



COST Action Meeting



POSTHARVEST ANCONA

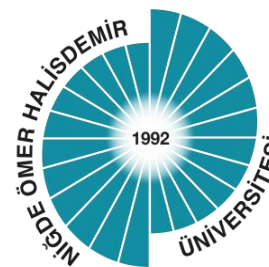
23-25 JANUARY 2024



Efficacy of wild *Aureobasidium pullulans* VOCs and Application Methods vs Strawberry Fungal Pathogens



**UNIVERSITÀ
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Postharvest control strategies

Fungicide treatment **NO!!!!**

Sanitation practice **YES!!!**

Alternative approaches **YES!!!**



Epiphytic yeast sources and sampling sites



(a) Local apple genotype "Niğde Elması" (*M. domestica* L.); (b) rosehip (*R. canina*); (c) hawthorn (*C. orientalis*); (d) wild pear (*P. elaeagnifolia*), and (e) geographical location of the sampling sites.

- Wild sources can be correlated to BCAs metabolic fluxes?

The evaluation of strain diversity provides a great chance to increase the knowledge of metabolic functions



Among the yeast isolates, 32 demonstrated notable antagonistic activity with apple postharvest pathogen
 =
mycelial inhibition (MI) rates equal to or exceeding 40%

Exploring Wild and Local Fruits as Sources of Promising Biocontrol Agents against *Alternaria* spp. in Apples

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To explore **VOCs** antagonistic potential of yeasts strains isolated from wild fruit carpospheres
vs
B. cinerea and *C. acutatum*

&

To characterize yeasts **VOCs** and evaluate the effectiveness of two different **application methods**



Molecular characterization of the pre-selected 32 BCAs candidates (*ITS* and *EF1*)

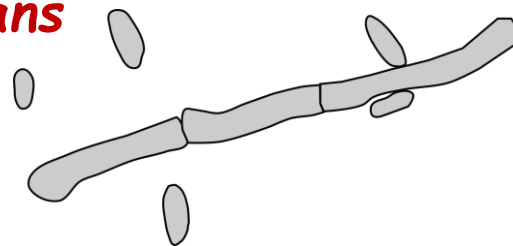


- ✓ Test the effect of yeasts **VOCs** on pathogens growth (\emptyset) by using 2 different **application methods**
- ✓ **SPME-GC-MS VOCs** analysis



