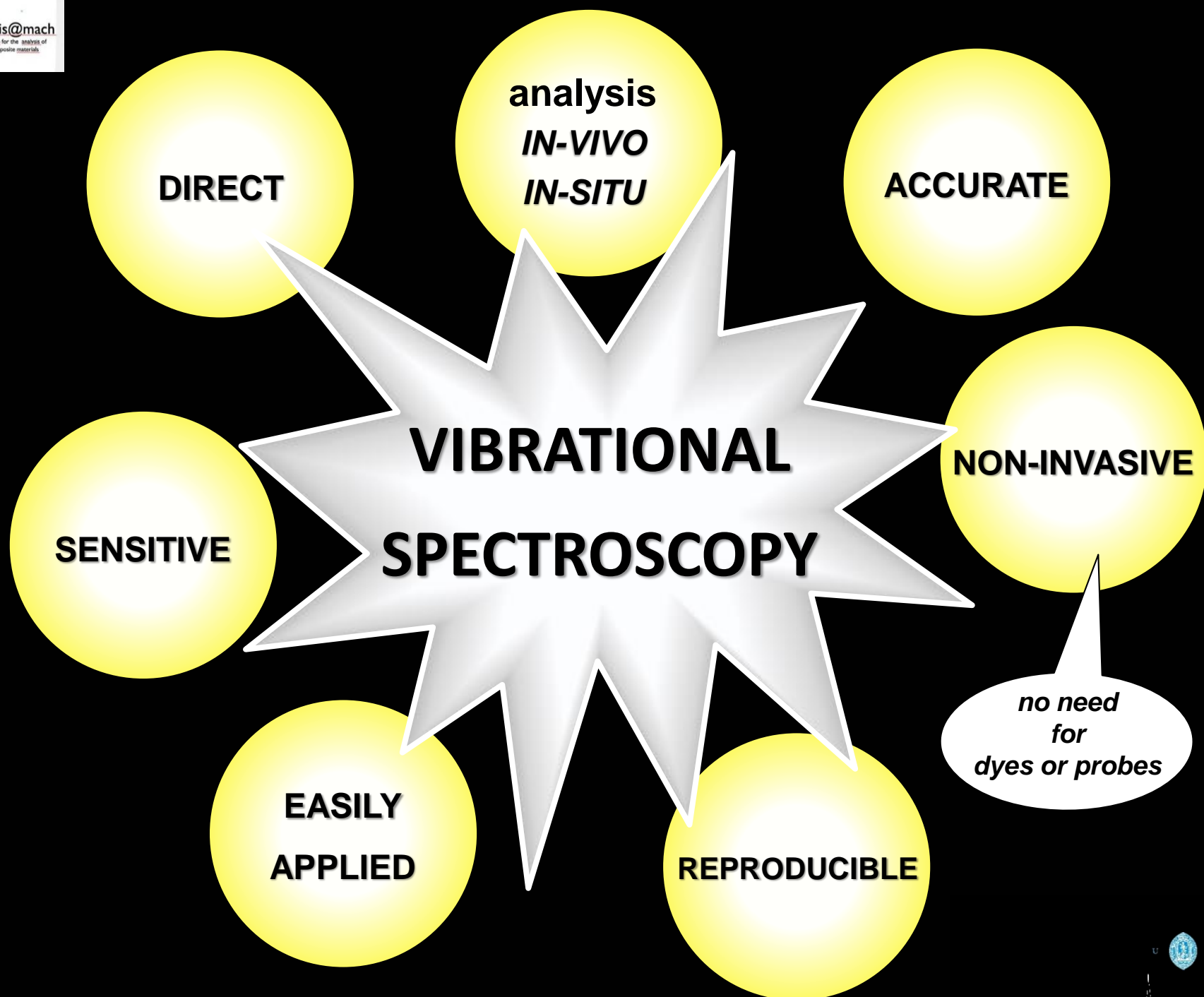
Coimbra University PORTUGAL

<http://www.ci.uc.pt/qfm/>

ISIS 



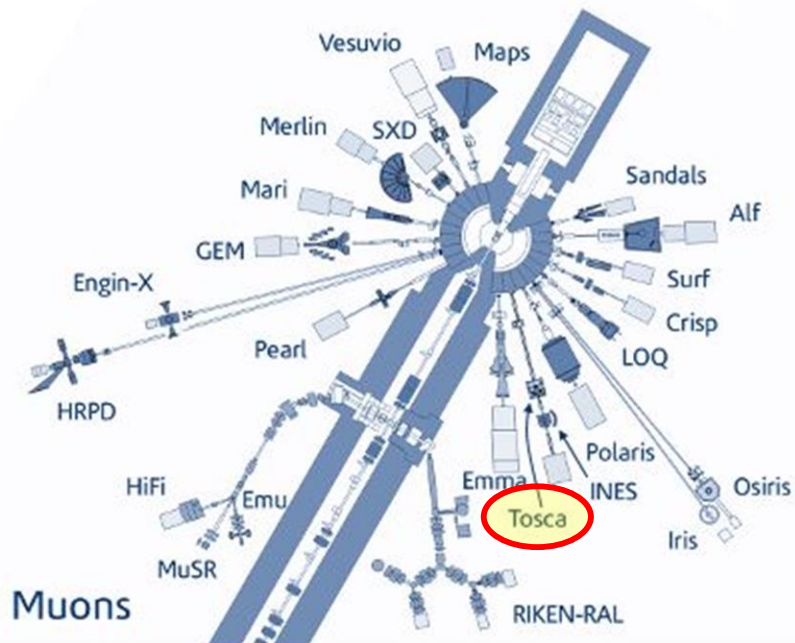
UNIVERSITÀ
DEGLI STUDI
FIRENZE



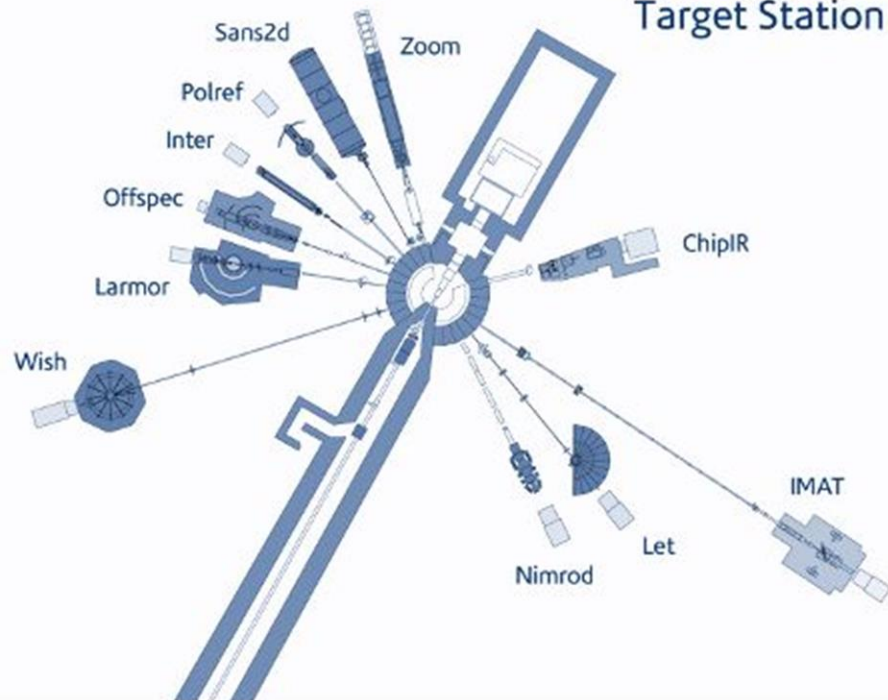




