

# Promotion of Adventitious Root Formation of Miracle Fruit (*Synsepalum dulcificum* Daniell) Through Stem Cuttings and Air Layering Technique

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**ABSTRACT:** *Synsepalum dulcificum* or Miracle fruit plant is a medicinal shrub that belongs to the family Sapotaceae are known to exert an extraordinary effect of changing sour taste to sweet. The increase in industrial demand may cause depletion on the raw materials source as it is a slow-growing plant. Propagations of miracle fruits are restricted due to difficulties in rooting through cuttings and the seeds are recalcitrant. This study was to overcome the needs to supply large number of seedlings for large-scale planting by inducing adventitious root formation through vegetative propagation methods such as stem cutting and air layering (marcotting). A total of 140 softwood stem cuttings were treated with four IBA concentrations (0, 500, 1000, and 2000 mg/L) and planted in sand bed under non-mist system. Another experiment involved air layering was initiated on vertical young shoots treated with commercial rooting hormone Seradix No.2 (3000 ppm). Percentages of rooting (%), mean number of root (%), and mean root length (cm) per rooted cutting were collected 2 months after planting. Stem cuttings soaked in control treatment produced the highest percentage of rooting (54.28%) per cutting. However, mean root numbers per rooted cutting increases with high concentrations of IBA treatment. Adventitious root started to emerge four weeks after propagation period in air layering method. Results showed that 73.33% air layers successfully induced roots with mean root length 5.98cm. Thus, vegetative propagation is a promising technique that can be applied to promote adventitious rooting in hard-to-root species as in *Synsepalum dulcificum*.

**KEYWORDS:** Adventitious root, Air Layering, IBA, Stem cutting, *Synsepalum dulcificum*

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## INTRODUCTION

Miracle fruit or known as *Synsepalum dulcificum* Daniell is an African native shrub that belongs to the family Sapotaceae. Small ellipsoid berries of large seed coated with thin layer of edible pulp are produced throughout the year. The fresh pulps of the fruits were known to exert an extraordinary effect by causing acidic food consumed to taste sweet. This sweetening property is caused by the action of a miraculin; a type of glycoprotein compound found in the tasteless pulp of the miracle fruit. The mechanism works on the taste buds of the tongue by distorting the sweet receptor under acidic condition which makes the food taste sweet (Metcalf & Chalk, 1972).

Nowadays, nutritionist are more interested into natural food sweetener as compared to some artificial sweetener that contain carcinogenic compound such as cyclamates and saccharine which may cause health problems to the consumer (International Agency for Research on Cancer, 1980). *S. dulcificum* are found to be one of the possible sources of natural food sweetener which the fruit can be used to overcome diabetic patients from consuming sweet food without taking in sugar (Kant, 2005). For centuries, people in West African often use miracle fruit to sweeten their sour foods and drinks such as acidulated maize bread and sour palm wine (Inglett *et al.*, 1965).

Demand of miracle fruits in industry has increased drastically due to the need for large scale productions and for further research to enhance the potential uses of the plant in medicinal areas.