



**UNIVERSITY OF WEST ATTICA**  
**DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY**



# «Research activities of the Food Microbiology Laboratory»

2023-2024



Permanent laboratory staff:  
S.Konteles, Assistant Professor  
A.Batrinou, Assistant Professor



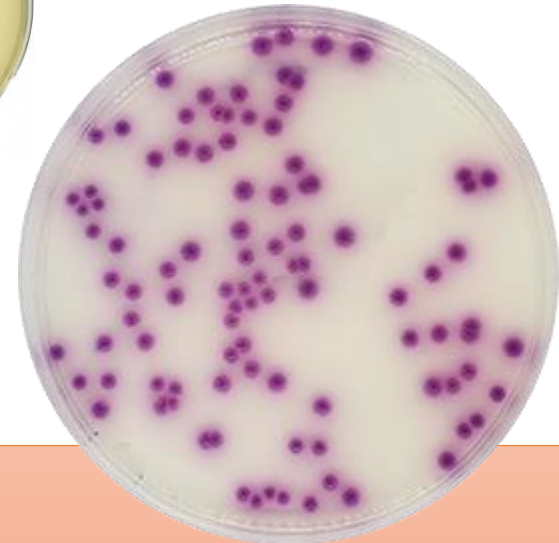
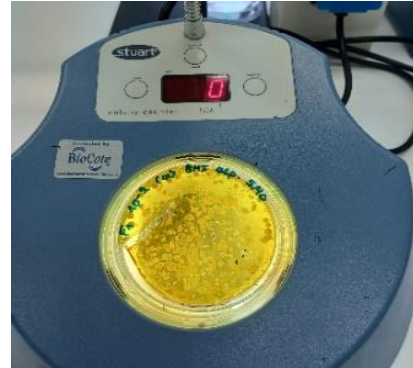
# Research activity during the last three years (2021-2024):

- 34 publications in scientific journals with impact factor
- 19 presentations in international conferences with referees
- Supervision of 2 PhD candidates
- Supervision of 6 postgraduate theses
- Supervision of 25 undergraduate theses
- Participation in two research projects
- Private Research Funding by GSK UK.
- Memorandum of Understanding with the Mediterranean Agri-Food Competence Centre, MACC (Crete)
- Collaborations with other departments of UniWA: Department of Biomedical Sciences, Department of Mechanical Engineering, Department of Biomedical Engineering, Department of Conservation of Antiquities and Works of Art
- Agricultural University of Athens: Department of Food Science and Human Nutrition
- NTUA: Department of Chemical Engineering,
- National and Kapodestrian University of Athens: Department of Biology, School of Medicine
- Institute of Technology of Agricultural Products, Athens

# 1<sup>a</sup>. Classical microbiological analyses

- **Detection and enumeration of pathogenic microorganisms in food:**

- *Salmonella*
- *Listeria monocytogenes*
- *Escherichia coli*
- STEC
- *Staphylococcus aureus*
- *Campylobacter*
- *Cronobacter sakazaki*



- **Methods of analysis:**

- With chromogenic selective nutrient substrates (ISO methods)
- With molecular analyses (PCR, 16S rRNA sequencing for bacteria, ITS sequencing for fungi) in collaboration with the Food Molecular Analysis Laboratory