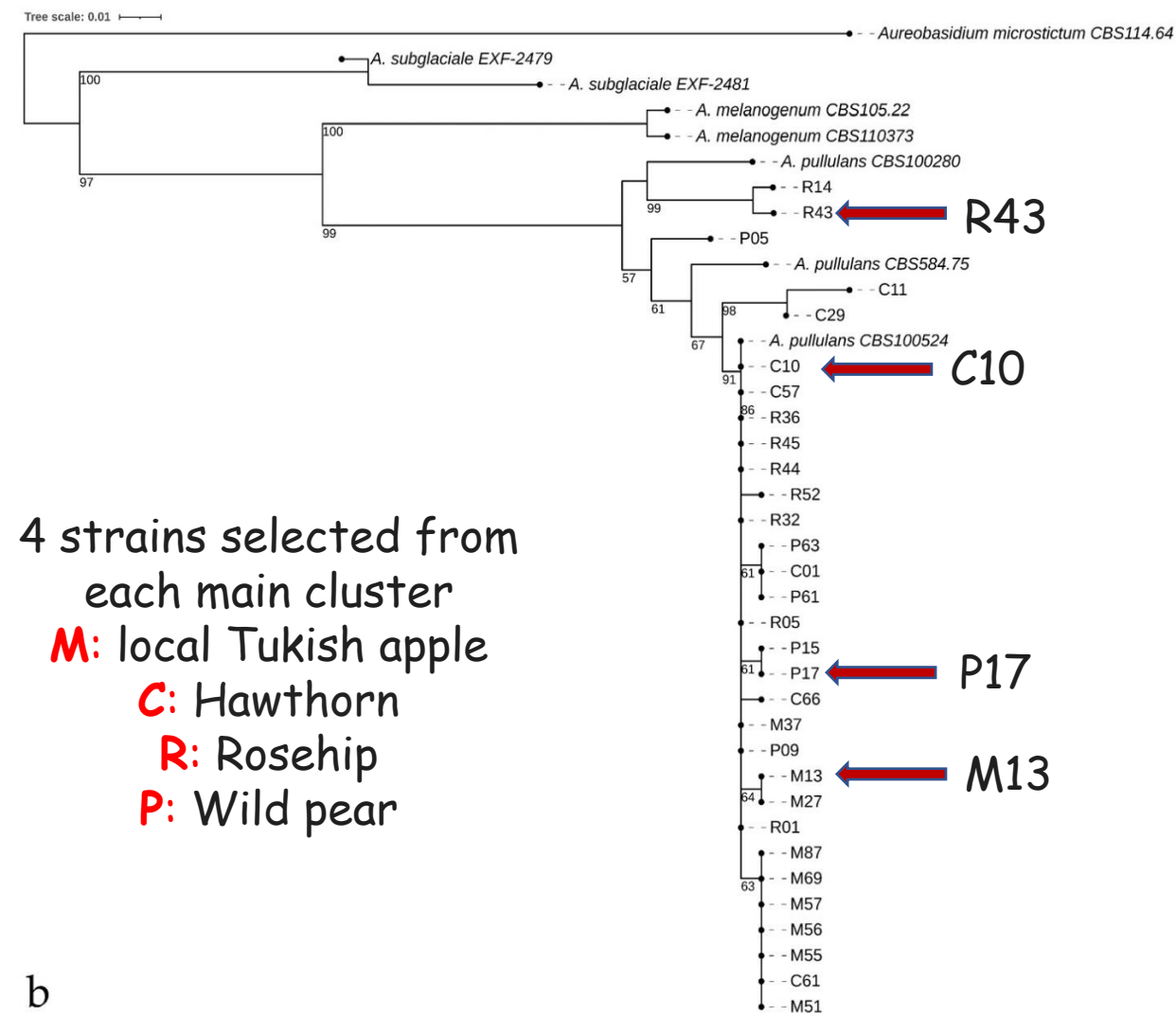
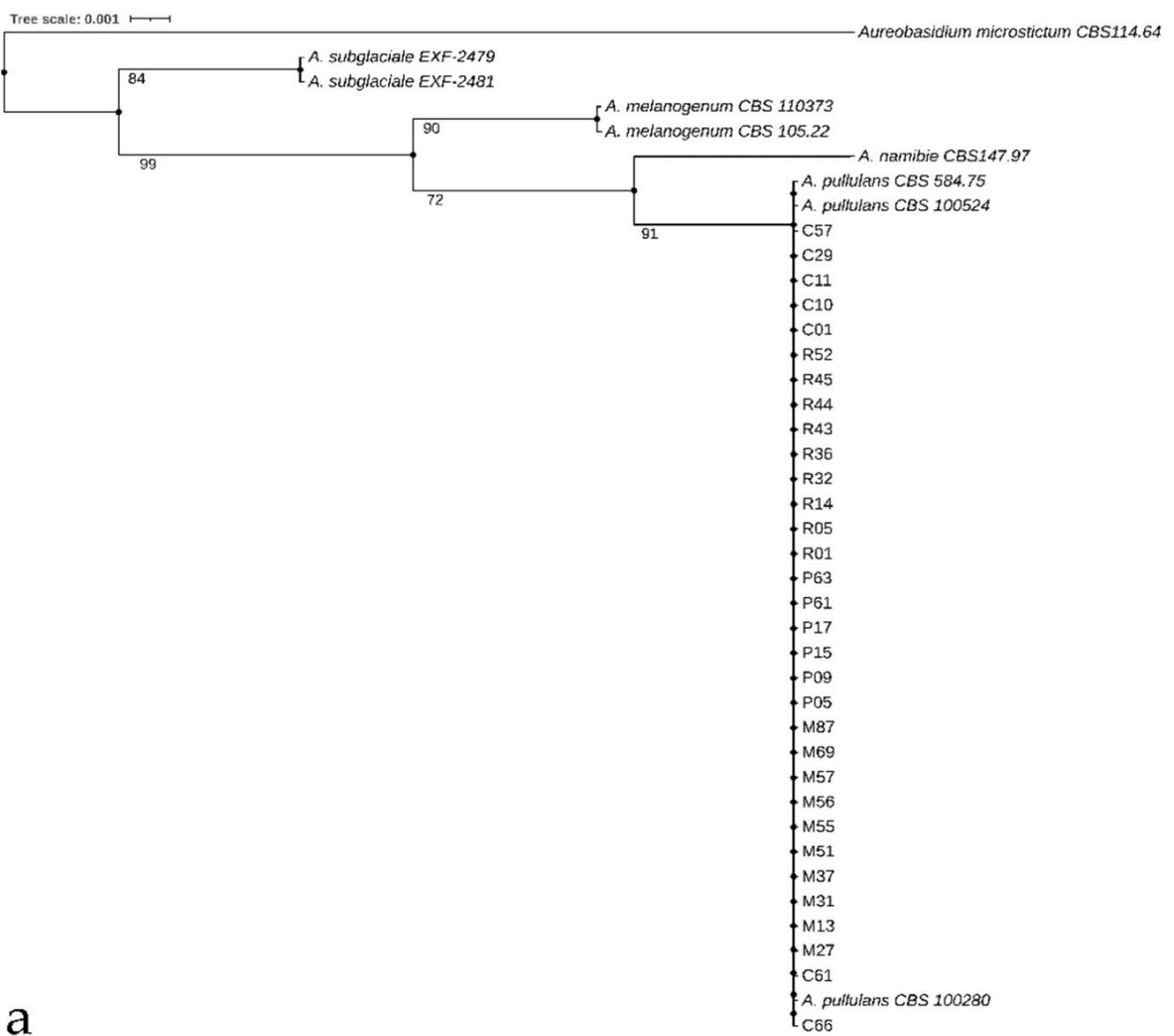
VOCs application by **hydrogel spheres** on strawberry

