Title:

Biomass and hydrolysate of microalgae are effective plant biostimulants

Authors & affiliations:

V. Ördög[1,3], M. Strnad[2], W.A. Stirk[3], P. Bálint[1], Á.F. Mógor[4], J. Tóth[1], P. Pőthe[1], G. Takács[1], I. Gergely[1] and J. Van Staden[3]

[1]Department of Plant Science, Faculty of Agricultural and Food Science, Széchenyi István University, H-9200 Mosonmagyaróvár, Hungary
[2]Laboratory of Growth Regulators, Palacky University, Cz-78371 Olomouc, Czech Republic
[3]Research Centre for Plant Growth and Development, School of Life Sciences, University of KwaZulu-Natal, Pietermaritzburg Campus, P/Bag X01, Scottsville 3209, South Africa
[4]Federal University of Paraná, Curitiba, Brazil

Abstract:

According to the European Biostimulant Industry Council (EBIC), a conglomerate of biostimulant producers, biostimulants include seaweed extracts, amino, humic or fulvic acids, chitosans, as well as beneficial fungi and bacteria. Although the regulation of biostimulants is quite complex in both the EU and the USA, sales of biostimulants were ca. 1 billion US$ in 2015 and predicted to increase annually by 10 to 12 %. The focus of this presentation is to highlight that microalgae biomass and microalgae hydrolysates are promising biostimulants. The Mosonmagyaróvár Algal Culture Collection (MACC) is the third largest soil algae collection in Europe. The main purpose of the Curator and the collaborating international research team is to quantify plant growth regulators (PGRs) in the strains and promote their use in agricultural plant production. Therefore, MACC microalgae strains were introduced into a screening project to detect PGRs. It transpired that all microalgae produced similar plant hormones to higher plants. Auxins, cytokinins, brassinosteriods, and gibberrellins were detected in 24 freshwater green microalgae strains by analytical methods. Strain-specific hormone profiles were established. Microalgal PGRs influence plant growth and development. In small plot trials, rapeseed, sunflower and winter wheat plants responded to microalgae treatments applied to leaves with increased pigment content, stronger root and shoot systems which contributed to yield increase. Lettuce treatment with the hydrolysate of the commercially available cyanobacterium, *Arthrospira platensis* increased growth of plant root and leaves.