

Humboldt Kolleg

Hilton Garden Inn Hotel, Doamnei St. 12, Bucharest

18-22 November 2020

Global Challenges of the 21st Century

1) Technological development and human health/ quality of life

2) Climate change and environmental sustainability

3) Democracy and cohesion in Europe

Implication of Biogenic Isoprenoids in Climate Change and Plant Protection

Biogenic isoprenoids are released by vegetation to the atmosphere in significant quantities and are playing a crucial role in atmospheric chemistry and composition. Isoprene is the most abundant and dominant hydrocarbon emitted from a wide range of plants. There is evidence that isoprene protects plants against environmental stress and also contributes to biosphere-atmosphere interactions, affecting air quality.

Vegetation emits more hydrocarbons into the atmosphere than human activity can produce directly, and it emits significantly more of them when temperatures are elevated. Volatile isoprenoids are involved in a wide range of ecological and physiological interactions. They can serve as pollinator attractants, herbivore repellents, toxins or antibiotics. The production of volatile isoprenoids is metabolically and energetically costly for the plants. By searching the answer to the question “why plants produce isoprenoids” it became clear that they play not only a significant role in biosphere – atmosphere interactions, but they are also involved in a broad array of protective functions against biotic and abiotic stress. Their role as antioxidants and in improving the membrane structure and functionality of the photosynthetic machinery is experimentally proven. Even more, the suppression of isoprene production under control conditions induces transcriptional changes and triggers wide rearrangements in plant metabolome and proteome to minimize the negative stress effects resulting from isoprene absence.

Violeta Velikova is a professor at the Institute of Plant Physiology and Genetics of the Bulgarian Academy of Sciences (IPPG – BAS). Prof. Velikova is the director of the “Photosynthesis – activity and regulation” laboratory at IPPG, and she also directs the Scientific Council of IPPG. Prof. Velikova studies the impact of climate change factors and anthropogenic pollution on primary and secondary plant metabolism. She is an expert in the physiological role of volatile and non-volatile isoprenoids involved in plant defense. The study of the physiological role of isoprenoids under abiotic stress has been the primary focus of her work during two CNR-NATO Outreach Fellowships, NATO “Collaborative Linkage Grant”, NATO Reintegration Grant and Alexander von Humboldt fellowship. She is a principal investigator in 10 international and 3 national scientific projects. So far, Prof. Velikova has published 102 papers in peer-reviewed ISI-indexed international journals, with a total number of > 4000 citations, and an H index of 25. Two students obtained their PhD degree under her supervision.