

Effect of coconut (*Cocos nucifera*) water extract on the development of adventitious roots in *Polyscias fillicifolia* stem cuttings

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ABSTRACT

Purpose Vegetative propagation continues to be a popular method to propagate ornamental plant species. Coconut water (CW) can be considered as an abundant source of hormones and other plant growth regulators (PGRs). In this study, vegetative propagation of *Polyscias fillicifolia* was attempted using PGRs isolated from CW.

Research method Stem cuttings were treated with varying concentrations (5, 10, 25, 50, 100 $\mu\text{g mL}^{-1}$) of PGR isolated from CW. The results were compared with a control set (treated with distilled water) and with those treated with solutions of pure synthetic indole acetic acid (IAA).

Findings *P. fillicifolia* canes treated with a 25 $\mu\text{g mL}^{-1}$ concentration of IAA, isolated from CW, showed the highest levels of root induction and development. Root development was more rapid (5 weeks) in the samples treated with PGRs isolated from CW compared to the canes propagated in the field by placing the canes on coir beds in plant nurseries. (6 weeks).

Originality This is the first study to use PGRs isolated from CW extracts to improve lateral root proliferation, induce shoot development and leaf emergence in *P. fillicifolia*.

Key words: Plant growth regulators, *Polyscias fillicifolia*, Coconut water, vegetative propagation

INTRODUCTION

Polyscias, a genus in the family Araliaceae, consists of approximately 150 species. *Polyscias spp.* are shrubs or trees containing leaves with serrated margins. *Polyscias* are popular as ornamentals and exported from Sri Lanka to various European markets. In Sri Lanka, most varieties of *Polyscias* are propagated from stem cuttings. To facilitate root development, and shoot length, synthetic hormones are usually applied to stem cuttings. However, due to adverse side effects on human health, and the effects on environment, the use of synthetic hormones is not a popular technique (Karunarathna, *et al.*, 2019). Vegetative propagation by means of stem cuttings is widely used in horticulture (Dada *et al.*; 2019). In some instances, vegetative propagation is hampered by inadequate rooting, or by high variations in the rooting response (Lee and de Fossard, 1974; Teale *et al.*, 2005). Rapid and uniform development of adventitious

roots on stem tissue is an important factor in the propagation of *Polyscias spp.* for export markets (Druege *et al.*, 2016). Therefore, new methods to induce rapid and uniform adventitious root development in plants are of interest for the Horticulture industry (Teixeira Da Silva, 2003). The application of plant growth regulators (PGRs) is a common practice in horticulture to promote rooting. Indole-butyric acid (IBA), indole acetic acid (IAA), and naphtheleneacetic acid (NAA) are commonly used PGRs during the propagation of cuttings. Plant growth regulators generally increase the percentage of rooted cuttings, root initiation rate, and the number of roots per cutting (Amzallag, 1999).

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