Research & Innovation focusing on technological improvements in wine

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Wine Institute of Athens
ELGO "DEMETER"

Entrepreneurial Discovery Focus Group on wine for Eastern Macedonia and Thrace
18-19 November 2014, Drama, Greece

The Wine Institute of Athens

now Institute of Agricultural products
ELGO "DEMETER" (formerly NAGREF)
Directorate General of Agricultural Research

- **Research activities**

-research projects funded by the EU, GSRT, Ministry of Agriculture, etc.

-collaboration with national and European research organisations and the wine industry

- **Services & other activities**

-for the Ministry of Agriculture

-lab services

Technological improvements in wine

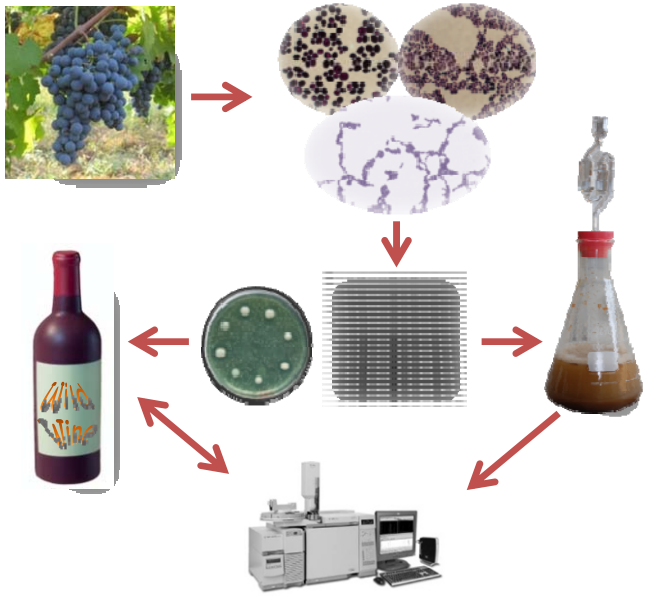
•Wine Grapes

grape variety
viticultural practices

•Vinification

-Prefermentation Practices

eg.destemming, crushing, maceration, pressing, must clarification, adjustments to must



-Fermentation (alcoholic & malolactic)

fermentation, fermentors

-Postfermentation Treatments

fining, aging

Current trends in the wine market

Market share:

Increasing competitiveness

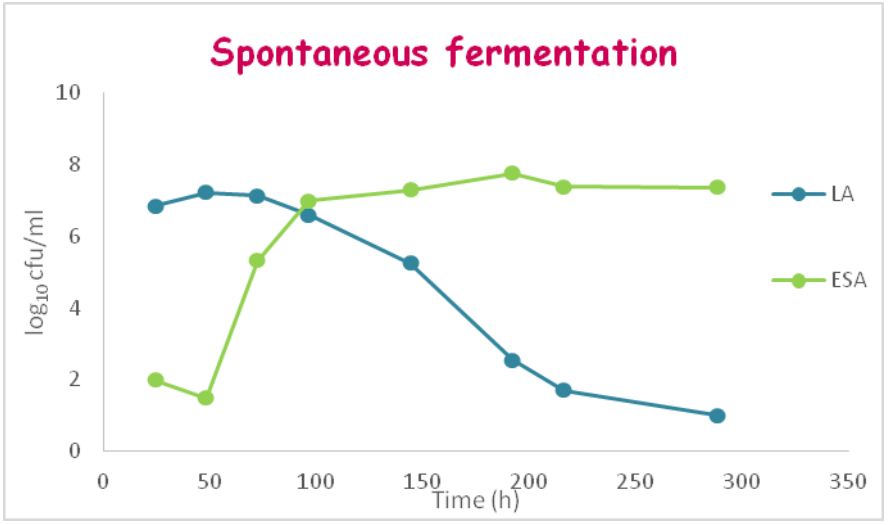
	Export volume %		Exports as % of prod'n volume	
	1980-84	2009	1980-84	2009
Old World (France, Italy, Spain, Portugal, Germany)	75.8	59.9	17.8	36.9
South hemisphere (Argentina, Australia, Chile, New Zealand, South Africa)	1.1	26.9	1.8	18.9
USA	0.7	3.9	2.8	49.7
Other	22.4	9.3	10.6	13.4
TOTAL	**100.0**	**100.0**	**13.9**	**32.4**