Target Station 1



Target Station 2



BEAM ON





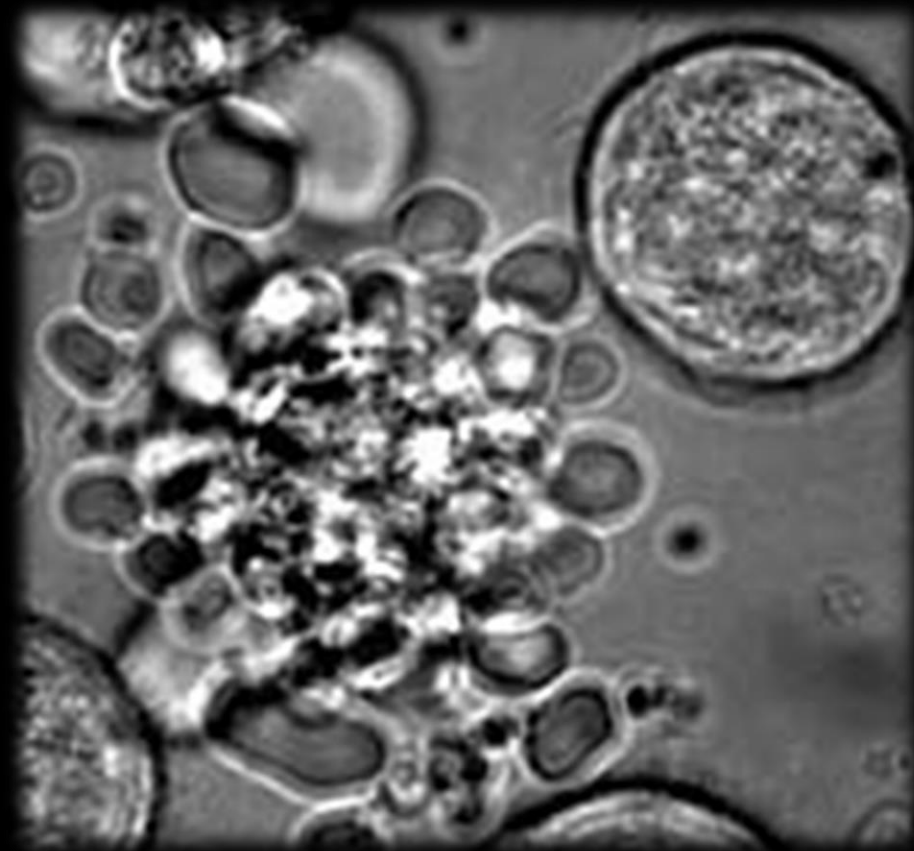
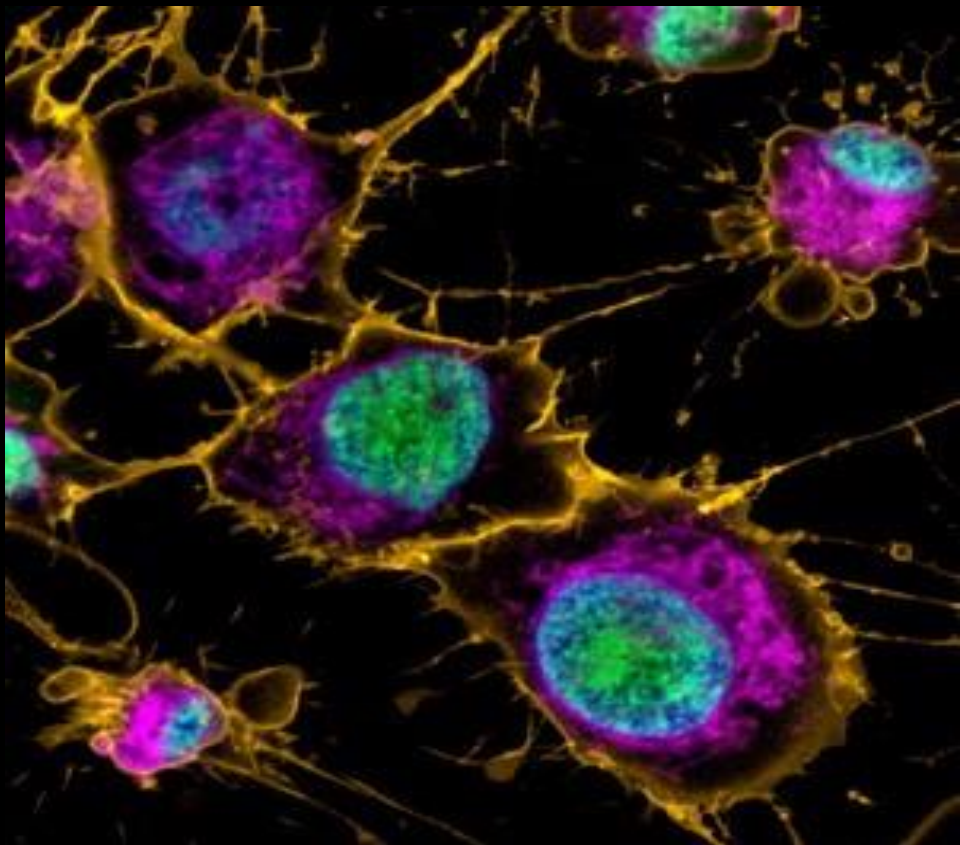
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Olive Oils – antioxidant activity

