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Root Induction and Propagation of *Sedum takesimense* Nakai Using Leaf Cutting Method

Eun Ju Cheong*
College of Forest and Environmental Science, Kangwon National University, Chuncheon 24341, Republic of Korea

Abstract

The effect of basal nutrients concentrations and exogenous auxin for root induction from leaves of *Sedum takesimense* were investigated for mass-propagation. Root induction rates were significantly different from the concentrations of basal salts but not influenced by supplemented IBA in the medium. The lowest concentration of MS basal salts (1/10) was most effective to induce roots from leaves followed 1/5 MS, and 1/2 and full strength MS medium. Supplement of IBA 10 μM in the medium did not improve the root induction that resulted no differences compare to the hormone free media. Rooted leaves were transplanted in soil and survived in greenhouse.

Key Words: *Sedum takesimense*, root induction, mass-propagation, leaf cutting, nutrients

Introduction

The *Sedum takesimense* is indigenous perennial plants growing in course soil of rocky hills of the seashores in Ulrung Island, Korea (Lee et al. 2003). Many plants in this genus are generally used for ground covers in garden for its attractive appearances in leaves and flower and hardness to drought or wind (Kim and Lee 2007). These are becoming popular for use in roof greening for its superior adaptation to infertile soil and low maintenance (Hawke 2015). In addition, leaves contain some chemicals of antinocieptive and anti-inflammation (De Melo et al. 2009; Jang et al. 2016). The anti-oxidant chemical, 2,6-di-O-galloylarbutin, in the leaves is considered very promising chemicals as a cosmetic ingredient (Thuong et al. 2007). Large amount of plants is needed as for the planting or extracting the substance. Plants can be propagated by sowing but vegetative propagation is necessary for mass production of uniform materials. The rooting ability of leaves was investigated to develop mass-propagation method because leaves are the most abundant material in plants without destructing plants.

Materials and Methods

Plants were grown in greenhouse for 2 months after the transplanting from the wild. Shoots grow around 30cm and leaves were collected from the 4-5th node from the top which has leaves at least 3 cm in size. Leaf size ranges from 3-5cm and old leaves were not used to avoid the effect of physiological status due to age. Leaves were washed thoroughly in water with detergent and surface sterilized with 2% of NaOCl for 20 min by shaking in beaker then rinsed with double sterilized distilled water three times. Basal cut ends were trimmed before explants placed in culture medium. Culture medium is composed of Murashge and Skoog medium (1962) without carbohydrate sources, pH was adjusted 5.8 before autoclave and solidified with 4 g/L

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Corresponding author: Eun Ju Cheong

College of Forest and Environmental Science, Kangwon National University, Chuncheon 24341, Republic of Korea
Tel: 82-33-250-8312, Fax: 82-33-259-5617, E-mail: ejcheong@kangwon.ac.kr

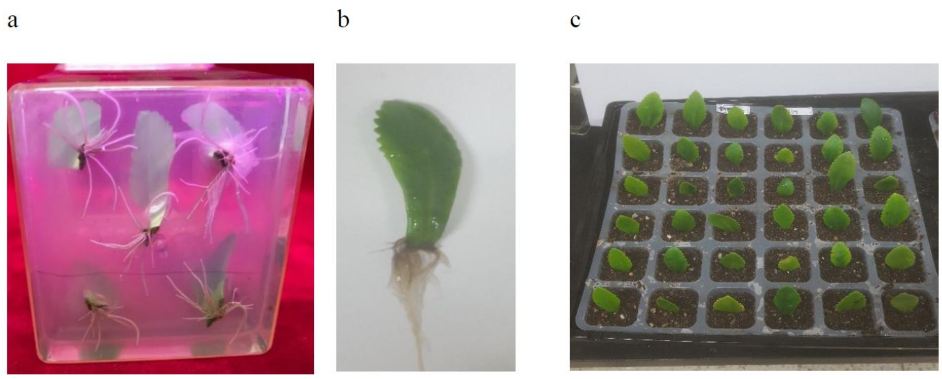

Fig. 1. Root induction from leaves of *S. takesimense* (a, b) and planting in soil (c).

Table 1. Percent of root induction from leaves on different media

Medium strength	1X MS	1/2X MS	1/5 X MS	1/10 X MS
Hormone free	20	25	45	55
10 μM IBA	20	25	50	50

Cultures were maintained for four weeks.

of gelrite. Nutrients concentration was modified as 1/10, 1/5, 1/2 and full strength of the original medium and 10 μM IBA was added in each medium. Medium was autoclaved for 20 min at 121°C. Each medium contained 5 leaves and experiment was repeated 4 times. Cultures were maintained at 23±2°C under 16 h photoperiod. Number of leaves produce roots were counted within four weeks of culture. Rooted leaves were planted in soil then acclimatized in greenhouse.

Results and Discussion

Roots were produced from the basal cut end of leaves around 10 days later in culture. Percent of root induction was different from the media especially the concentration of nutrients (Table 1). Although there was some variance among the repeat, 50% of leaves produced roots in 1/10 MS medium with or without IBA. Other low concentration of nutrients containing medium (1/5 MS) was second best for root induction from leaves showing 45-50%. Root induction rate was significantly decreased in two media which contain relatively high concentration of nutrients (full strength and 1/2 MS).

Adventitious root induction in vegetative propagation like stem cuttings is influenced by the explant physiological status and exogenous condition but mostly nutrients in medium (Verstraete et al. 2012). Since Hyndman et al. (1982) reported the influence by the concentrations of nitrogen and sucrose, these two elements are playing an important role in adventitious rooting (Schwambach et al. 2005; Zerche and Druege 2009). Especially low concentration of nitrogen was more effective in inducing adventitious root from the explant (Hyndman et al. 1982; Schwambach et al. 2005). Although auxins are one of effective treatment to induce adventitious roots, it had less effect on the explant. Only a prompt submerging in the auxin containing solution was effective in Eucalyptus (Fett-Neto et al. 2001) which is agreed to our result. Rooted leaf explants were successfully survived in soil. However, new shoots were not produced for long time. It is necessary to promote new shoots formation from the leaf cuttings so as for using the mass-propagation method.

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