

sources of contamination

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# The Uniud Project on mineral oils in olive oils



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# PUNTO IMPRESA



# Multi-company financed PhD

Companies support scientific research in the framework of a research PhD in order to deepen and update on a topic of common interest, each contributing with a liberal grant of euros (i.e. 2.500 Euro) deductible annually for three years.

Upon reaching a sufficient number of subscriptions, the University activates a PhD scholarship on the topic, also organizing at least half-yearly dissemination meetings to stimulate a constant dialectic with the business world.

#### Advantages for the companies

- The Company is updated at least every six months on the research conducted in the area of common interest.
- The company enters a network that also involves other companies interested in the same topic.
- Contact with the academic world can bring further future opportunities to the company (such as participation in joint projects on European calls).
- The Company benefits from tax breaks for liberal donations in favor of university research.





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Evaluation of hydrocarbon contaminants in olives and virgin olive oils () CroseMark from Tunisia



#### MOSH concentrations (mg/kg oil) in extra virgin olive oils from the market

	EVOO1	EVOO2	EVOO3	EVOO4	EVOO5
MOSH C10-16	1.6	2.4	2.8	3.9	4.3
MOSH C16-35	8.7	12.3	6.6	10.4	27.0
MOSH >C35	1.2	3.5	0.8	3.3	6.7
MOSH TOT	11.5	18.2	10.3	17.6	38.0



Characteristics of the sampling sites

Sample code	Site location	Municipality inhabitants*	Type of site	Distance from road/ vehicular traffic
OF1	Teboulba-Monastir	37485	Semi-rural	150 m/ medium
OF2	Sousse (centre)	221530	Urban	1-5 m/ high
OF3A	Monastir (centre)	93306	Urban	1-5 m/ high
OF3B	Monastir (centre)	93306	Urban	100 m/ high

OF2	Sousse (centre)	221530	Urban	1-5 m/ high	no
OF3A	Monastir (centre)	93306	Urban	1-5 m/ high	no
OF3B	Monastir (centre)	93306	Urban	100 m/ high	no
OF4	Hammam Sousse	42937	Semi-rural	200 m/ medium	yes
OF5A	Bekalta-Monastir	17850	Rural	1-5 m / low	yes
OF5B	Bekalta-Monastir	17850	Rural	200 m/ low	yes
OF5C	Bekalta-Monastir	17850	Rural	400 m/ low	yes
OF6	Moknine-Monastir	57111	Semi-rural	300 m / medium	no
OF7	Menzel-Kamel-Monastir	8432	Rural	300 m / low	no
OF8	Kasserine	83534	Semi-rural	>300 m / low	yes

\* 2014 Tunisian census data

MOSH content (mg/kg) of the oil oil extracted from olives both by physical mean (Abencor

and with solvent)





Use of

pesticide

no

#### **UNIVERSITY OF UDINE** *Results of a collaboration research between UniUD and Blauel & Co.*

# *Monitoring environmental impact*



#### Six areas differently exposed to environmental contamination in Greece

Γερολιμένας

Uncontaminated areas



Polluted areas

#### Satellite view of the six area where the olive samples were collected



In each area 2 olive trees were chosen where samples of passive paper filters, soils and olives were collected

# **Environmental contamination: olives**



For each area two olive trees were identified to collect samples of olives in 2 periods







The olives were washed with water and after a LLE with hexane, the superficial contamination was determined by injecting the concentrated hexane extract into the LC-GC apparatus

Washed olives were ground and extracted in a microwave extractor with hexane ethanol (1:1), the extracted fat was diluted and injected to determine total contamination

Constant and little
contamination (on average around 2 mg/kg of oil) was
found in olives
independently on the
collection site
Superficial contamination
was about 1-2% referred to
whole olive contamination



## **Environmental contamination: soil**



mg/kg dry soil

	soil	isoalkanes	<i>n</i> -alkanes	<i>n</i> -alkanes carbon range	ratio <i>n</i> -alkanes/isoalkanes	total hydrocarbons
supposed "clean" areas	Α	0,8	4,3	21-45	5,5	5,8
	В	1,9	6,4	23-36	3,3	9,0
	С	1,0	7,2	21-37	6,9	9,7
	D	3,7	6,1	21-37	1,6	11,0
supposed	Ε	1,1	8,2	21-47	7,4	9,8
"dirty" areas	F	1,1	1,6	23-35	1,5	3,4



# Tests with passive traps

15

Passive traps made of paper filters (without oil and with 30 mg oil) exposed in highly trafficked road to determine the air contamination





# **Passive traps**

LC-GC traces of oil extracted from cardboard filters placed for 3 weeks in 6 different sites







## Monitoring on EVOO

Oil from different sites in Greece:

- ✓ Crete (CR)
- ✓ Messinia (ME)
- ✓ Argolide (ANC)
- ✓ Epidauro (EP)









Minutes



#### Contamination during transport in jute bags





# Six cultivar from one Italian grove collected at the same period far from sources of environmental contamination



n-C10-16 n-C16-20 n-C20-35 >n-35





### Three variety were followed during ripening



#### No evident trend was observed during ripening

### More data are needed!