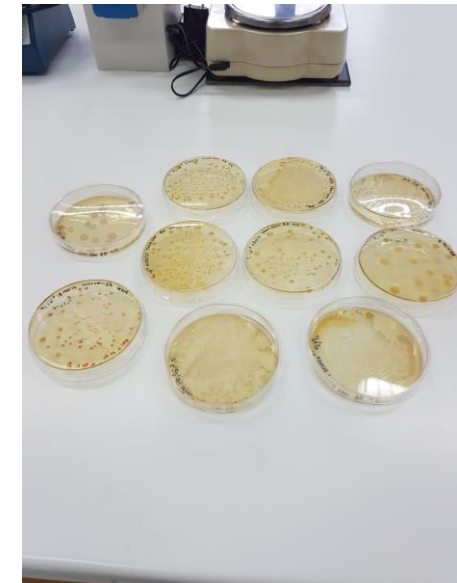
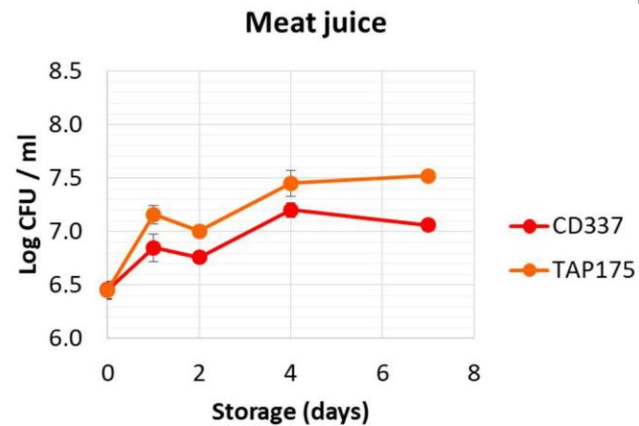
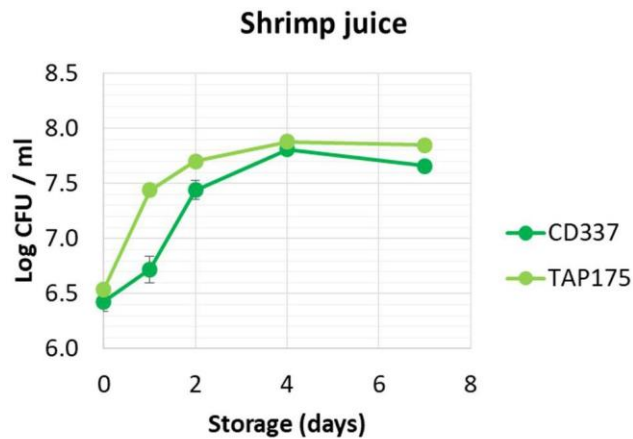
## 1b. Classical microbiological analyses:

- **Detection and enumeration of spoilage microorganisms in food**
- OMX
- Yeasts/Fungi
- Psychrotrophic microorganisms
- Anaerobic microorganisms
- **Detection and enumeration of probiotic microorganisms in foods and dietary supplements (eg probiotic tablets)**
- **Lactic acid bacteria (LAB)**



# 2. Food microbial stability studies

- Estimation of shelf-life of food of animal or plant origin
- Study of accelerated microbiological spoilage of food

