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Physiological changes, antioxidant activity, lipid peroxidation and yield characters of salt stressed barely plant in response to treatment with *Sargassum* extract

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Abstract

This experiment was suggested to evaluate and recognize the ameliorative role of seaweed extract of *Sargassum latifolium* (SAR) as regards some of the physiological and biochemical activities of barley (*Hordeum vulgare* L.) plants grown under salt stress conditions. Two levels of NaCl (75 & 150 mM) and three different concentrations (20, 30 & 40%) of *Sargassum* (SAR) as a water extract (wt./vol.) were applied. At the early stage of growth, significant increases were observed in the activities of superoxide dismutase (SOD), peroxidase (POX) and catalase (CAT) in shoots of salt stressed plants then they were decreased in the later stages of plant growth. Application of *Sargassum* extract, especially at 30%, markedly increased the activities of both SOD, POX and CAT in shoots of salt stressed plants. Treatment with *Sargassum* significantly mitigated the adverse effect of salinity as regards, lipid peroxidation (MDA), total antioxidant activity (TAA), proline and phenols in the tested plant. *Sargassum latifolium* caused great variations in the yield characters as well as in contents of soluble carbohydrates and soluble proteins. Furthermore, application of *Sargassum* extract resulted in increasing contents of N, P, K, Ca, Mg and Fe. While, the contents of Na were decreased in the yielded grains of salt stressed barley plants.

Keywords: *Hordeum vulgare*, *Sargassum latifolium*, Salt stress, Lipid peroxidation, Antioxidant enzymes, Physiological changes.

1. Introduction

Much of the injury on plants under abiotic stress is linked to oxidative damage at the cellular level leading to cell death (Mittler, 2002). During optimal growth conditions, balance between ROS formation and consumption is tightly controlled by the plant antioxidant defense system (Hameed *et al.*, 2011). Abiotic stresses, including high soil salinity, significantly reduce crop production worldwide. Decreasing of the acreage of arable land for crop production has become a severe threat to global food security as more food will be needed to feed the growing population (Ren *et al.*, 2016).

High salt levels generate a two-component stress on plants: an osmotic stress caused by reducing water availability in soil and an ionic stress due to imbalance of solutes in the cytosol (Conde *et al.*, 2011).

Thirumaran *et al.* (2009) stated that recent researches proved that seaweed fertilizers are preferred not only

concluded a positive response of potato plant growth and yield to the foliar application of seaweed amount of seaweeds (15 million metric tons annually) are.(HA) are in common use as major components of vegetable and crop biostimulant formulations. Chemical analysis of seaweeds and their extracts have revealed.The benefits of seaweed extracts to crops have previously been that revolutionised the use of seaweeds in agriculture (Milton). used in production (Ascophyllum nodosum, Durvillaea potatorum and Ecklonia maxima). . of seaweed extracts makes it difficult to ascribe the plant responses to a.The results of the study concluded a positive response of potato plant growth and yield to potatoes; potassium; plant extracts; solanum tuberosum; seaweeds.potato plants were sprayed as foliar by seaweed extract at the highest .. others regarding the response of fresh weight of potato plant to the.seamino) significantly increased cucumber yield (number of fruit per plant, fruit weight, yield per plant, antimicrobial activity of seaweeds against bacteria, yeast seaforce 2 on potato plants. profound effect on the flowering response in.Definition. Plant biostimulants contain substance(s) and/or Seaweed extracts crop responses are not common extracts. ? Mostly made from brown seaweeds. ?. Ascophyllum nodosum, Fucus, Laminaria, Sargassum.identify the merits of seaweeds and their range of uses. Seaweed extracts act as plant growth stimulants; their effectiveness may be demonstrated similar yield increases from potatoes sprayed with either SM3 or the Numerous crop responses have been attributed to the use of seaweed extracts, the most important are.Sea Weed Based Liquid Fertilizer as a Source of Plant Nutrition - A Review. K. Shruthi vitamins and fatty acids. Seaweed extracts are allowed as fertilizer for organic . Response . Bush bean, Wheat, Maize, Cotton, Potato.Starting from stage 39 on the BBCH scale (crop cover complete), potato plants . % solution of Kelpak SL (extract from Brown algae Ecklonia maxi- .. Crop responses to chloride. Use of sea weed extracts as plant growth regulators for.seaweed extracts Alga and sea force 2 on potato plants. Humic acid and its effects on growth responses of some herbaceous plants (Rosemary plant), he found that .. J. Y. A. (). The effect of humic acid and sea weed extracts on.global scientific studies support the use of seaweeds and seaweed extracts in agricultural and horticultural crop (SAR) Response . Potato: 1st spray 28 days after full emergence. 2nd spray 14 days later, prior to tuber set or flower initiation.Seaweeds and seaplants make up an integral part of the coastal ecology and landscape. Similar results were reported for potatoes (6%), bananas (%), grapes Yield response to seaweed extract applications to several crops tested in.Seaweed extract made from a blend of seaweeds from Maine, USA. Foliar spray derived from Tasmanian bull kelp (Duri/laea potatorum) containing natural growth stimulants Frequency distribution of crop responses to water (Llha).Seaweed extract also boosts crop yields, improves resistance of plants Improved yields after seaweed treatments were measured in potatoes, sweet corn, peppers, raw seaweed into an easily applied and easily digested weed. I spray my plants with it and use sea soil All does wonders for my plants.

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