All the 32 strains were *Aureobasidium pullulans*



ITS gene

EF1 gene

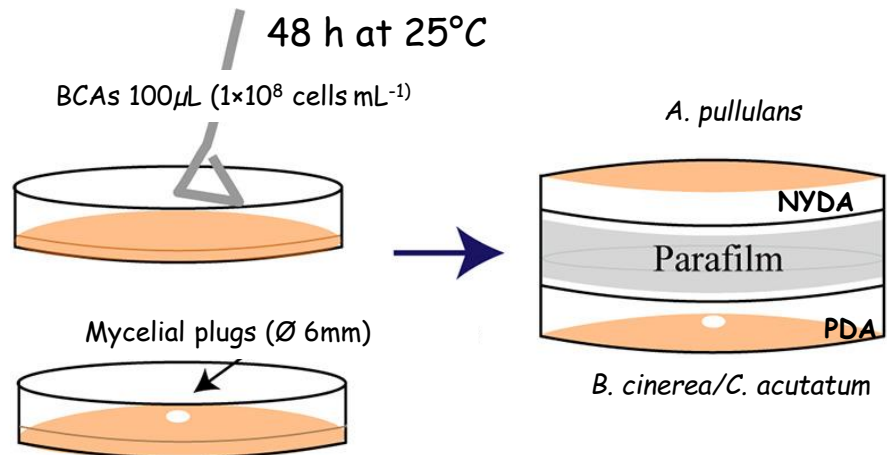


4 strains selected from each main cluster
M: local Turkish apple
C: Hawthorn
R: Rosehip
P: Wild pear

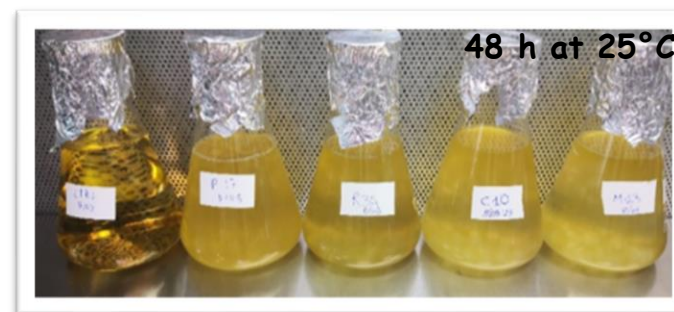
a

b

Double Petri dishes assay



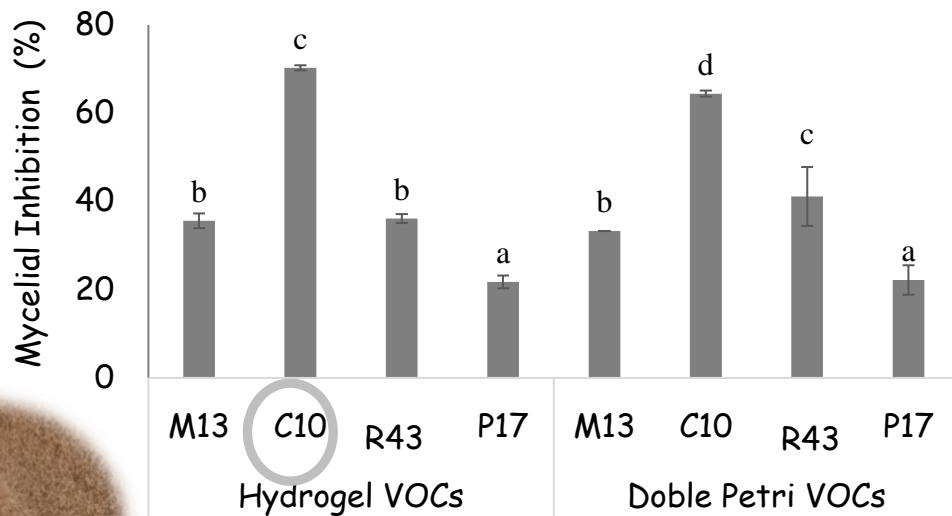
Double Petri dishes assay with Hydrogel spheres



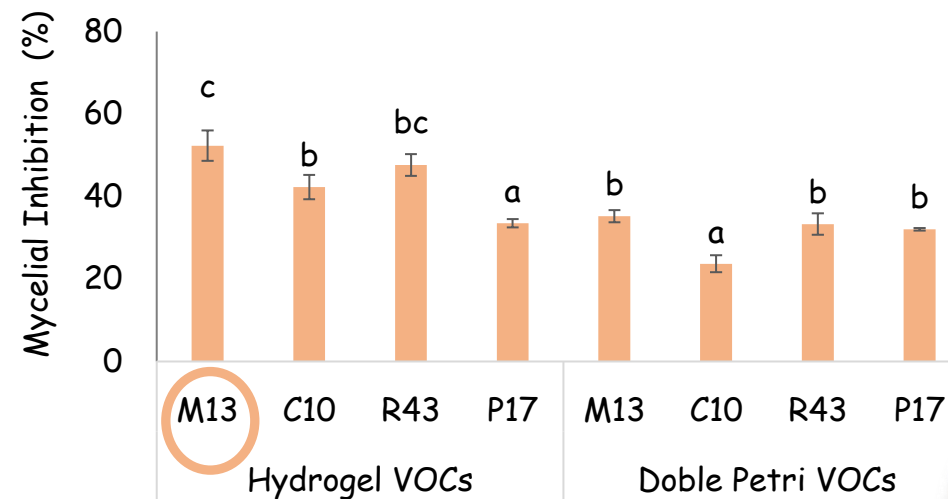
BCAs (1×10^8 cells mL⁻¹ in 250 mL NYDB + sterile 360 spheres)