beneficial against oxidative-related disorders

inflammation, cancer, cardiovascular disorders, neurodegenerative diseases



Olive Oils – antioxidant activity beneficial against oxidative-related disorders

Chemoprevention & **Chemotherapy** – adjuvant chemotherapy
chemosensitization

Letters in Drug Design & Discovery, 2017, 14, 000-000

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RESEARCH ARTICLE

Antiproliferative Activity of Olive Oil Phenolics against Human Melanoma Cells

A.L.M. Batista de Carvalho^a, F. Caselli^a, V. Rodrigues^{a,b}, F. Paiva-Martins^{b,c} and M.P.M. Marques^{a,d,*}

Letters in Drug Design & Discovery, 2018, 15, 000-000

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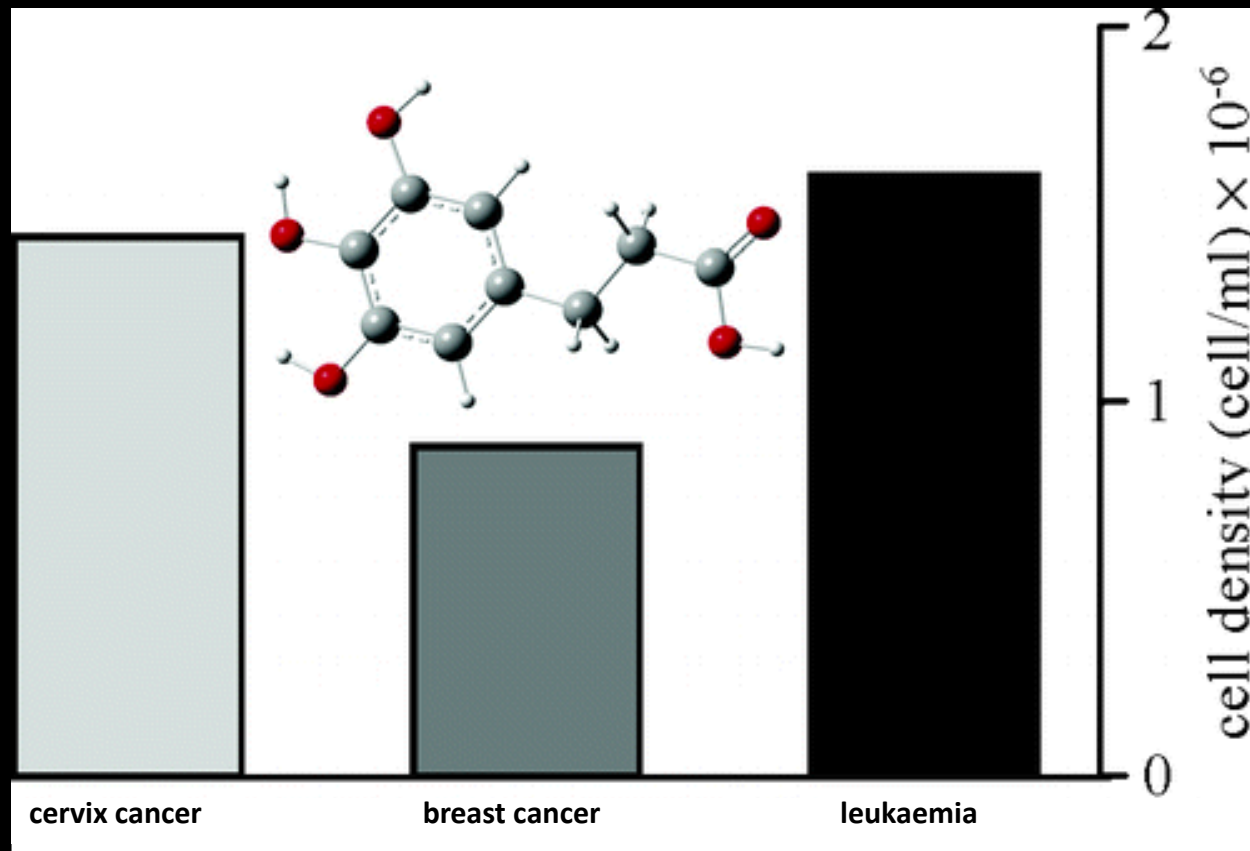
RESEARCH ARTICLE

The Impact of Antioxidants from the Diet on Breast Cancer Cells Monitored by Raman Microspectroscopy

Paula Sofia Coutinho Medeiros^a, Ana Lúcia Marques Batista de Carvalho^{a,*}, Cristina Ruano^b, Juan Carlos Otero^b and Maria Paula Matos Marques^{a,c}