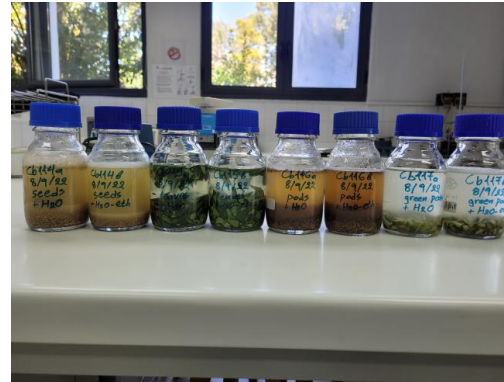


# Related publications

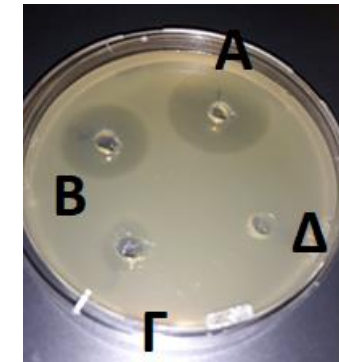
1. Konteles SJ, Stavropoulou NA, Thanou IV, Mouka E, Kousiaris V, Stoforos GN, Gogou E, Giannakourou MC. Enriching Cured Meat Products with Bioactive Compounds Recovered from *Rosa damascena* and *Rosmarinus officinalis* L. Distillation By-Products: The Pursuit of Natural Antimicrobials to Reduce the Use of Nitrites. *Applied Sciences*. 2023; 13(24):13085. <https://doi.org/10.3390/app132413085>
2. Thomas, A., Konteles, S. J., Ouzounis, S., Papatheodorou, S., Tsakni, A., Houhoula, D., & Tsironi, T. (2023). Bacterial community in response to packaging conditions in farmed gilthead seabream. *Aquaculture and Fisheries*, 8(4), 410-421.
3. Giannakourou, M. C., Stavropoulou, N., Tsironi, T., Lougovois, V., Kyrana, V., Konteles, S. J., & Sinanoglou, V. J. (2023). Application of hurdle technology for the shelf life extension of European eel (*Anguilla anguilla*) fillets. *Aquaculture and Fisheries*, 8(4), 393-402.
4. Anthimia Batrinou, Irene Strati, Andreas Tsantes, Efstathia Tsakali, Jan Van Impe, Spiridon Konteles<sup>1</sup>, Panagiotis Halvatsiotis<sup>4</sup> and Dimitra Houhoula, Molecular Characterization of Shiga Toxin Producing *E. COLI* (STEC) Virulence Genes from Various Foods, (NN\_11\_FOOD-SAFE\_09), FOODSIM 2022, KU-Leuven, University of Leuven, Camp Ghent, 3-6 April 2022
5. Spiridon J. Konteles, Anthimia Batrinou, Arhontoula Chatzilazarou, D. Houhoula Irene Strati, Jan F.M. Van Impe and Efstathia Tsakali, Inhibitory Phenomena to *Cronobacter sakazakii* in Co-Culture with the *Bifidobacterium animalis* subsp. *lactis* BB-12 in Synthetic Medium at Different Inoculation Level, (NN\_14\_FOOD\_PRED\_05) FOODSIM 2022, KU-Leuven, University of Leuven, Camp Ghent, 3-6 April 2022
6. Konteles, S. J., Strati, I. F., Giannakourou, M., Batrinou, A., Papadakis, S., Ourailoglou, D., ... & Sinanoglou, V. J. (2021). Instant Herbal Powder: Functionality Assessment through Chemical, Microbiological and Shelf Life Kinetics. *Analytical Letters*, 1-12.
7. Papadakis, P.; Konteles, S.; Batrinou, A.; Ouzounis, S.; Tsironi, T.; Halvatsiotis, P.; Tsakali, E.; Van Impe, J.F.M.; Vougiouklaki, D.; Strati, I.F.; et al. (2021) Characterization of Bacterial Microbiota of PDO Feta Cheese by 16S Metagenomic Analysis. *Microorganisms* 2021, 9, 2377. <https://doi.org/10.3390/microorganisms9112377>
8. Nikolopoulou, G.; Tsironi, T.; Halvatsiotis, P.; Petropoulou, E.; Genaris, N.; Vougiouklaki, D.; Antonopoulos, D.; Thomas, A.; Tsilia, A.; Batrinou, A.; et al. Analysis of the Major Probiotics in Healthy Women's Breast Milk by Real-Time PCR. Factors Affecting the Presence of Those Bacteria. *Appl. Sci.* **2021**, *11*, 9400. <https://doi.org/10.3390/app11209400>