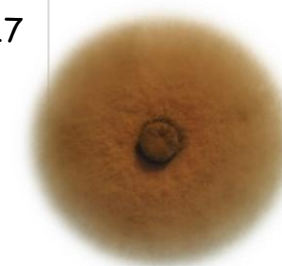
results



Botrytis cinerea



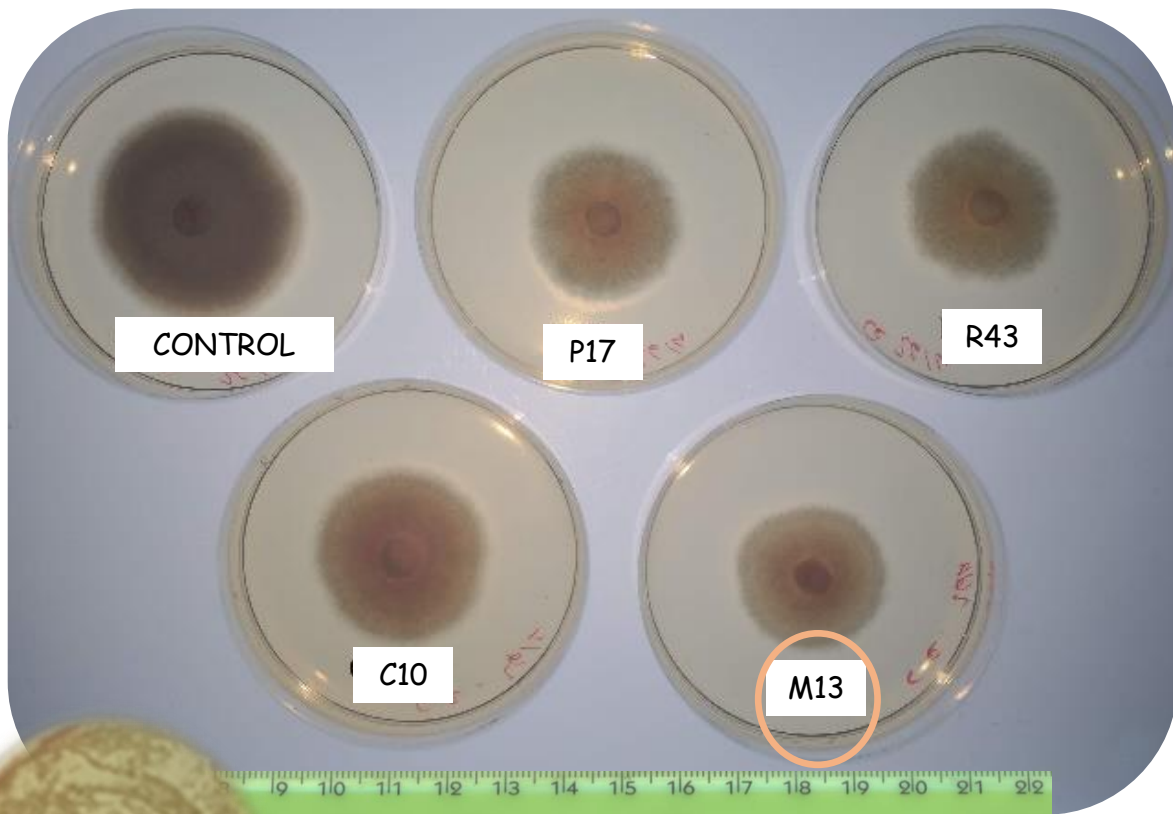
Colletotrichum acutatum



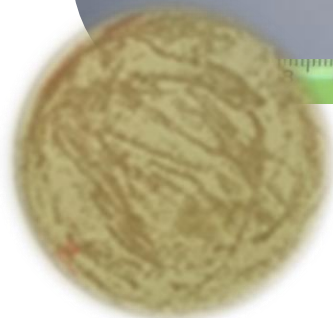
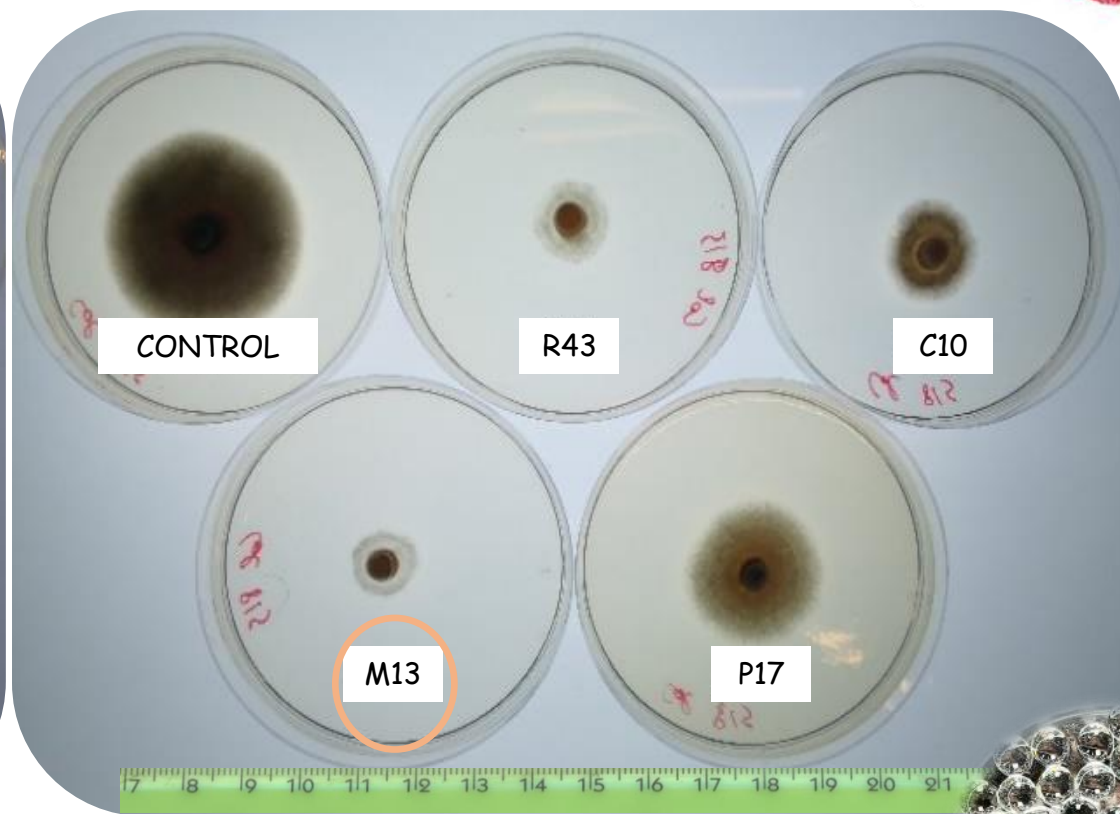