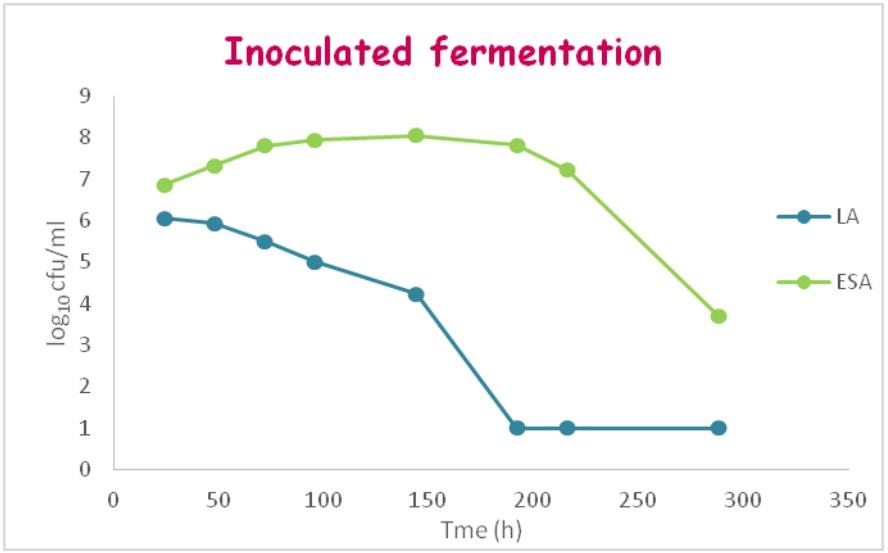
Consumers' preferences:

- allergen-free/safe wines
- Wines produced according to natural and organic procedures
- Moving to quality and "artisan" wines

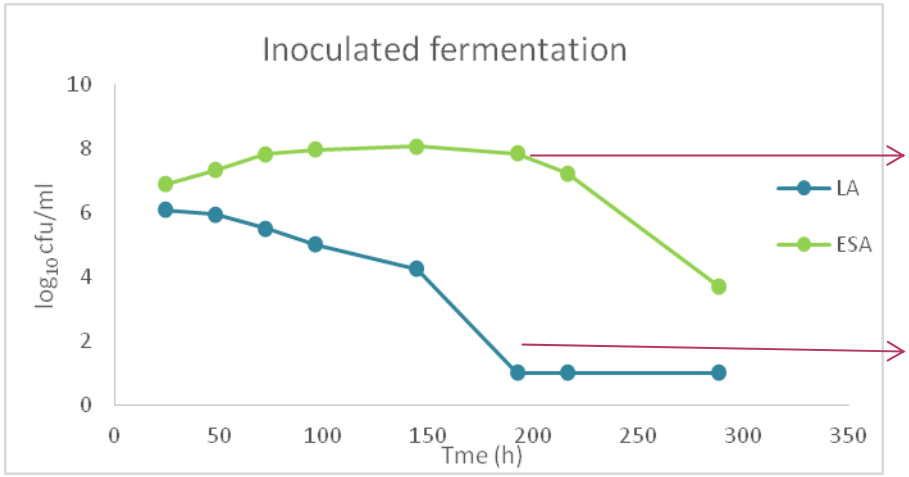
Smart Specialisation Strategy for Research & Innovation