# 3a Studies of antimicrobial activity of various agents against pathogenic micro-organisms

- Plant extracts
- Hydrogels
- Metal Nanoparticles

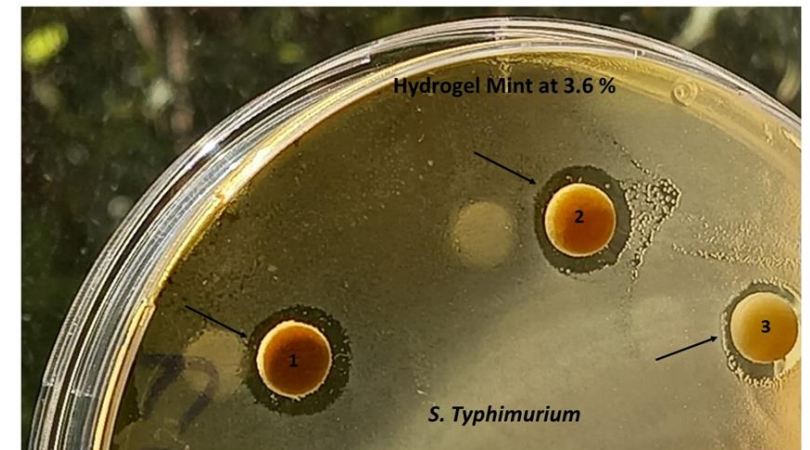


With classical methods in  
Petri dishes



Μέθοδος well  
diffusion

Μέθοδος disc diffusion

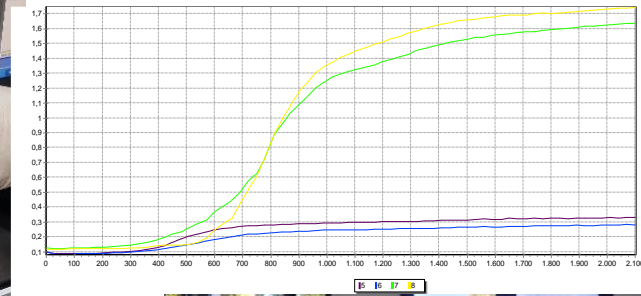


## Publications:

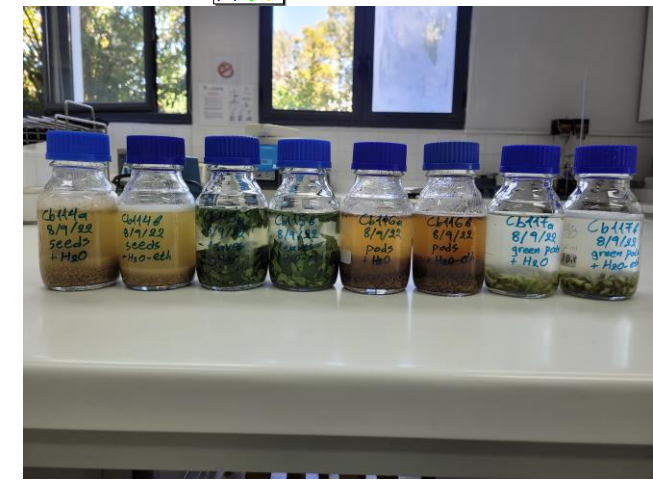
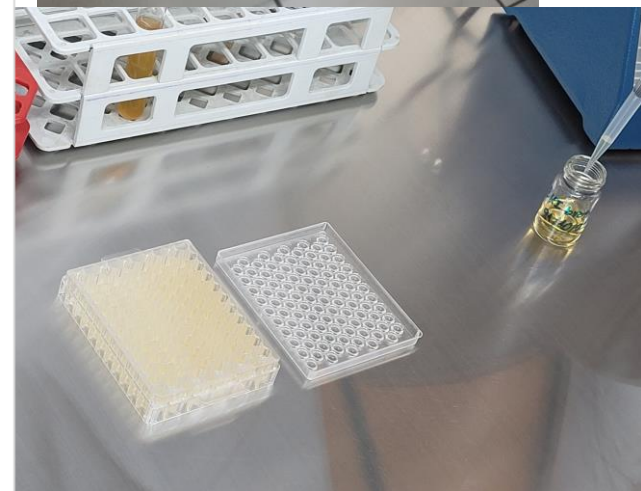
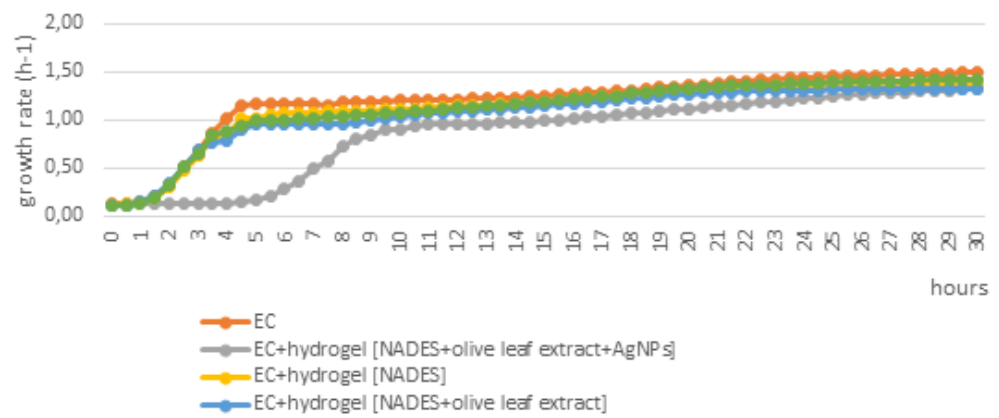
1. Pyrovolou K., Konteles S., Aloizou, E., Tsiaka, T., Fildisis, G., Strati E., Batrinou A. (2022). Antimicrobial activity of carob (*Ceratonia siliqua* L.) extracts. 1st International Congress on Food, Nutrition & Public Health - Towards a sustainable future, Instituto Nacional de Saúde Doutor Ricardo Jorge, I.P., Lisbon, Portugal, 17th November 2022
2. I.Pitterou, A. Tzavara, A. Tzani, M.Andriakaina, K.Pyrovolo, K. Tsiantas, A. Batrinou, S. Konteles, C. Fountzoula, A. Kriebardis, P. Zoumpoulakis, A. Detsi,(2023) Nanocomposite alginate hydrogels incorporating silver nanoparticles: a green approach towards smart antimicrobial materials, MedChem 2023, Paul Ehrlich Euro-PhD Network, Dept of Pharmaceutical Chemistry of Aristotle University of Thessaloniki, 16-18 July 2023, Thessaloniki, Greece

