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Development of Philodendron Billietiae Plantlet Derived from its Somatic Embryo: Plant Cell Totipotency

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Introduction

Philodendron billietiae is the most expensive Philodendron plant in the world. It belongs to Araceae family. We have performed somatic embryogenesis of P. billiatiae [1]. However, the amount of plantlet is a few. Therefore, we multiplicated shoots by shoot multiplication method. Why we can multiplicate the shoots further? That is because the character of plant cell totipotency. It means in plants, the differentiated cells (shoot) can sometime regain totipotency and regenerate into a whole plant.

Material and Method

Material

Somatic embryo of Philodendron billietiae 4 weeks of culture [1].

Method

Meristem culture

Firstly, the explant (shoot) was surface sterilized by 96% alcohol for 30 second and 20% Clorox for 3 minutes. Then, the explants were washed by sterile water 4 times. The scale of the shoot was opened under stereomicroscopy until 0.2-0.5 mm and the shoot meristem was obtained. The shoot meristem was cultured on initiation media MS containing 1 g active charcoal for 2 weeks. Thereafter, the shoot was subculture on MS media supplemented with 0.5 mg/l BAP and 0.025 mg/l NAA.

Somatic embryogenesis

Sterile leaf explant was cultured on embryogenic callus medium. It is consisting of M9 macronutrient, M9 micronutrient, B5 vitamin, 2 ppm NAA, 2 ppm BAP, 1.5 g/l glutamine, 0.1 g/l casein hydrolysate, 1 g/l MES buffer, 3 % sucrose and 0.8 % agar. Then, the embryogenic callus was subculture onto somatic embryogenesis medium. It is an M9 medium supplemented with 1.5 g/l glutamine, 5 ppm NAA and 1 ppm BAP. Thereafter, the globular and heart somatic embryos were transferred onto M9 medium supplemented with 1.5 g/l glutamine, 0.5 ppm NAA and 1 ppm BAP.

Shoot multiplication

Shoot of P. billietiae somatic embryo was subculture onto shoot multiplication medium, consist of Murashige medium supplemented with 2 ppm of BAP (Benzyl amino purine). They were put under 16 hours light and 8 hours dark of light.

Result and Discussion

Plant cell totipotency can be seen as follows:

Both (Figures 1 and 2) were on the same medium, Murashige and Skoog medium supplemented by 2 ppm of BAP. Plant cell totipotency developed from somatic embryo explant developed many shoots. In this research source of explant, nutrition media and constituent and culture environment seems to be suitable for Philodendron billietiae. Therefore, in conclusion, plant cell totipotency developed from somatic embryo explant was emphasized on Figure 2, by developing many shoots. This is the first study in P. billiatiae cell totipotency.

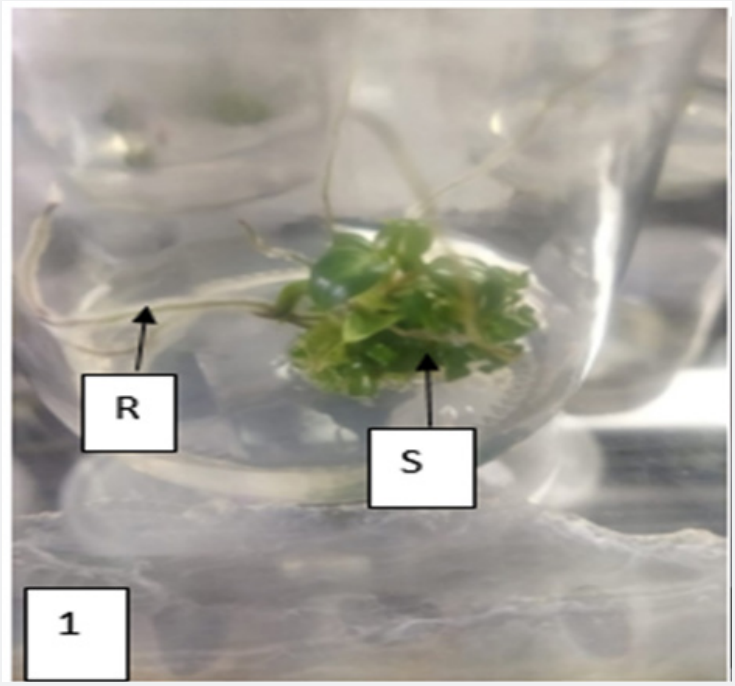

Figure 1: shows somatic embryo of Philodendron billietiae. Shoot (S), R (Root).

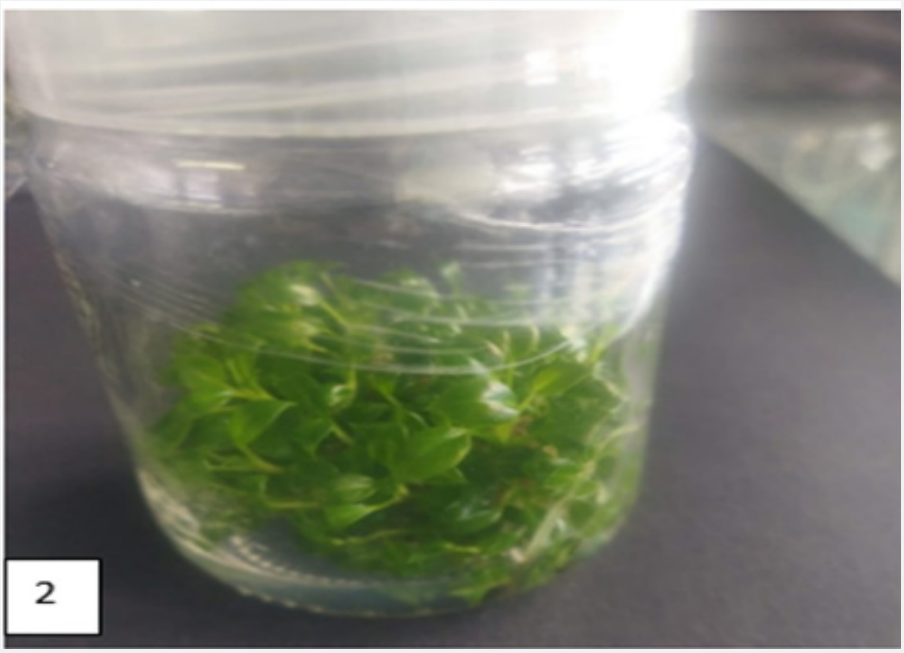

Figure 2: shows shoot multiplication by using somatic embryo as an explant.

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