Technological improvements in wine – Fermentation Management

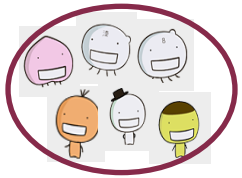




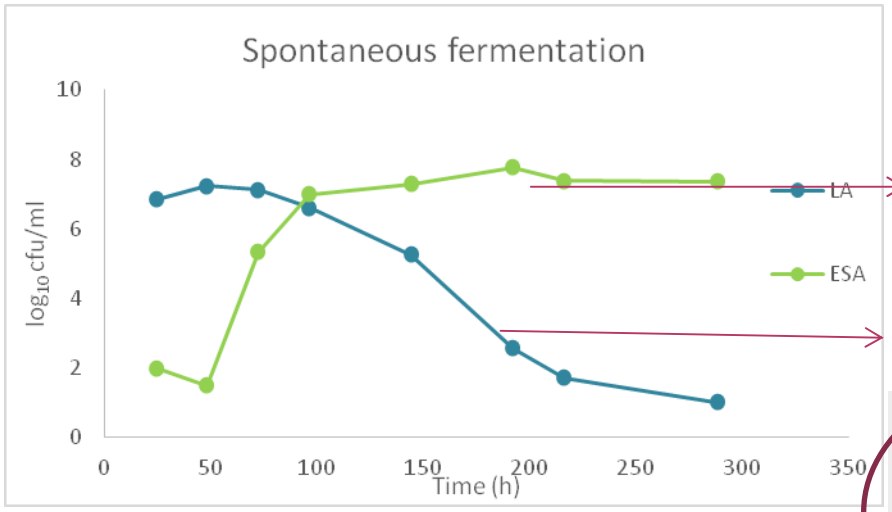
Taking a closer look…

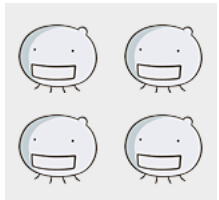


1 exotic commercial strain used by thousands and thousands of winemakers worldwide

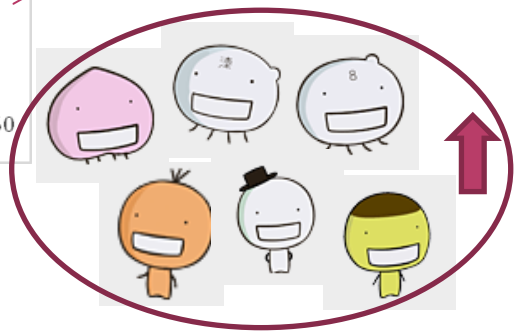


non-*Saccharomyces* species



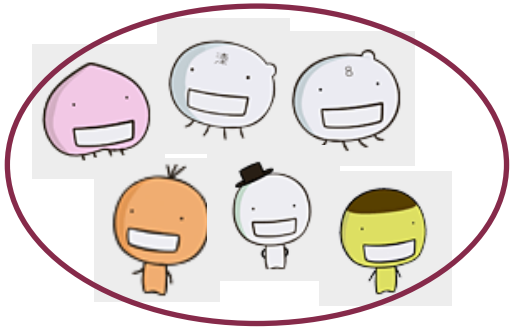


Several indigenous *S. cerevisiae*



non-*Saccharomyces* species

INOCULATED *VS* SPONTANEOUS FERMENTATION

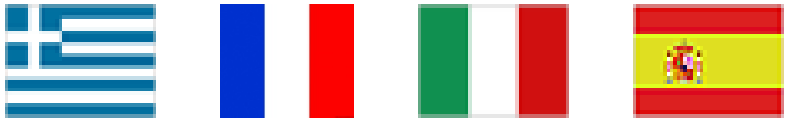


pros	*cons*
INOCULATED	
Reproducible and predictable	Low complexity
Controlling undesired metabolites	Sensory resemblance of wines from diverse origins
	Yeasty-like aromas
SPONTANEOUS	
High complexity	Yearly fluctuation of indigenous microbiota
Typicity	Unpredictable
	Production of undesirable metabolites

Experiences with international research collaborations:
THE WILDWINE PROJECT

"Multi-strain indigenous yeast and bacterial starters for 'wild-ferment' wine production"

The concept:



" offering a solution to SME-AGs (associations) in need of outsourcing research activities - through their members SMEs - to specialized RTD performers for the benefit of their members"