# 3b Studies of antimicrobial activity of various agents against pathogenic microorganisms

- Microorganism growth curve measurement method (Bioscreen C automatic turbidometry)



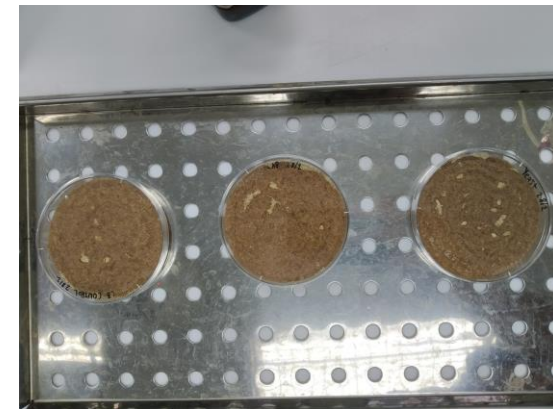
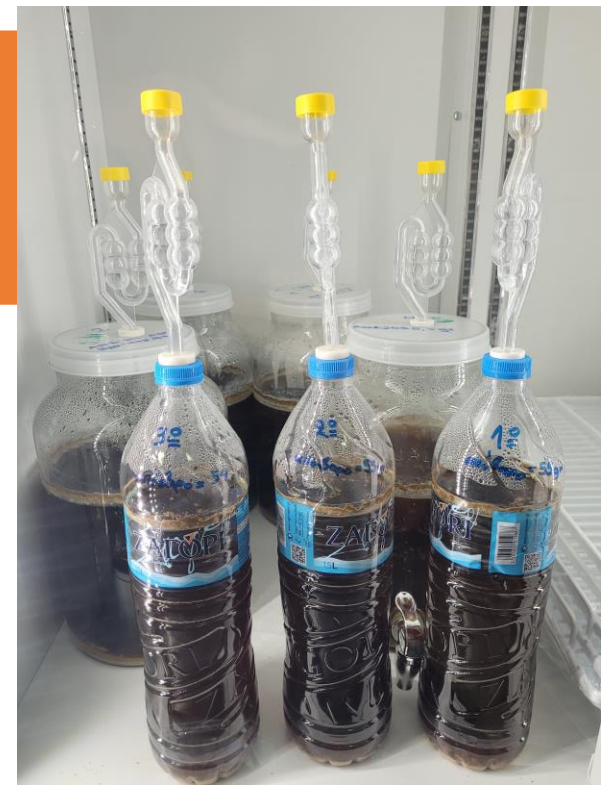
Antimicrobial activity of hydrogels against *Escherichia coli* ATCC 25922 (EC)





# 4. Microbial fermentations

- Preparation of alcoholic beverages by fermentation of plant substrates (eg carob)
- Solid phase fermentations in vegetable seeds
- Fermentation involving lactic acid bacteria/yeast/filamentous fungi



## Publications:

1. Pyrovolou K, Tataridis P, Revelou P-K, Strati IF, Konteles SJ, Tarantilis PA, Houhoula D, Batrinou A. Fermentation of a Strong Dark Ale Hybrid Beer Enriched with Carob (*Ceratonia siliqua* L.) Syrup with Enhanced Polyphenol Profile. *Applied Sciences*. 2024; 14(3):1199. <https://doi.org/10.3390/app14031199>
2. Pyrovolou, K.\*, Konteles, S., Strati, E., Tataridis, P., Tsioka, A., Batrinou, A (2023) Fermentation of carob syrup with *Saccharomyces cerevisiae* produces a fermented high-polyphenol alcoholic beverage, 7<sup>th</sup> International ISEKI-Food Conference, 5-7 July 2023, Paris, France
3. Pyrovolou, K\*, Konteles, S, Strati, E, Tataridis, P, Tsioka, A, Batrinou, (2023) Fermentation of stout beer and its upgrade to imperial stout, by carob syrup addition, improving functional characteristics of the final product, 7<sup>th</sup> International ISEKI-Food Conference, 5-7 July 2023, Paris, France
4. Pyrovolou K., Konteles S., Strati E., Tataridis, P., Avramopoulos, C., Tsioka, A., Batrinou A. (2022) Fermentation of beer enriched with carob syrup (*Ceratonia siliqua* L.) increases bioactivity of final product. 1st International Congress on Food, Nutrition & Public Health - Towards a sustainable future, Instituto Nacional de Saúde Doutor Ricardo Jorge, I.P., Lisbon, Portugal, 17th November 2022