Olive Oils – antioxidant activity beneficial against oxidative-related disorders

Chemoprevention & **Chemotherapy** – adjuvant chemotherapy
chemosensitization



antioxidant activity – depends on oil's composition in polyphenols

hydroxytyrosol, oleuropein derivatives, phenolic acids

characterisation at the molecular level

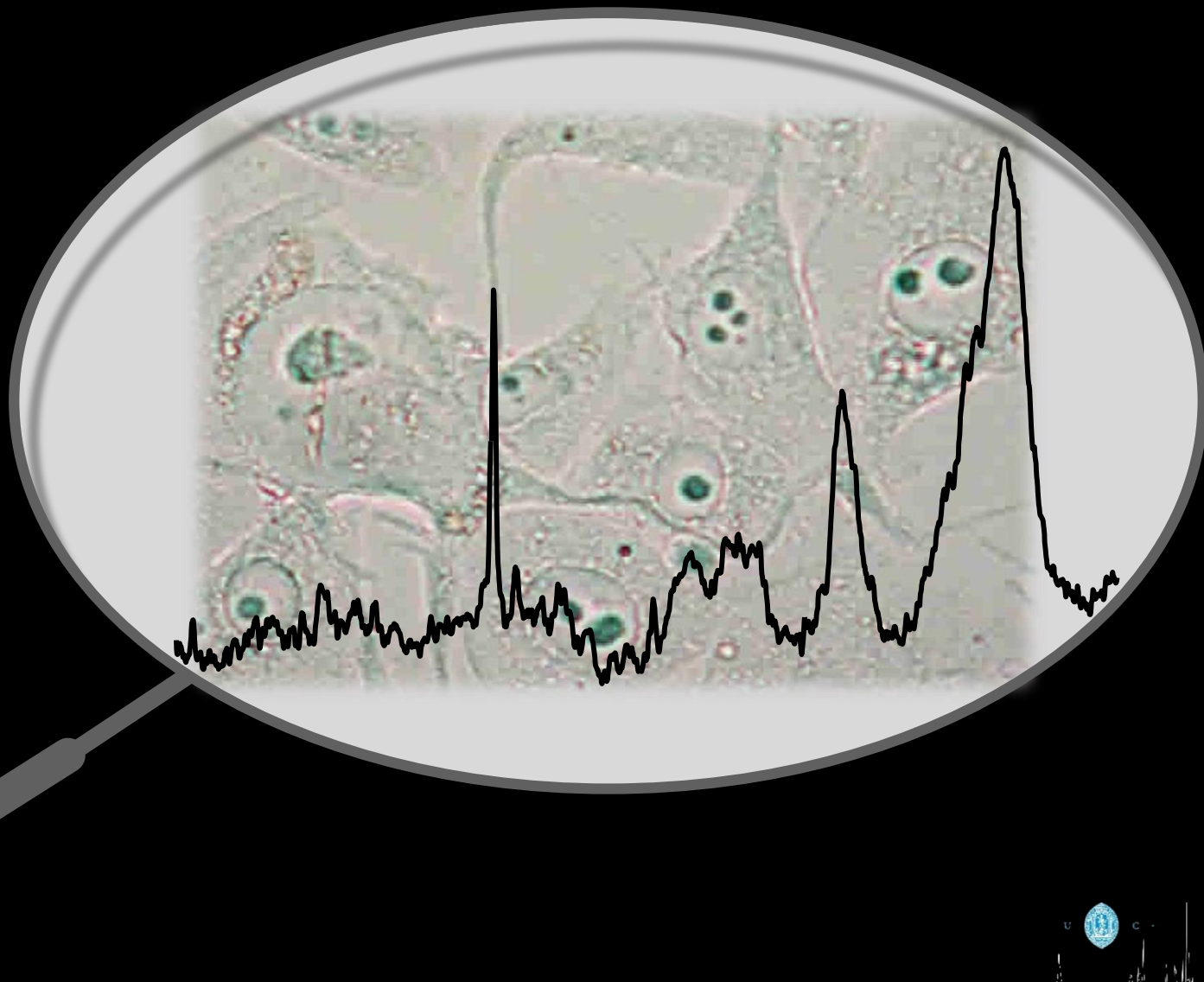
identification of main components

spectral fingerprint

**VIBRATIONAL
SPECTROSCOPY**

antioxidant activity – depends on oil's composition in polyphenols

hydroxytyrosol, oleuropein derivatives, phenolic acids

