

# Evidence for Rooting Factors in a Seaweed Concentrate Prepared from *Ecklonia maxima*

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## Summary

Using the mung bean rooting bioassay evidence was found for the presence of heat stable, translocatable root promoters in seaweed concentrate prepared from the brown alga *Ecklonia maxima* (Osbeck) Papenfuss. The optimum response was obtained with a 10% solution. This concentration also promoted the rooting of six species of garden plants. Attempts are currently being made to identify the active component(s).

*Key words:* Seaweed concentrate, adventitious root formation, mung bean assay.

*Abbreviations:* SWC = seaweed concentrate; IBA = indole butyric acid.

## Introduction

There are many reports that seaweed preparations improve plant growth (Metting et al., 1990). The beneficial effects have been attributed to the presence of growth substances, particularly the cytokinins, which occur at relatively high levels in various seaweeds and seaweed preparations (Pederson, 1973; Blunden and Wildgoose, 1977; Featonby-Smith and Van Staden, 1984a; Tay et al., 1985, 1987).

Although plant yield is increased in many crops (Metting et al., 1990), a remarkable feature of a number of studies was that a SWC prepared from *Ecklonia maxima* significantly increased root growth (Featonby-Smith and Van Staden, 1984b; Beckett and Van Staden, 1989). As cytokinins are considered to inhibit rooting (Van Staden and Harty, 1988) it is difficult to attribute the observed increase in root growth to these hormones. Using root cultures of tomato Finnie and Van Staden (1985) showed that very low levels of cytokinin as well as a SWC increased both lateral root development and root extension *in vitro*. This finding has not been followed to its logical conclusion and no attempts have been made to analyse for the presence of rooting factors in the seaweed preparation used. Auxins have been isolated from marine algae (Augier, 1976; Williams et al., 1976; Sumera and Cajipe, 1981; Kingman and Moore, 1982) and they

may well be responsible for the increased root growth observed following seaweed applications. This paper reports on the occurrence of rooting factors in a commercial seaweed preparation.

## Materials and Methods

### *Seaweed preparation*

The seaweed concentrate used in this study is marketed as Kelpak and is prepared by a special cell burst process from the brown alga *Ecklonia maxima* (Osbeck) Papenfuss (Featonby-Smith and Van Staden, 1983).

### *Mung bean bioassay*

In order to test for rooting factors in the SWC the standard mung bean rooting assay as described by Hess (1964) was used. Seeds of *Vigna mungo* L. were surface sterilized in 3.5% sodium hypochlorite for 20 min, rinsed thoroughly and then soaked in tap water for 6 h. The seeds were planted in moist vermiculite in large trays (50 × 40 cm) and allowed to germinate at 26 °C in a growth cabinet. After 9 days uniform hypocotyl cuttings 12 cm in length with two primary leaves, but cotyledons removed, were prepared from the seedlings. The cuttings were immediately transferred to vials (90 × 24 mm) filled to a depth of 6 cm with the respective test solu-