# 6. Studies of food interaction with the human gut microbiome

- Human gastric and intestinal conditions simulation system
- Study of the bioavailability of polyphenols of various foods after their interaction with various microorganisms of the human microbiome

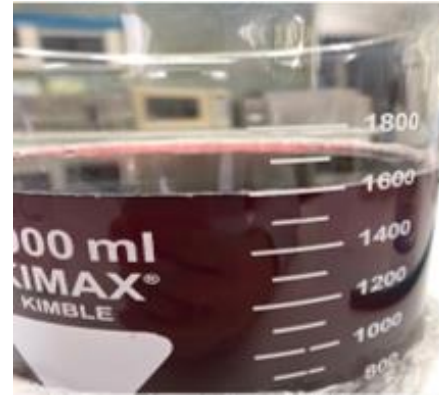


## **Publications:**

Pyrovolou K., Konteles S., Kosta C. , Kaliora, A.C. , Amerikanou C. , Strati E. , Batrinou A. (2022) Bioavailability of carob syrup polyphenols in a simulated gastrointestinal and colonic fermentation system. 1st International Congress on Food, Nutrition & Public Health - Towards a sustainable future, Instituto Nacional de Saúde Doutor Ricardo Jorge, I.P., Lisbon, Portugal, 17th November 2022

# 7. Manufacture of new products by microencapsulation of probiotic microorganisms

- Microencapsulation of probiotic microorganisms with spray dry (in collaboration with the Food Engineering Laboratory)



## **Publications:**

Polyvakidi M., Pyrovolou K., Konteles S., Strati E., Papadakis S., Batrinou A. (2022). Non-dairy probiotic herbal beverage with microencapsulated lactic acid bacteria) 1st International Congress on Food, Nutrition & Public Health - Towards a sustainable future, Instituto Nacional de Saúde Doutor Ricardo Jorge, I.P., Lisbon, Portugal, 17th November 2022

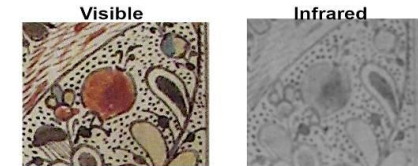
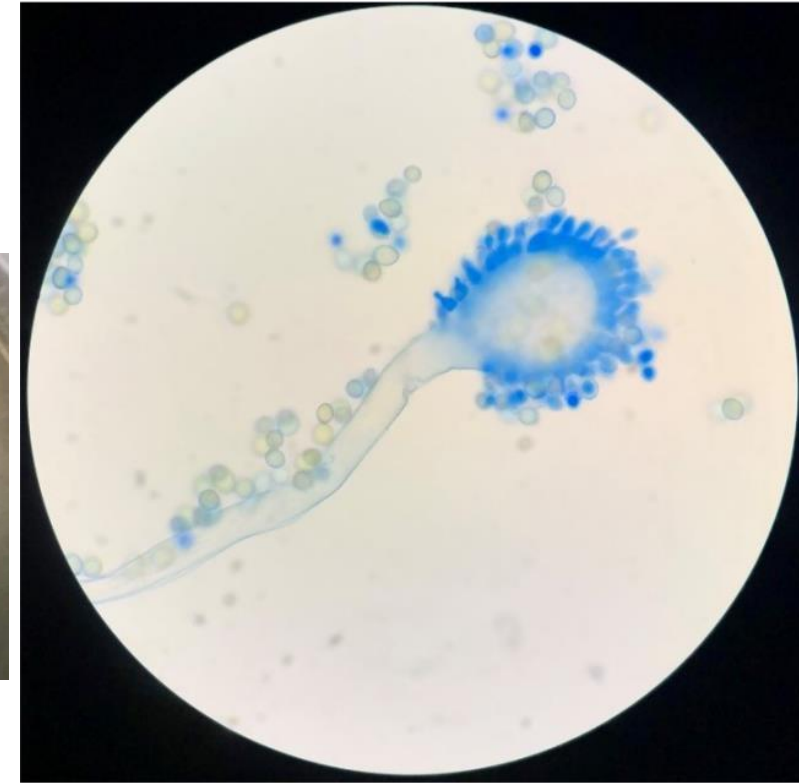
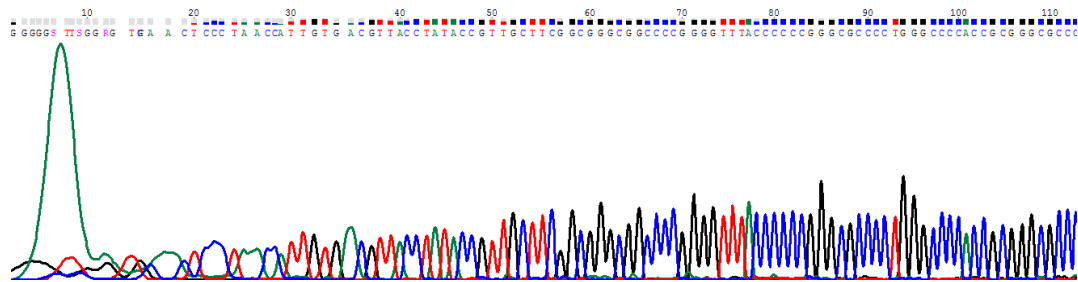
# 8. Surface hygiene control with bioluminescence method

