MOL2NET, International Conference Series on Multidisciplinary Sciences
*UDLABIOTECH-01: I International Biotechnology Congress,*
*UDLA, Quito, Ecuador, 2019*

Oral Presentation – 16th of October 2019:

# Plant microbiomes and their benefit towards a more sustainable agriculture

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| **Graphical Abstract** | **Abstract.** |
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| *Insert grafical abstract figure here* | Ancient societies first attempted to domesticate wild plants for food production, which gave rise to present-day agriculture. Nowadays, more than a third of agricultural production is lost due to abiotic or biotic stress, such as drought, salinity, pests and diseases. Current predictions indicating an expanding world population until the end of the century, one of humanity's greatest challenges should be how to feeding the world in a sustainable way, as future increases in crop yields should be achieved with fewer input of fertilizers and pesticides. These challenges have raised awareness of the importance of the plant root microbiome to improve agricultural and horticultural practices.<br><br>Plant roots are colonized by a surprising number of microorganisms, revealing in most cases an intimate symbiotic relationship which facilitates nutrient uptake and provides the host plant with higher resistance against attackers. In this context, plants can be seen as "superorganisms" that depend on their root |

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| | microbiome for important functions. But the impact of plant domestication on the functional diversity and beneficial activities of this root microbiome is still largely unknown. Recent studies showed taxonomic differences in the root microbiome between wild relatives and modern cultivars, mainly in root architecture and root exudation. This leads to the hypothesis that present-day cultivars might have lost traits to recruit and activate host-specific beneficial root microbiota.<br><br>Our research project investigates tomato species and native soils in the Andes to explore the taxonomic and functional diversity of their root microbiomes. Next generation sequencing and 'omics technologies, combined with classic microbiological techniques are being used to obtain insight in the diversity of root-associated microbial communities of tomatoes. We hypothesize that wild tomatoes grown in their native soils harbour unique and higher frequencies of beneficial root microbiota, compared to modern cultivars. |