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Use of electricity to direct microbial metabolite production

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At the metabolic level, many organisms respond adaptively to changes in external stimuli such as exposure to toxins, drugs or radiation. For instance, high light exposure can induce up regulation of photo-protective metabolites and pigments in diverse plants and algae. Here, the author will focus on recent findings showing how application of electrical energy, alone or in combination with other stressors, may be used to guide and direct metabolism in microorganisms. Emerging bio-electrochemical tools and strategies for the targeted metabolomic analysis of useful electrically stimulated biological products including biofuels, antioxidants and pigments will be discussed. HPLC, GC and potentiostatic methodologies are used to study microbes as pure cultures or as syntrophic associations of bacteria, archaea and phototrophs such as cyanobaceria. Global profiling approaches useful for the discovery of novel electrically induced metabolites, proteins and response pathways will also be addressed.

Biography

John M Pisciotta received his PhD from Johns Hopkins University for research on heme and lipid metabolism in malaria. Postdoctoral stints at the University of Maryland Center for Marine Biotechnology and then Pennsylvania State University College of Engineering focused on the development of novel bioelectrochemical systems (BESs) for production of bioenergtic products from waste. He is currently an Assistant Professor in the Department of Biology at West Chester University in Pennsylvania where he teaches courses on Industrial Microbiology and Microbial Physiology.

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