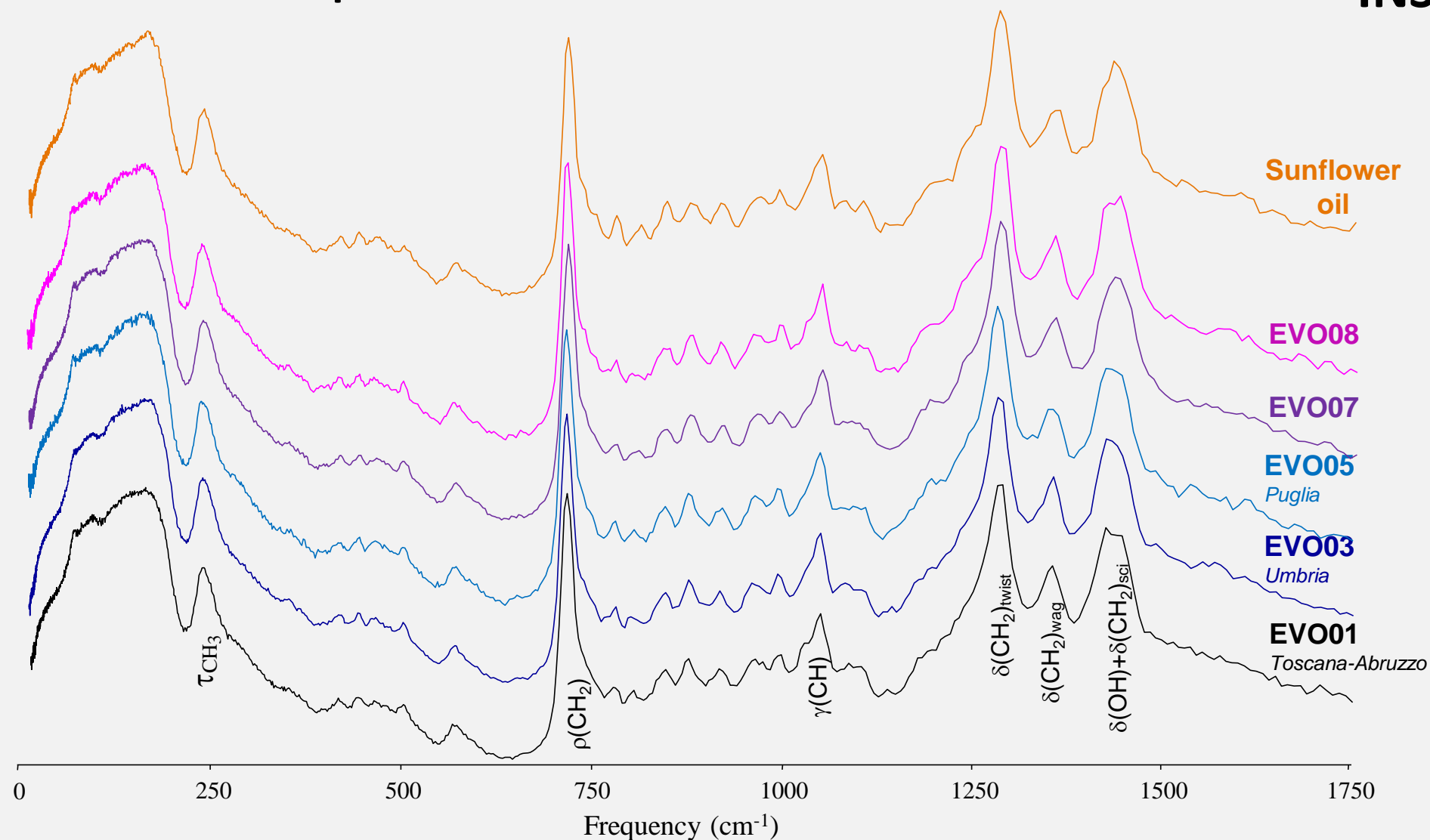


Edible Virgin Olive Oils

Italy – *Toscana, Umbria, Puglia, Abruzzo*

comparison between oils from different sources

INS



Edible Virgin Olive Oils

Italy – Toscana, Umbria, Puglia, Abruzzo

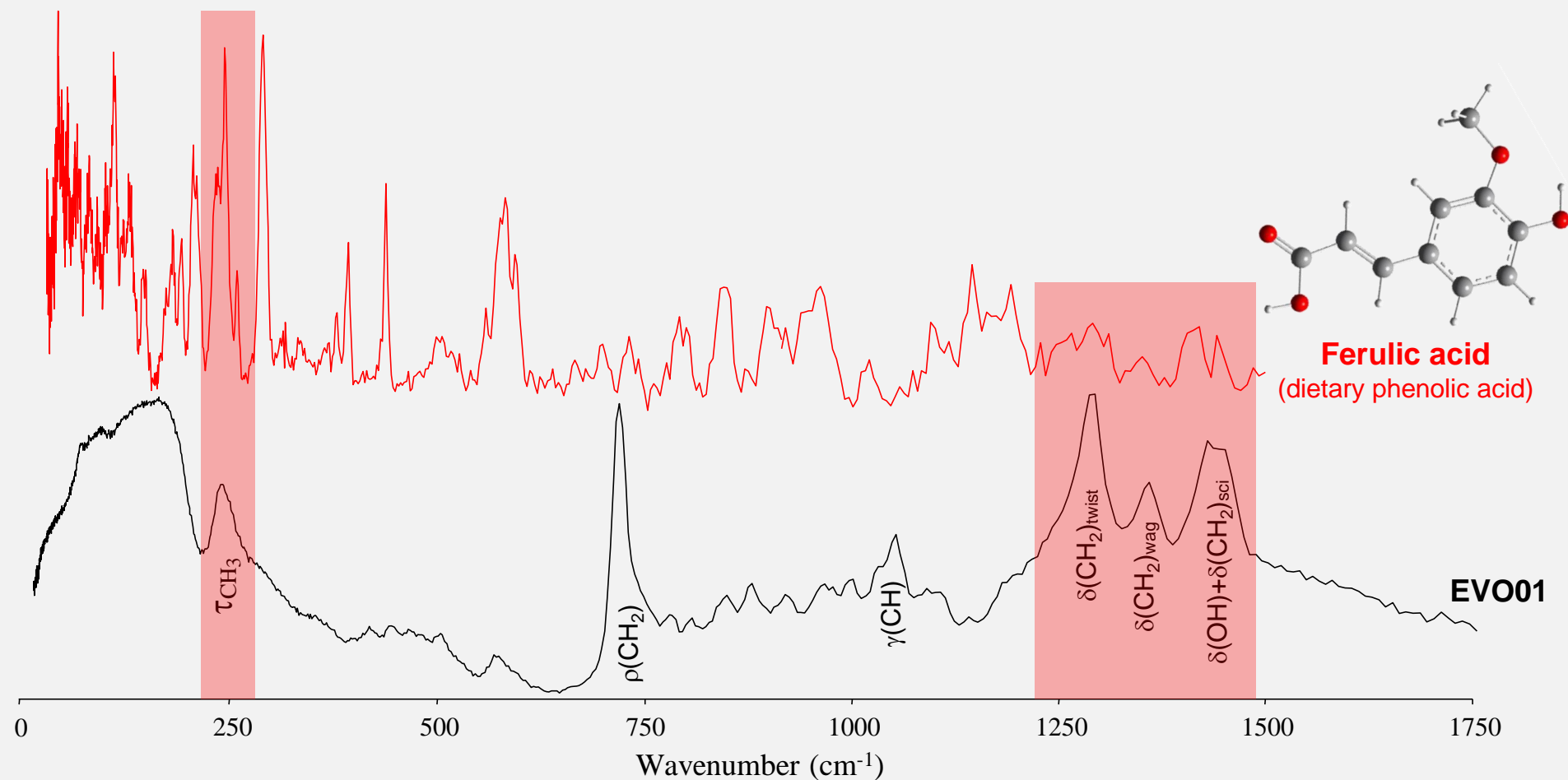
- ★ **all oil samples showed an identical vibrational profile**
- ★ **similar composition in major components – mainly fatty acids**
(linoleic, oleic, palmitic, ...)
- ★ **phenolic components – minor constituents**
responsible for antioxidant activity
phenolic content/composition differs between different types of oils

