

ENHANCEMENT OF SUGAR BEET SEED GERMINATION, PLANT GROWTH, PERFORMANCE AND BIOCHEMICAL COMPONENTS AS CONTRIBUTED BY ALGAL EXTRACELLULAR PRODUCTS

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ABSTRACT

Effect of culture filtrates of nine algal strains belonging to Nostocales and Chlorellales on seeds germination, growth and certain biochemical characteristics of sugar beet was tested for their contents of indole acetic acid, gibberellic and abscisic acids. Plant seeds soaked in algal culture filtrates for 24 hrs showed maximum germination percentage when soaked in filtrates of *Spirulina platensis* (72.9%), *Anabaena oryzae* (70.0%), *Oscillatoria* sp (69.8%) and *Nostoc muscorum* (68.7%) over the counterparts which were soaked in water. Greenhouse pot experiments were conducted during the winter growing seasons of 2005/2006 and 2006/2007 to investigate the effect of algal culture filtrates application methods as phytohormones source on growth stimulation and yield quality of sugar beet.

Results revealed that different application methods had no significant effect on leaves and roots dry weight as well as total soluble solids, sucrose and purity percentages in root juice during the two seasons, while the positive significance was conducted by the treatments of *Nostoc muscorum*, *Anabaena oryzae*, *Spirulina platensis*, *Nostoc humifusum*, *Anabaena flos aquae* and *Phormidium fragile* culture filtrates.

The combination of seed-pres soaking and foliar application method significantly increased leaves chlorophyll contents, as well as, nitrogen, phosphorus and potassium percentages in roots over the control in both seasons.

Keywords: Algal culture filtrates, *Beta vulgaris*, foliar application, plant growth regulators, seed-soaking.

Abbreviations used: ABA, abscisic acids; FS, Foliar spray; GA, Gibberellic acid; IAA, Indole acetic acid; PGRs, plant growth regulators; SP, Seed pres soaking; TSS, Total soluble solids.

INTRODUCTION

Sugar beet (*Beta vulgaris* L.) is a temperate biennial root crop cultivated for sugar production, as forage and organic matter supply for soil. It has multiple uses in industry (Çamaş and Esendal, 1999), production of oxygen during vegetation period and recently considered for production of bio-ethanol (Rinaldi and Vonella, 2006). Although, approximately 70% of total sugar production is supplied by sugar cane, sugar beet remains as a unique source of sugar for temperate zones (FAO, 2006). Physiological control in the plants is governed by four classes of hormones: inhibitors such as abscisic acid that block germination; auxins that control root formation and growth; the gibberellins that regulate protein synthesis and stem elongation; and cytokinins that control organ differentiation (Riley, 1987).