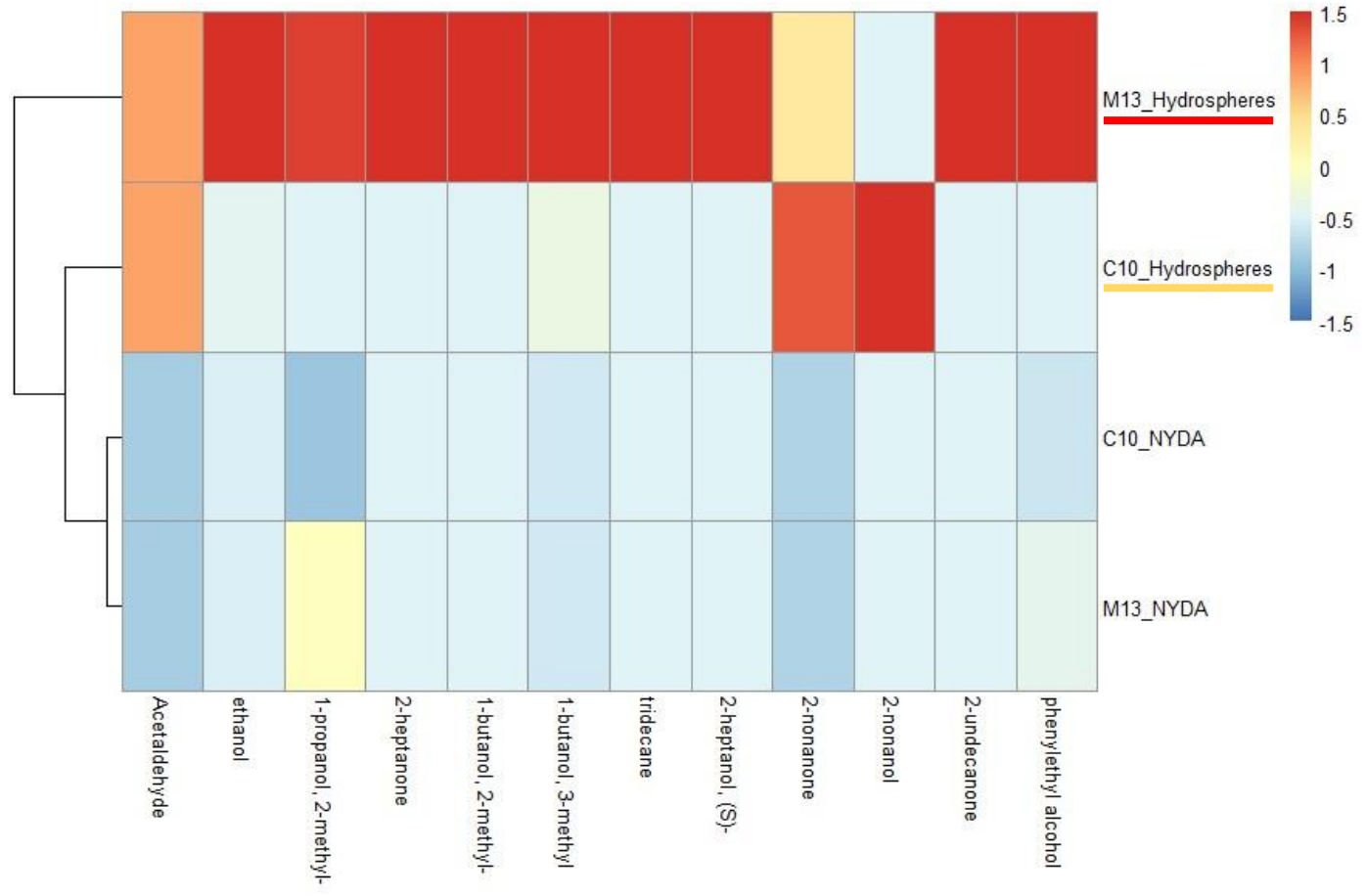
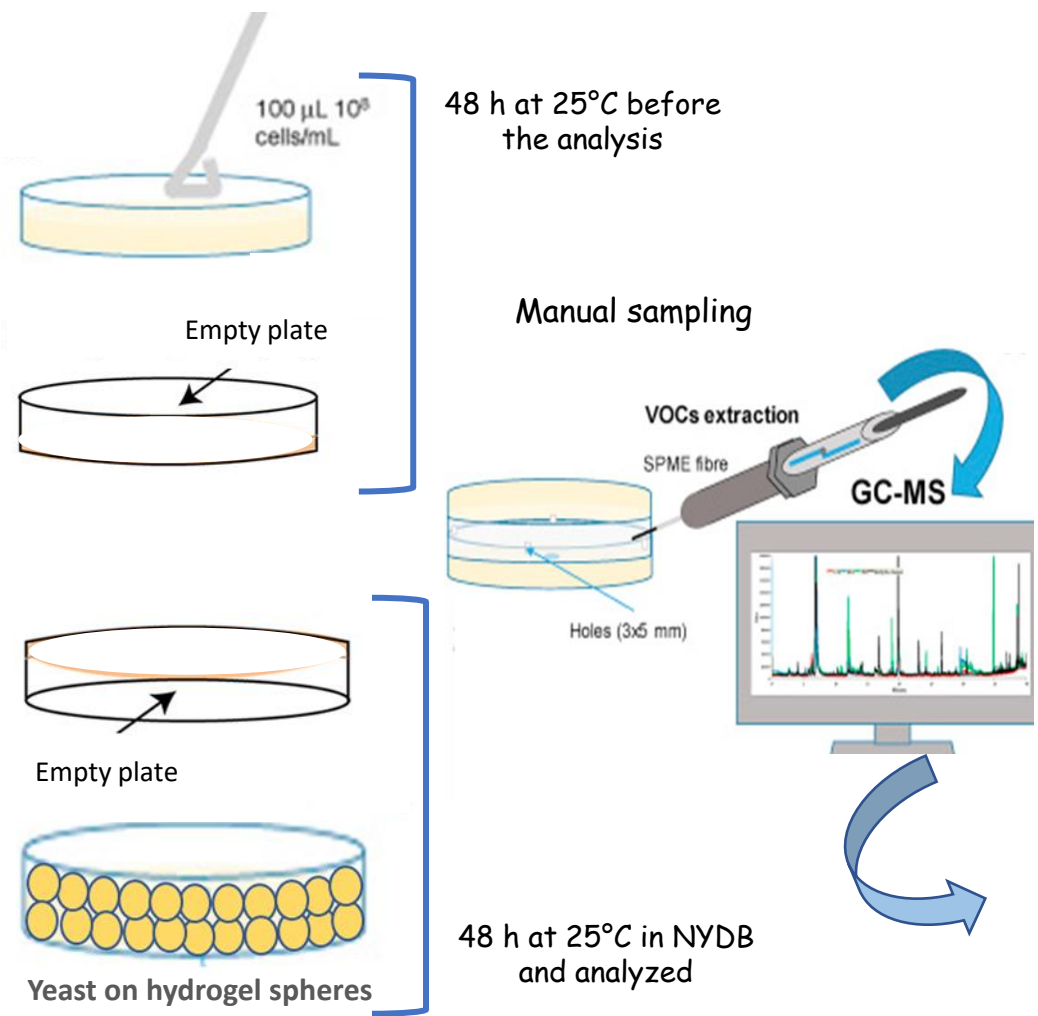
C. acutatum

