

6th Annual Conference on

MICROBIOLOGY

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Annual Conference on

MICROBES AND BENEFICIAL MICROBES

October 16-17, 2017 Baltimore, USA

Developing next generation of microbial inoculants for agriculture**Antonino Baez, Yolanda E Morales-García, Verónica Quintero Hernández and Jesús Muñoz-Rojas**
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The current agricultural-production schemes totally depend on chemical fertilizers, pesticides and herbicides to grow plants, control pests, diseases and weeds in an effort to increase yields and maintain high product quality. The adopted green revolution technology have provoked several adverse effects to the environment due to indiscriminate use of agrochemicals. Spray deposition of pesticides represent a serious human health-risk because of their persistence in the environment and their ability to concentrate up in the food chain. Chemical fertilizers are the largest input costs of current agricultural production systems and the most polluting waste. Thus, microbial inoculants arise as an economically and environmentally feasible alternative for partial or total replacement of chemical fertilizers. Even though inoculation of plants with beneficial bacteria is centuries old and several research groups around the world have been working in isolation and description of new microorganisms, just few microbial inoculants appear on the commercial market, probably due to inoculants are not used, are of poor quality, or the production technology is limited. The next generation of inoculants include bacterial consortia able to promote plant growth more effectively than a single bacterium which represent desirable inputs for organic farming schemes. We have developed multi-species inoculants with several beneficial effects on plants like nitrogen fixation, iron chelation, phosphate solubilization, inhibition of pathogenic microorganisms, bioremediation of toxic compounds, thus reducing and eliminating the need for using chemical fertilizers and chemical pesticides. In this work we will describe the promising results of our polymicrobial formulations tested into the field crops and the challenges faced when the production process was scaled-up from petridishes to bioreactors.

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