

Effect of Seaweed Concentrate and Applied Hormones on *In Vitro* Cultured Tomato Roots

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Summary

Seaweed concentrate prepared from *Ecklonia maxima* stimulated the growth of *in vitro* cultured tomato roots. Both root extension and root elongation were significantly improved. This effect could be mimicked by low concentrations of zeatin. At concentrations of 10^{-6} M or above, all aspects of root growth were inhibited. IAA, ABA, and GA_3 had no stimulatory effect on root growth. Autoclaving did not result in a loss of the stimulatory effect of seaweed concentrate. With ashing this effect was however, eliminated. Chromatographic separation of the seaweed concentrate indicated the presence of more than one stimulatory compound each of which may affect different aspects of root growth differently.

Key words: *Ecklonia maxima*, root growth, seaweed concentrate, zeatin.

Introduction

There are numerous reports that seaweed products are beneficial to plant growth (Blunden, 1972). In view of the low rates of application necessary to elicit a response it has been suggested that organic compounds rather than mineral elements are responsible for yield increases (Abetz, 1980). Hormones, and in particular the cytokinins, have been suggested as the active ingredients (Booth, 1966). Commercial seaweed products have been shown to contain cytokinin-like activity (Hussain and Boney, 1969; Brain et al., 1973) and more recently *cis*- and *trans*-ribosylzeatin, *trans*-zeatin, dihydrozeatin and $N^6(\Delta^2$ -isopentenyl)adenosine have been tentatively identified from a seaweed concentrate prepared from *Ecklonia maxima* (Featonby-Smith and Van Staden, 1984). Positive proof that cytokinins are the active constituents is however, lacking.

Most of the more recent reports on the beneficial effects of seaweed products have indicated that root growth of the treated plants was significantly increased. These increases were obtained irrespective of whether the seaweed was applied as a foliar spray or directly to the soil as a root drench (Blunden and Wildgoose, 1977; Featonby-Smith and Van Staden, 1983 a and b; Nelson and Van Staden, 1984 a and b). In the majority of cases applications during the early vegetative phases of growth were most effective. An improvement of root growth, which naturally affects ultimate yield, could therefore be one of the major reasons why seaweed products are benefi-