Double Petri dishes assay

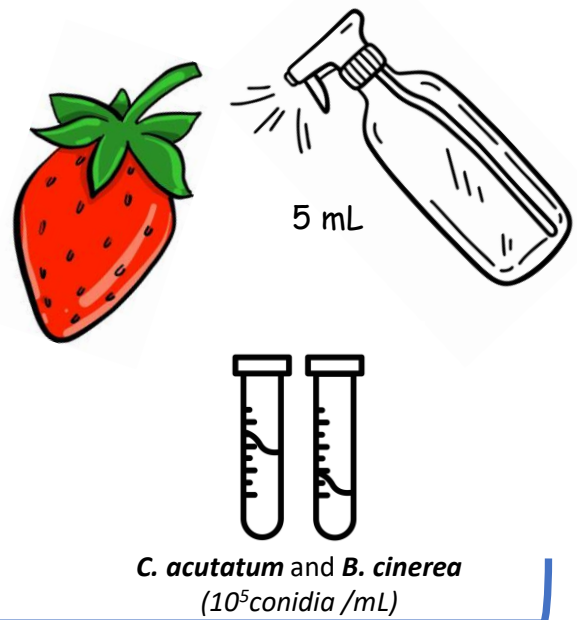
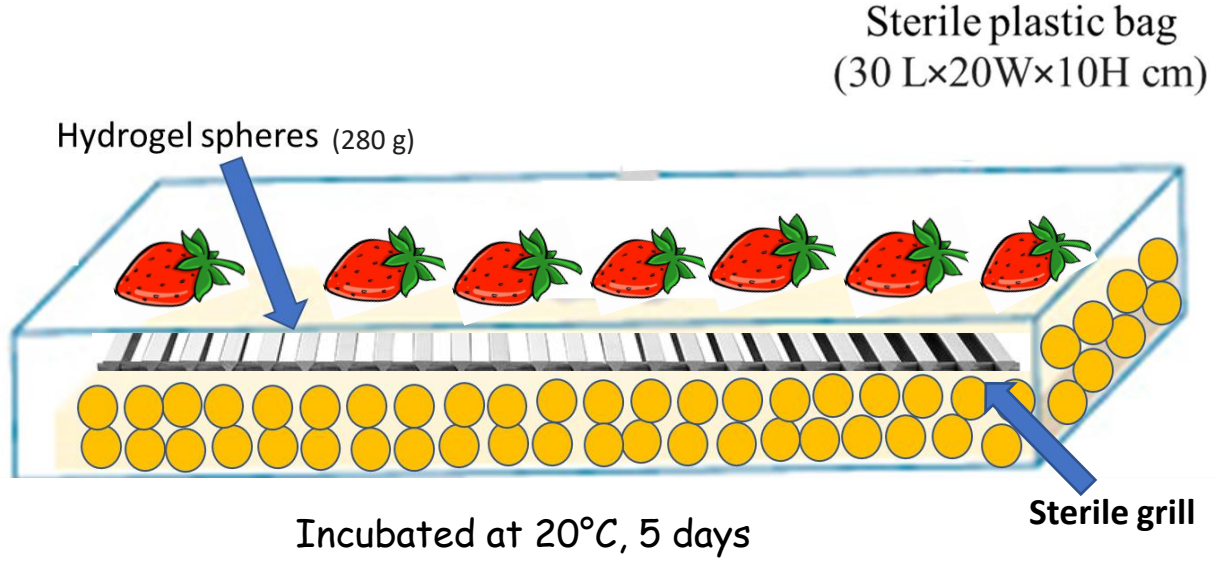


Double Petri dishes assay with Hydrogel spheres

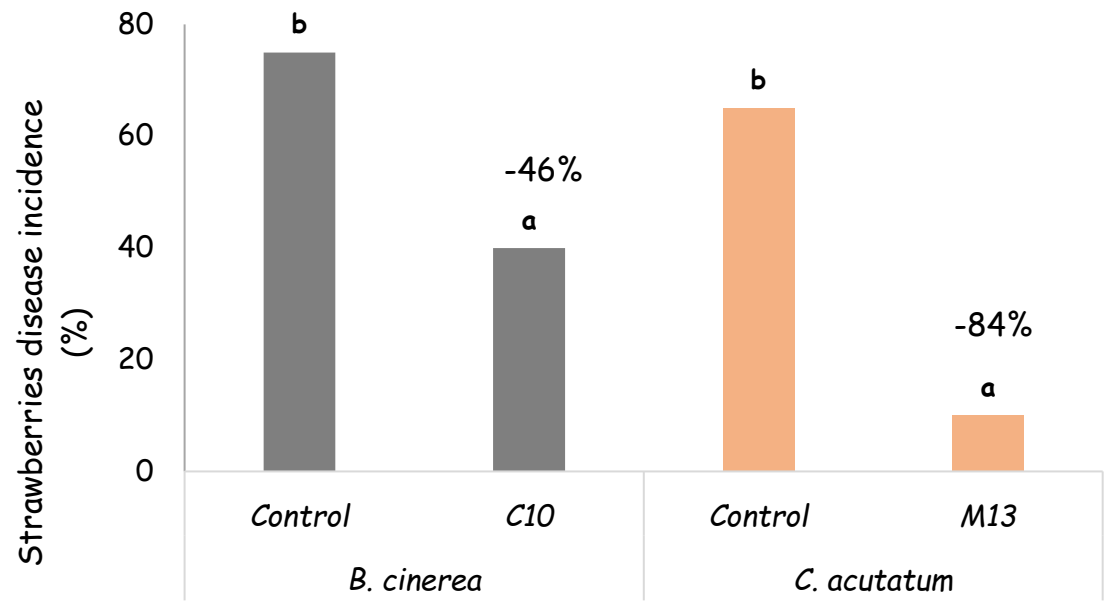




Fragaria × ananassa cv 'Candongga'



results



- ✓ Polymeric spheres: **high water binding capacity** and **> surface area**;
- ✓ Hydrogel spheres displayed **stability** over time of microorganisms' **cells viability** (Parafati et al. 2017);
- ✓ **The novelty**: hydrogel spheres improve the antagonistic activity, through the production of active VOCs (**> number** and **concentration**).