Consortium

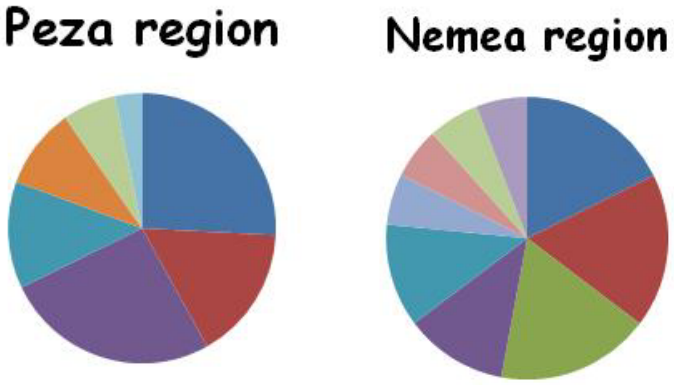
SEVENTH FRAMEWORK PROGRAMME

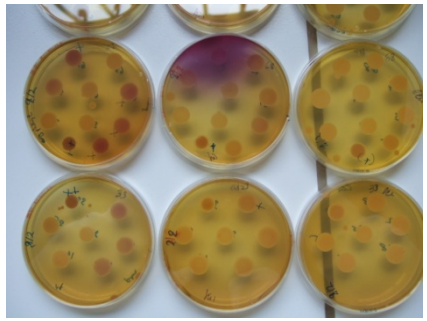
WildWine

Simulating spontaneous fermentation

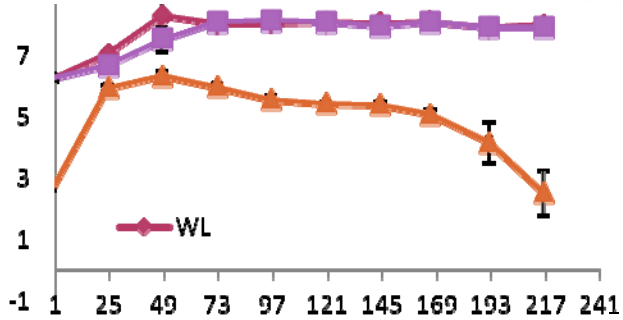
Non-*Saccharomyces* biodiversity

Technological evaluation

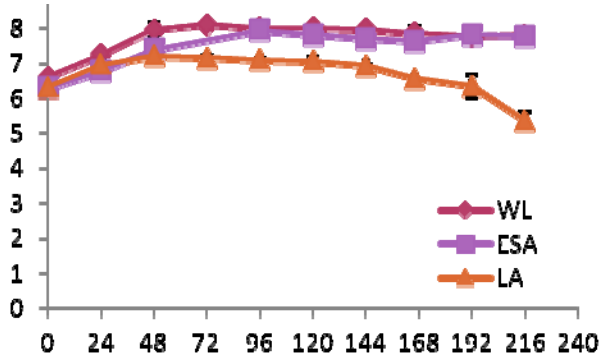




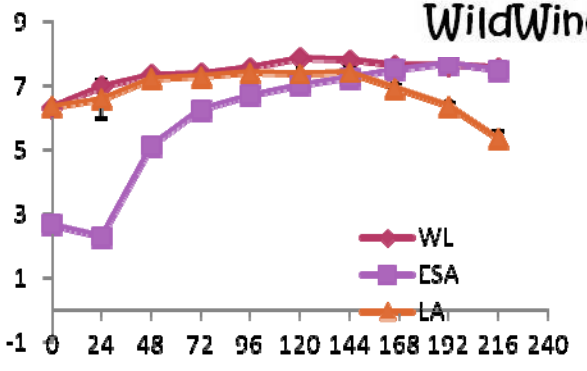
C. zemplinina *L. thermotolerans* *H. guilliermondii* *I. orientalis*
H. uvarum *P. anomala* *H. osmophila* *T. delbrueckii*
M. pulcherrima *C. incommunis* *Pichia sp.*