- Use of a luminometer to check microbial load on surfaces with special swabs that measure the amount of ATP on surfaces
- The amount of ATP correlates with the biological load present on a surface and indicates the areas that need disinfection

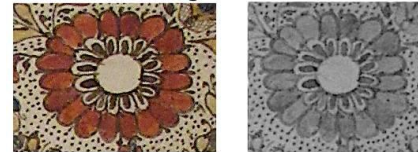


# 9. Cooperation with the Department of Conservation of Antiquities and Works of Art

- Analysis of Byzantine manuscripts for the presence of fungi
- Molecular identification of fungi (in collaboration with the Molecular Analysis Laboratory)



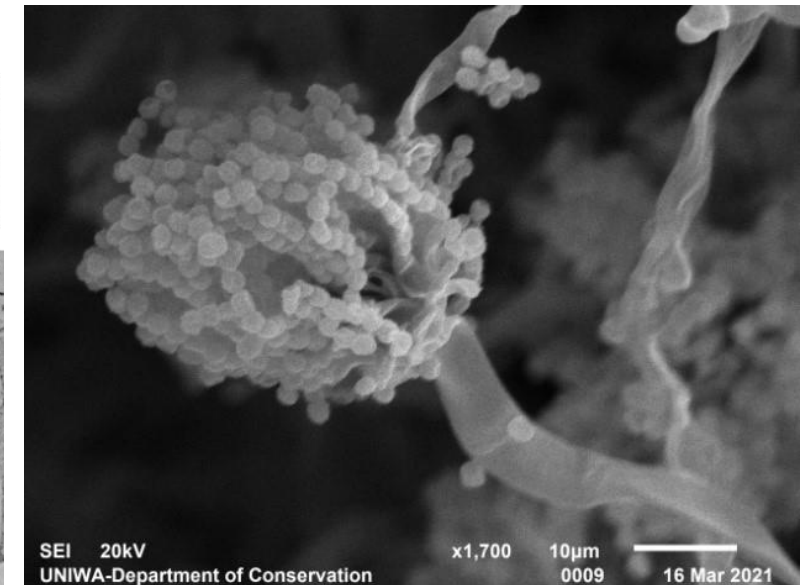
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Page 10 recto



## Publications:

1. Vassiliki KOKLA, Anthimia BATRINOI, Spyros PAPTAEODOROU, Dimitra HOUHOULA, Georgios PANAGIARIS, Agamemnon TSELIKAS, Assessing the preservation condition of a nineteenth century manuscript by physicochemical and biological assays, 5<sup>th</sup> International Conference on Innovation and Technology, 28<sup>th</sup> June-1<sup>st</sup> July 2022, Paris, France
2. Vassiliki Kokla, Anthimia Batrinou, Spyros Papatheodorou, Dimitra Houhoula, George Panagiari, Agamemnon Tselikas, "Non-invasive and biological analysis on pigments used in the nineteenth century manuscript", 7<sup>th</sup> Balkan Symposium on Archaeometry, 22-25 September 2020, Athens, Greece

# View of laboratory areas

