9° Simpósio Brasil-Alemanha
9. Deutsch-Brasilianisches Symposium

Integrating Systems for Sustainable Development
Linking human and natural components

September 15 -17, 2019 - University of Hohenheim, Stuttgart

Program and Book of Abstracts

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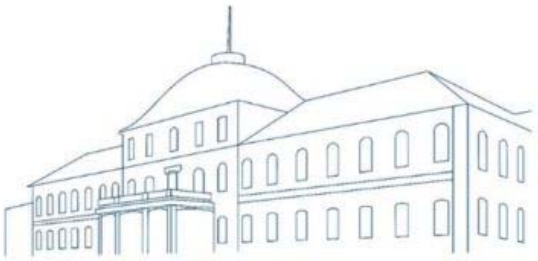

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Diversity of phytohormones within microalgae

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ABSTRACT

The supply of exogenous sources of vegetable hormones (phytohormones) seems to be a promising way to exploit plants physiological potential, aiming increases in plant biomass production. Algae may be a good natural source of interesting phytohormones, because of its fast growth and adaptability. Here we report the evaluation of nine strains of microalgae isolated from the Brazilian biodiversity and mainteined in the the Algae Biotechnology Lab, Embrapa Agroenergy, made to check out their potential to produce phytohormones of interest. Strains were grown in a regular J1 media and their biomass was collected at maximum growth phase. Biomass was lyophilized and solid-phase extraction methods were optimized using a commercial polymer anion exchange resin (PAX)[1] and a polymer cation exchange resin (PCX)[2] to separate acidic and alkaline phytohormones. A metabolomics protocol using UHPLC-MS/MS[1] was employed to identify and quantify metabolites in the samples extracts, in comparison to standard chemicals of nine main composts described in the literature as phytohomones (jasmonic acid, indole-3-acetic acid, indole-3-propionic acid, indole-3-butyric acid, gibberellic acid, abscisic acid, salicylic acid, trans-zeatin and trans-zeatin riboside). Results indicate that all nine strains of microalgae produced indole-3-acetic acid and isomers of indole-3-propionic acid in the evaluated conditions (and two strains produced only these compounds), as well as other phytohormones of interest, although with a broad diversity. One strain also presented isomers of jasmonic acid, abcisic acid, and trans-zeatin riboside. A similar one presented an isomer of indole-3-butyric acid, but no trans-zeatin riboside. Four strains showed the presence of indole-3-butyric acid isomers. Such diversity in a small group of microalgae from Tropical environments indicates that there is a great potential to be exploited. Next steps of this research includes the selection of microalgae strains with larger contents of phytohormones, ways to improve their biomass and desired content, how to extract and conserve them, and how to provide them to plants, aiming to enhance physiological activity and growth, thus increasing overall plant production. This may be a new input to ensure food production in a sustainable way.

[1] Delatorre, C. et al. (2017). Hormonal profiling: Development of a simple method to extract and quantify phytohormones in complex matrices by UHPLC–MS/MS, J. Chromatogr. B 1040:239-249.

[2] Cao, Z Y et al. (2016). Profiling of phytohormones and their major metabolites in rice using binary solid-phase extraction and liquid chromatography-triple quadrupole mass spectrometry, J. Chromatogr. A 1451:67-74.

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