Edible Virgin Olive Oils

Italy – Toscana, Umbria, Puglia, Abruzzo

comparison with dietary phenolic acids

INS

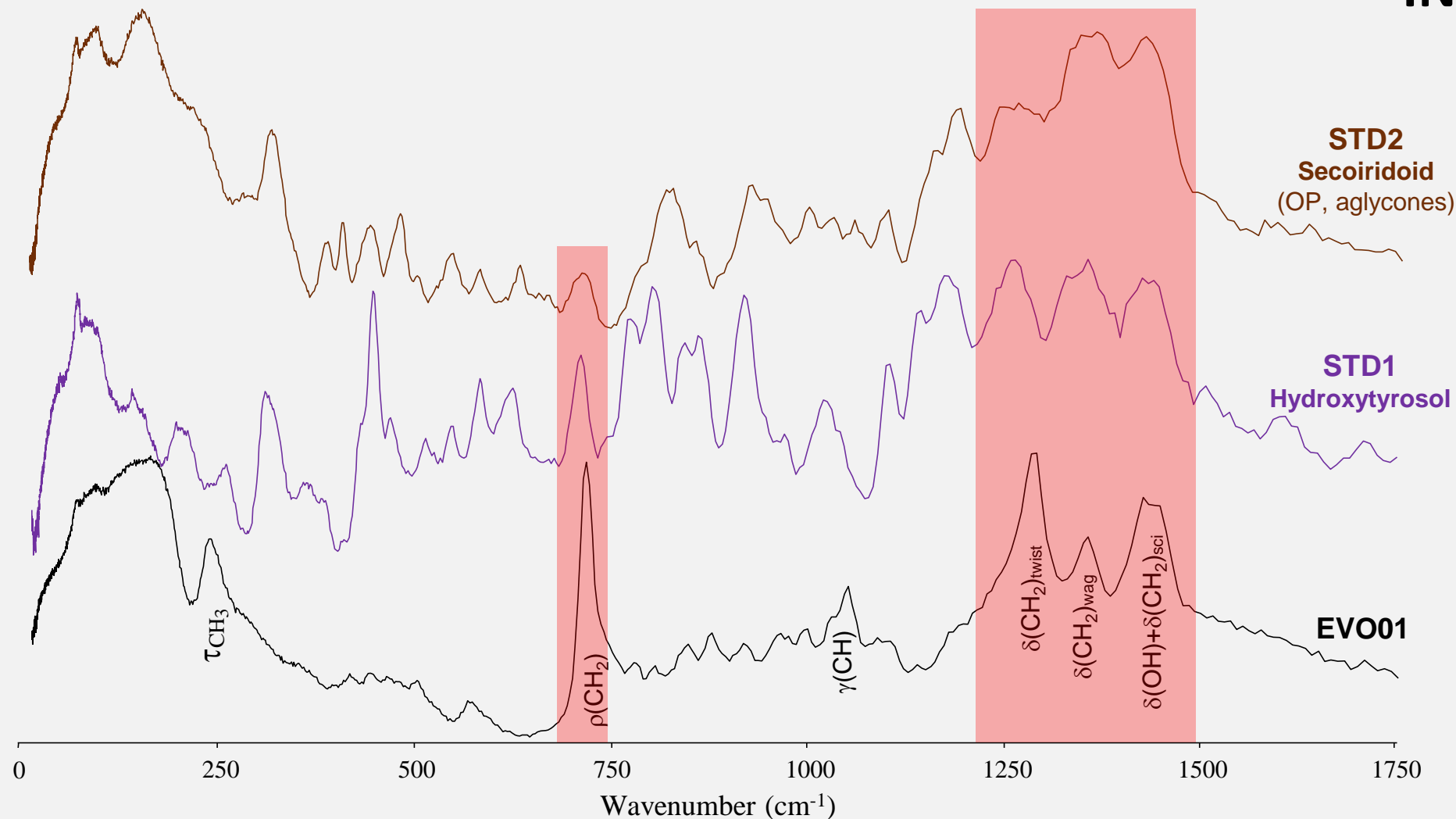


Edible Virgin Olive Oils

Italy – Toscana, Umbria, Puglia, Abruzzo

comparison with standard polyphenols

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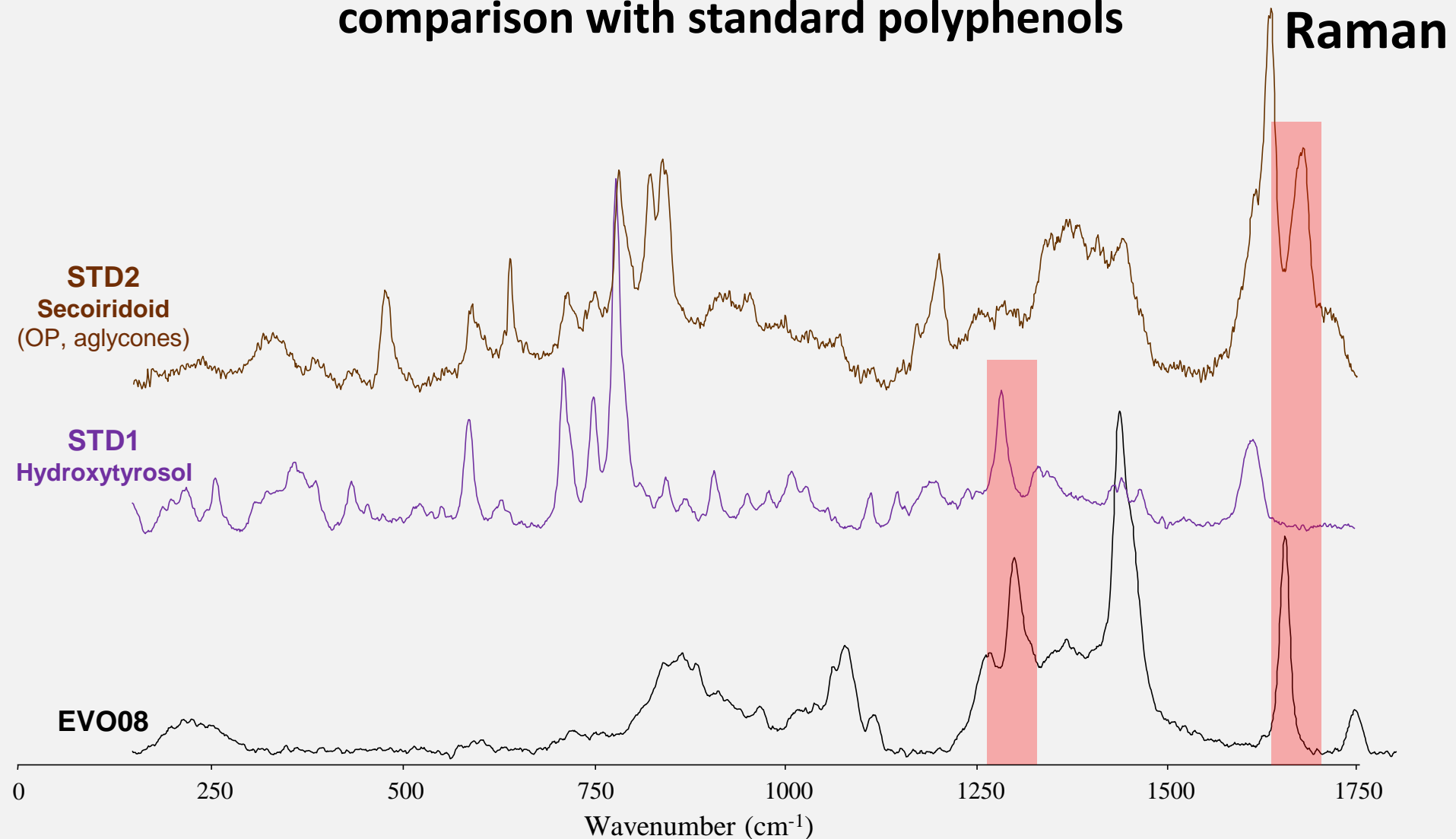


