



BIOFERTILIZING POTENTIAL OF SEAWEED LIQUID EXTRACTS OF MARINE MACRO ALGAE ON GROWTH AND BIOCHEMICAL PARAMETERS OF *ANDROGRAPHIS PANICULATA*

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Abstract

A pot experiment was conducted to identify the potential of *Sargassum wightii*, *Turbinaria ornata* and *Caulerpa racemosa* on growth and biochemical parameters of *Andrographis paniculata*. Seaweed liquid extracts were given to the tested plant in form of foliar spray. After 60 days, growth parameters such as shoot length, root length, total plant height, leaf area, number of the leaves, fresh and dried weight and biochemical parameters such as starch, glucose, protein, chlorophyll content were observed in the treated plants. Foliar application of individual seaweed treatments (T₁, T₂, T₃) enhanced the overall growth and physiology of *Andrographis paniculata*. But, there was an appreciable increase in growth and biochemical parameters in the treated plants which received mixture of seaweeds (T₄) when compared to individual treatment and control. This might may be due to synergistic and cumulative effect of qualitative and quantitative active ingredients such as micro and macroelements, vitamins and phytohormones present in the seaweed liquid extracts. Thus, seaweed liquid extract could serve as a promising effective organic biostimulant to replace the synthetic fertilizers for sustainable agriculture.

Key Words: Seaweed liquid fertilizers, growth, Biochemical, *Andrographis paniculata*.

Introduction

Usage of different inorganic fertilizers, pesticides, insecticides has damaged the soil ecosystem extensively. Proliferation and usage of inorganic fertilizers is now serious concern in agricultural system. This kind of practice makes the soil environment unsuitable for crop growth in future. Presently, the use of natural plant biostimulant is widely practiced to address the challenges to sustainable agriculture by ensuring optimal nutrient uptake, enhancing crop yield and tolerance to abiotic stress (Povero *et al.*, 2016). Seaweed extracts is a new generation of natural organic fertilizers containing highly effective nutritious source and promotes faster germination of seeds, increase in yield and resistant ability

of many crops (Ganapathy and Sivakumar, 2013). Extracts obtained from macroalgae has several economic importance in agriculture as soil fertilizer, growth stimulants (Khan *et al.*, 2009), enhanced seed germination and plant growth, root development, increased yield and quality of vegetables like cucumber, tomato, broccoli, spinach and bean and also increases post-harvest shelf life (Hernández-Herrera *et al.*, 2014). Macro algae extracts enhance crop's tolerance towards environment stress (Zhang and Schmidt, 2000) particularly enhance drought stress, increase nutrient uptake from soil and antioxidant properties of the plants (Turan and Köse, 2004). Important source of polysaccharides, phenolic compounds, osmolytes such as mannitol and also phytohormones including abscisic acid, auxins, brassinosteroids, cytokinins and gibberellins are found in seaweeds (Battacharyya *et*

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