Inoculated with *S. cerevisiae*



Co-inoculated
with wild yeast and *S. cerevisiae*

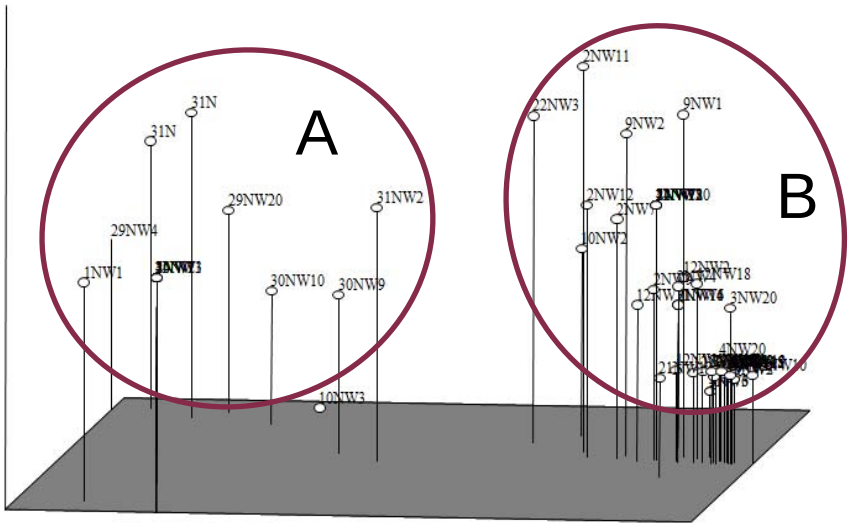


Sequentially inoculated
with wild yeast and *S. cerevisiae*

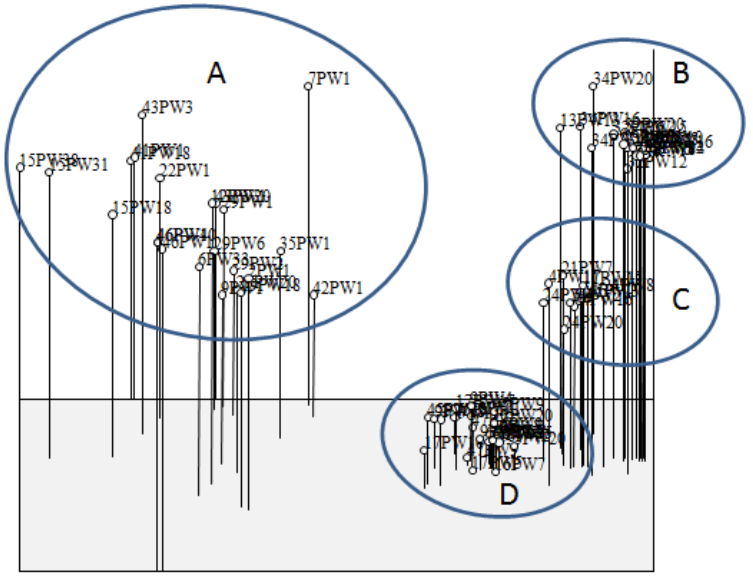
Complexity:
Sequentially > Coinoculated > Single innoculation