Edible Virgin Olive Oils

Italy – Toscana, Umbria, Puglia, Abruzzo

comparison with standard polyphenols

Raman



Edible Virgin Olive Oils

Italy – Toscana, Umbria, Puglia, Abruzzo

comparison with calculated spectra (Raman)

to help identification of minor phenolic components

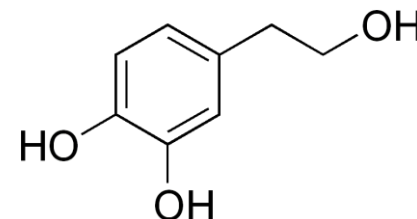
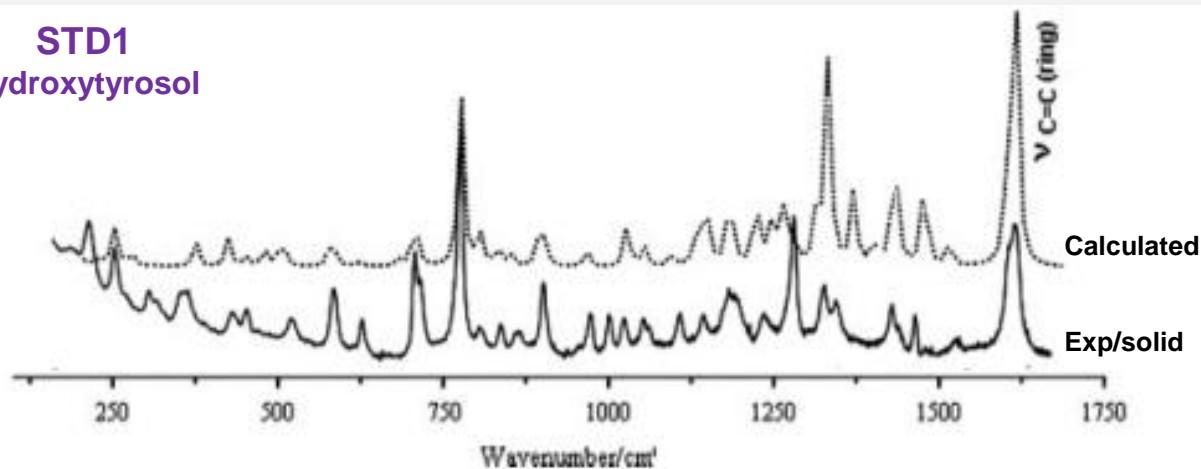


