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Microalgae originated biostimulants as a sustainable alternative for agriculture

Currently maintaining agricultural sustainability is a major problem due to growing global population, climate change and rapid increase of food demand. General problems in agriculture are loss of harvest, plant diseases, abiotic stress which may result in loss of 20 – 40 % of the crop. Use of conventional methods, for instance - pesticides results in decreased sustainability, also many organic biostimulants are not sufficiently effective. As a sustainable solution microalgal biostimulants (MBS) and biofertilisires (MBF) can be used to enhance plant stress resistance and increase production yield. Microalgae are microscopic, unicellular, or filamentous photosynthetic organisms with small size (1 – 900 µm) that can growth in marine and freshwater environments. Research show that MBS and MBF can potentially be used to increase plant growth and productivity and enhance pathogen and stress factors resistance. Microalgal biomass can be used as a source of slow macro- (K, P, N) and micro-nutrient (Mn, Cu, Zn, Fe) release. Additionally, microalgal ability to produce phytohormones (gibberellin, auxin, cytokinin et al.) can stimulate plants innate defence mechanisms. In northern regions, also in Latvia agricultural production is quite complicated due to relatively cold climate. Use of cheap industrial growth substrates (wastewater, agricultural by products et al) can be used for microalgal biomass production for further application in agriculture. Moreover, selection of strains suitable for certain growth environments may increase production of microalgal biomass.

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