S. cerevisiae diversity: within PDO regions

Nemea region



Peza region



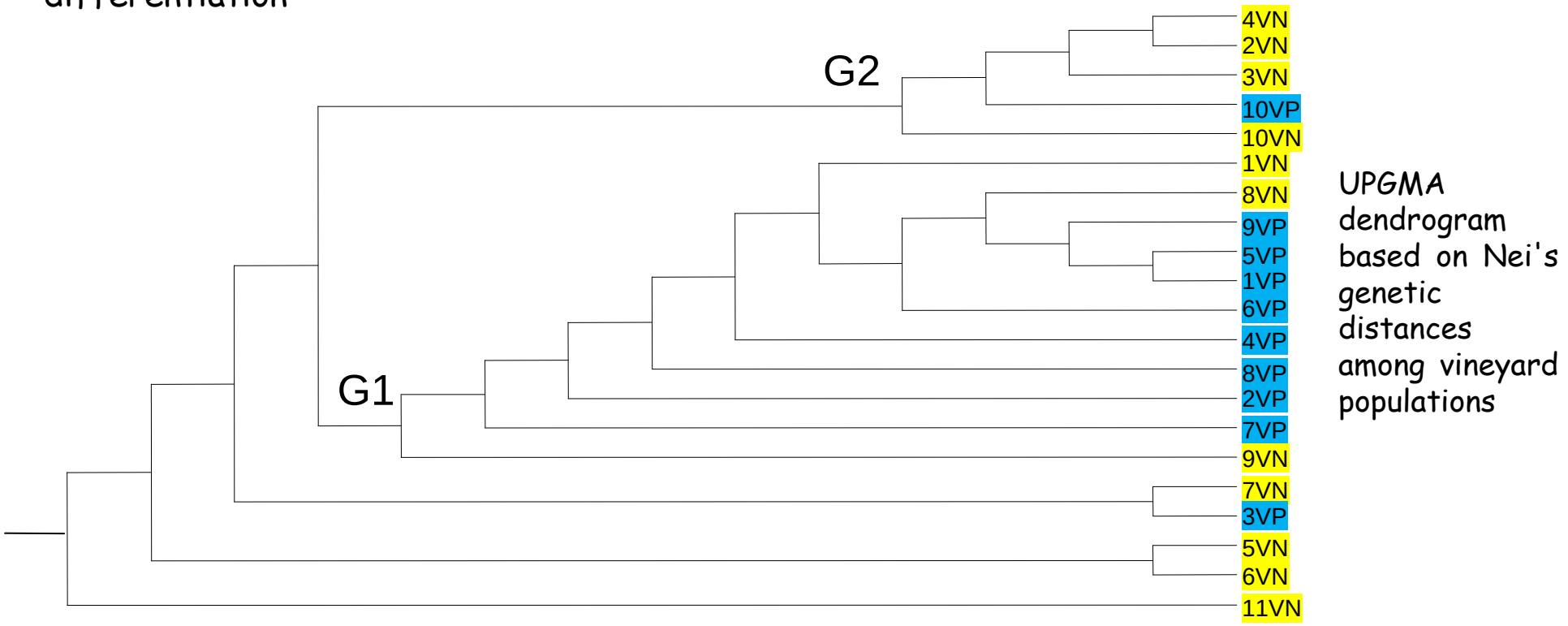
Principal coordinate analysis (PCoorDA) of unique molecular patterns (genotypes)

- Molecular patterns are highly diverse but clustered into major groups
- No clustering according to the sampling point or the vineyard of origin

WildWine

S. cerevisiae diversity: between PDO regions

- Nemea (in yellow) and Peza (in blue) populations showed a certain degree of differentiation



✓ AMOVA justified that the pops of Nemea & Peza are significantly different

✓ A number of distinct patterns may serve as "microbial signatures" for each zone

WildWine

Considering the advantages of Eastern Macedonia & Thrace

- Quest for ideal vineyard sites:
soil, climate etc

- Local varieties:
-enological assessment
-a local "signature" cultivar

- Introduction of successful Greek varieties
-response in local "*terroir*"

- Ancient tradition (from the end of the prehistoric era): traditional practices in modern winemaking

- Microbial "*terroir*":
Evaluation of local biodiversity and technological assessment of indigenous strains

The Wine/ITAP Institute

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Graduate students
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Entiola Gigdima
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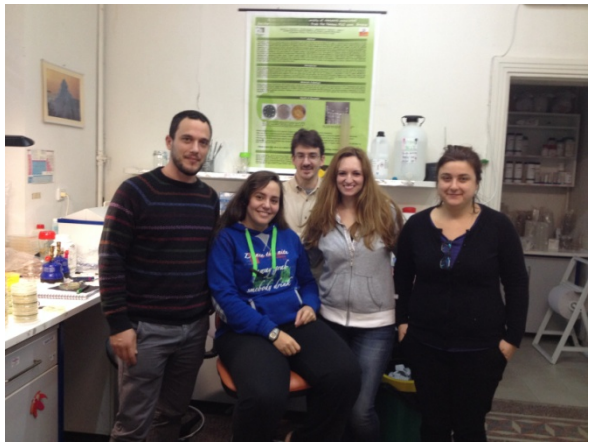

Thank you for your attention