EuroMicropH
Acidic Fridays

2nd Acidic Friday 2021-01-15 16:00 CET

Open discussion platform of the COST action EuroMicropH. This discussion series is intended to stimulate an exchange on the different aspects of how microorganisms react to low pH conditions and why people are interested to investigate this subject.

Please register here for the upcoming meeting. To access the meeting please follow the Zoom link beneath.

Join Zoom-Meeting

https://tuwien.zoom.us/j/95970206136?pwd=a3VDV1NXaWIzczF3TDd2UWtNSmlLUT09

Meeting-ID: 959 7020 6136
Password: n?@VqCH6

Agenda

Chairs

Ott Scheler, Tallinn Univerity of Technology, Estonia

Sholeem Griffin, University of Malta, Malta

16:00 Welcome

16:05 Andrés Garzón Ruiz, University of Castilla-La Mancha, Spain

Intracellular pH measurements by means of FLIM microscopy

16:25 Mehtap Usta, Trabzon University, Turkey

Honey Bees: Health and Diseases

16:45 Michał Arabski, Jan Kochanowski University, Poland

Application of laser interferometry technique in analysis of bacterial biofilm degradation

Questions and Discussion

Do you want to contribute to upcoming Acidic Fridays? Please register a talk here or contact Matthias Steiger Matthias.steiger@tuwien.ac.at (Leader WG 6).

Abstracts

Andrés Garzón Ruiz, University of Castilla-La Mancha, Spain

Intracellular pH measurements by means of FLIM microscopy

We have used three different CdSe/ZnS quatum dots (QDs), functionalized with D-penicillamine and small peptides, as pH probes for fluorescence lifetime imaging microscopy (FLIM). The fluorescence pH sensitivity of these nanoparticles was analyzed in different experimental media: aqueous solution, synthetic intracellular medium, and mesenchymal C3H10T1/2 and tumoral SKMEL-2 cell lines. Absolute intracellular pH values in live cells with FLIM were carried out (intracellular pH values of 7.0 and 7.1 for C3H10T1/2 and SK-MEL-2 cells, respectively). These fluorescent nanoprobes can also be used to distinguish between different types of cells in cocultures on the basis of their different fluorescence lifetimes in dissimilar intracellular environments.

Mehtap Usta, Trabzon University, Turkey

Honey Bees: Health and Diseases

Turkey, Food, Agriculture and Livestock Ministry of Apiculture Research Institute on average, according to data of 2020, 8 million 128 thousand the number of hives and 109.330 tons of honey production in the world should place. In the forefront of the beekeeping industry in our country as well as provide an important contribution to crop production through the agricultural economy and pollination in the world. It is assessed that in an environment without bees, vegetative production can decrease by 47%. Colony extinction events, which have been observed recently in different countries and whose cause cannot be explained, are considered as a problem that may affect biological balance in the future. It is noted that similar problems can be seen in Turkey. In addition, many factors affect the honey production negatively in the beekeeping sector. Some of these are bacterial and viral diseases that honey producers complain about. In addition to these, the most complained and damaging organisms are Varroa, Nosema, *Bacillus larvae* (American foulbrood), *Melicoccus pluton* (European Foulbrood), *Aspergillus flavus* (stone diseases), *Ascosphaera apis*, *Acarapis woodi*, *Marator aitatulas* and *Galleria mellonella*.

In this study, isolation and characterization of bacteria from *Varroa destructor* and *Apis mellifera* was performed. According to the preliminary evaluation, seven bacteria were obtained from *Varroa destructor*. Only four of the bacteria obtained from *Apis mellifera* have reached the results at this time. In total, 16 bacteria were isolated from *Apis mellifera*. Others' results are at the sequence stage. These bacteria named in preliminary evaluation were named according to colour, shape and 16S rRNA values. In addition to these, appropriate pH, temperature and biochemical tests will be done. In addition to these, studies of probiotic bacteria to be obtained from *Apis mellifera* are continuing. All these bacteria to be obtained will be used in honey bee health studies.

Michał Arabski, Jan Kochanowski University, Poland

Application of laser interferometry technique in analysis of bacterial biofilm degradation

One of the measurement techniques used in physical sciences, with a potential for new applications in biology, is laser interferometry. This method, based on the phenomenon of wave interference, enables quantitative substance assays using a measurement of the difference between light refractive indexes. Moreover, properties of laser-generated radiation, i.e. low beam divergence, narrow spectral band, and a high degree of coherence all have a positive influence on assay sensitivity. In our scientific work, we use a unique interferometric set-up constructed at Jan Kochanowski University in Kielce, Poland. This equipment can measure the degradation or forming of bacterial biofilm in the presence of antibacterial agents or drug releases from biopolymers in defined conditions. The resulting parameters can be used to formulate a mathematical description of these processes. In our study we tested (1) degradation of Pseudomonas aeruginosa ATCC15692 (PAO1) biofilm by bacteriophages, (2) effect of newly synthesized dendrimers on biofilm formation, and (3) releasing of antibiotics from biopolymers (alginate or hydroxyapatite) by laser interferometry.