Edible Virgin Olive Oils

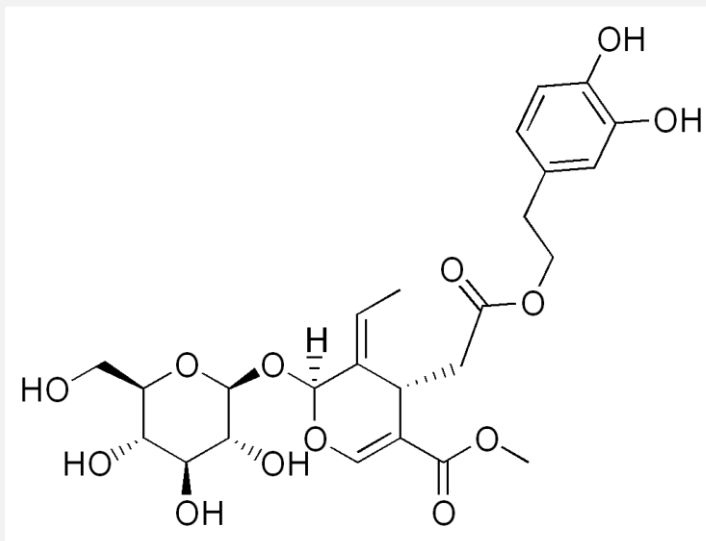
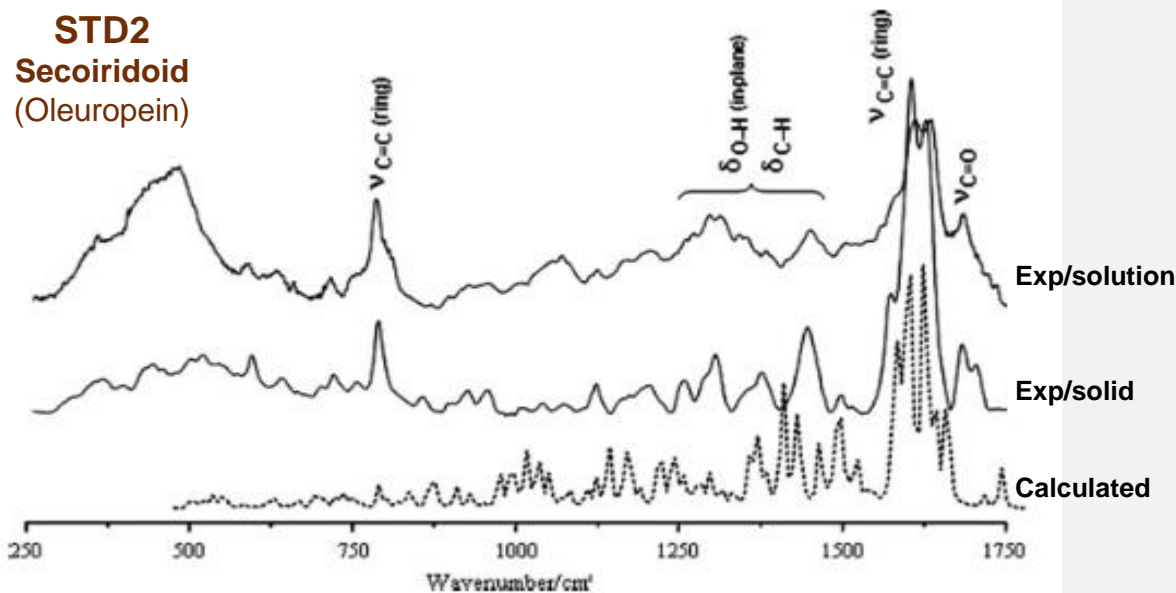
Italy – *Toscana, Umbria, Puglia, Abruzzo*

comparison with calculated spectra (Raman)

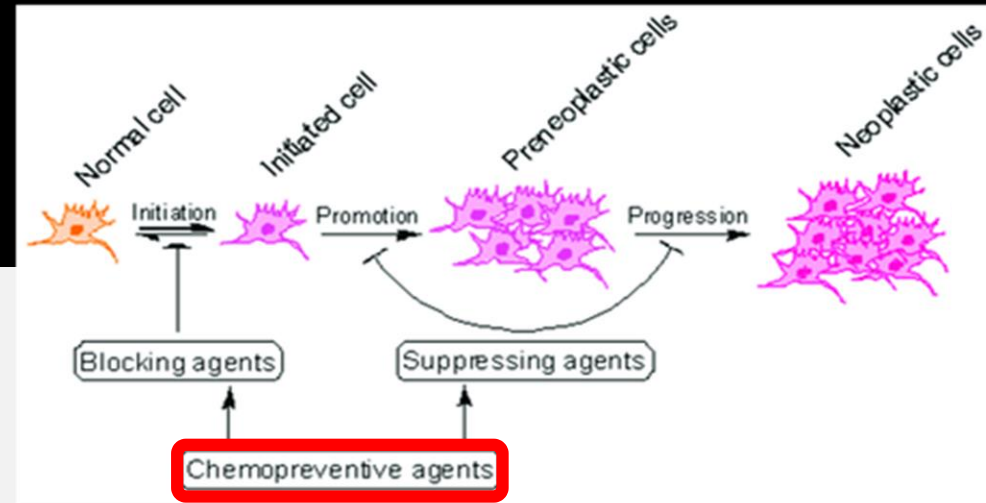
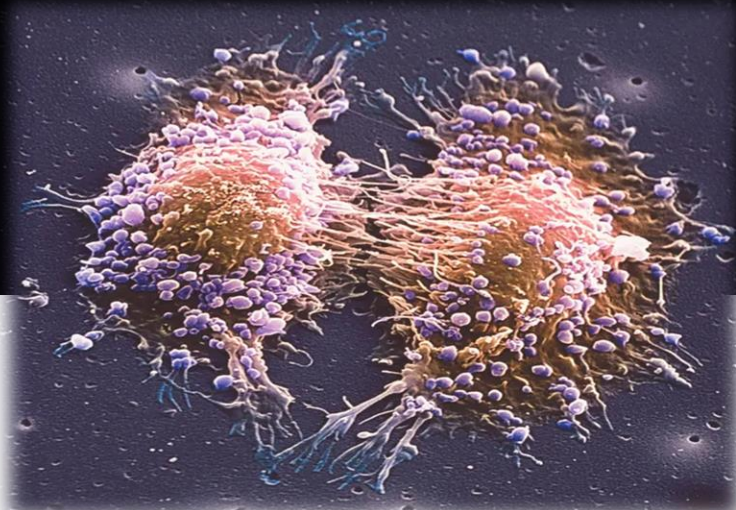
STD1
Hydroxytyrosol



STD2
Secoiridoid
(Oleuropein)



Olive Oils – antioxidant activity beneficial against oxidative-related disorders



- ★ vegetable oils – particularly olive oil
potential **chemopreventive & chemosensitising activity**
- ★ polyphenols – health-beneficial properties/antioxidants
are **minor polar components**

Obrigada

Grazie

