Rolin Dominqiue, J Comput Sci Syst Biol, 5:1
doi: http://dx.doi.org/10.4172/0974-7230.S1.07

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference and Exhibition on
Metabolomics & Systems Biology

20-22 February 2012 San Francisco Airport Marriott Waterfront, USA

Metabolomics data integration in tomato plant-fruit systems biology

Rolin Dominqiue
Université de Bordeaux, France

Tomato, our major source of vitamins and anti-oxidants, represents an important market around the world. However, tomato production is relentlessly challenged by environmental hazards, but also by changes in the consumer's demand for taste and nutritional value, thus requiring constant efforts to ameliorate varieties, but also cultural practice. A large body of literature shows the importance of genetic factors in the control of tomato quality as well as environmental growth conditions.

Considering systems biology as a comprehensible quantitative analysis of the manner in which all the components of a biological system interact functionally over time, we decide to use tomato plant-fruitas a biological system to studyhow this biological system works under control of environmental factors.

Tomato (SolanumlycopersicumL., cv Moneymaker) plants were grown under commercial culture conditions in a glass greenhouse in Sainte Livrade (0.56 E 44.29 N) in South-West France and harvested during the summer season. Measurements have been performed to characterise (i) the environmental conditions, (ii) the growth of the various plant organs, (iii) the variation of the processes involved in carbon acquisition and allocation and (iv) the availability of endogenous resources. Major environmental variables (temperature, light intensity, vapour pressure deficit, fruit temperature, etc.) have been recorded throughout the whole plant growth. To evaluate the biochemical fruit composition, metabolomics profiles were acquired by 1H NMR, GC-MS, LC-MS-QTOF. By using kinetic models describing metabolism (Poolman et al., 2004) as well as ecophysiological models (Génard et al., 2007), which enable the integration of environmental variables into the prediction (e.g., light, water and temperature) we estimate roles played by primary metabolism in determining fruit performance, i.e. biomass production and quality (sugar and organic acid contents).This presentation will focus on the metabolomics aspects of this project within the overall context of an integrated functional genomics approach.

Biography

Dr. Rolin has completed his PhD in France and postdoctoral studies in Philadelphia at USDA. He is heading the "Centre GénomiqueFonctionnelle Bordeaux" a federation of seven technological platforms, dedicated to the study of living organisms at a cellular and molecular scale in the French Aquitaine Region. In 2002, he had set up and lead the Metabolome Facility in Bordeaux. D. Rolin isPresident of the RéseauFrançais de MétabolomiqueetFluxomiquea French scientific society that aims at the promotion of Metabolomics &Fluxomics in France. D. Rolin is author of 63 research articles in peer-reviewed scientific journals.