ABOUT VOCs APPLICATION METHOD

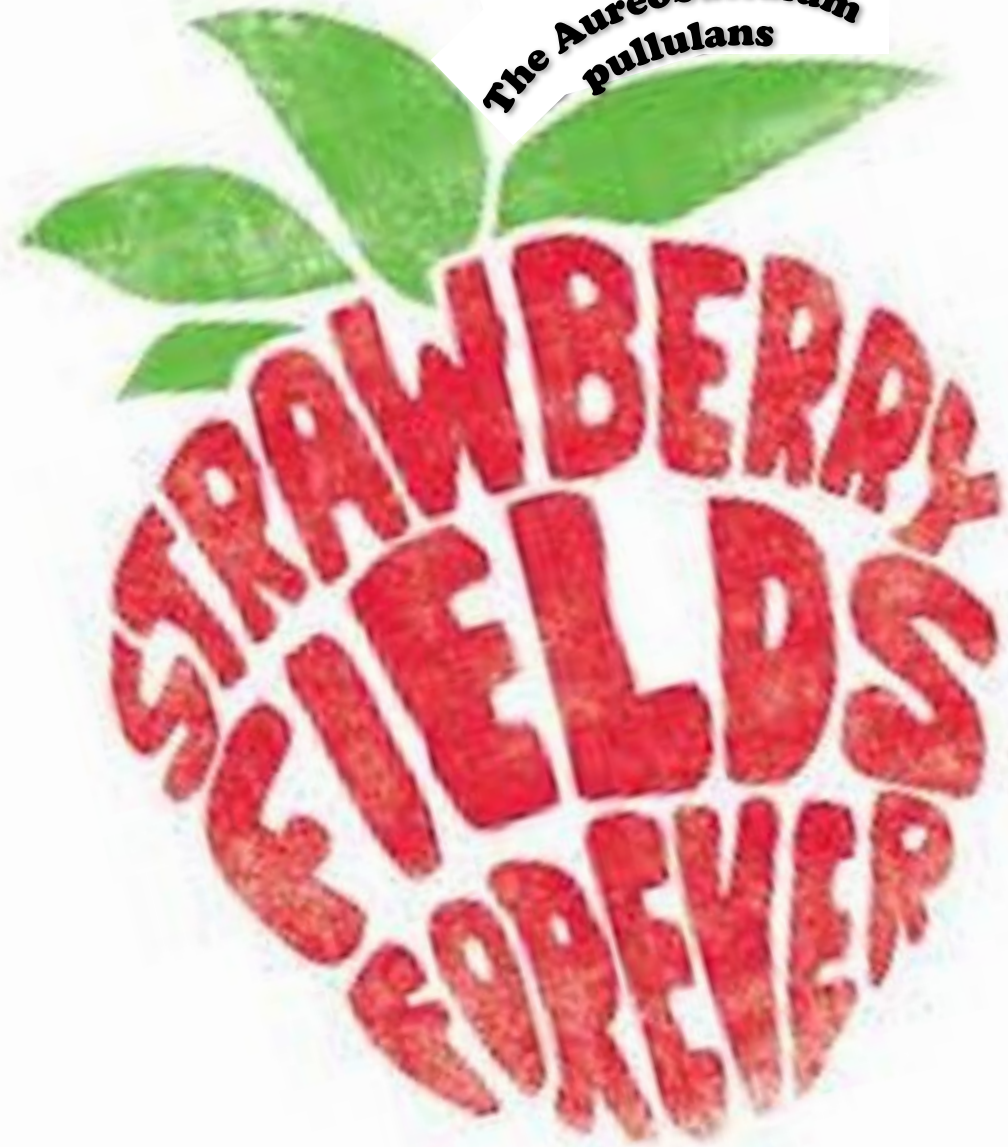
Can hydrogel spheres be considered as a tool for VOCs release in postharvest phase?



- ✓ **Alcohols** are the compounds most produced;
- ✓ *C. acutatum* was the **most sensitive** to VOCs;
- ✓ Compared to Bcas isolated from domesticated plants, 'wild' *A. pullulans* seems to produce a less complex volatilome on artificial media, but no less effective.

ABOUT BCA VOCs

The *Aureobasidium pullulans*



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hic sunt futura



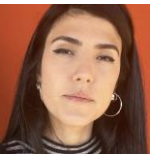
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Gaia Carminati
(Post-Doc)



(Raouf Saadallah
Post Doc)



Martina Lucci
(PhD student)

Thanks for your attention!