

ID 91

Optimization of tissue culture protocol to production of planting materials of *Pyrus communis* L.

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Abstract

Pear (*Pyrus communis* L.), belonging to the family Rosaceae, is an economically important clonally propagated crop widely cultivated in temperate climate zones and the fifth most widely grown fruit in the world. The Department of Agriculture in Sri Lanka has identified two types of local pear varieties in Sri Lanka as Ragala and Rahangala pears. Currently, grafting is the most common method of propagating pears in Sri Lanka. At the commercial level, Pears are difficult to propagate through grafting due to poor success rates. This study aimed to (a) develop a protocol for producing pear planting materials using tissue culture techniques with an efficient sterilization protocol and (b) select the best media composition for pear shoots multiplication. Ragala and Rahangala pear varieties were used to optimize the surface sterilization procedure at different NaOCl concentrations (10, 15, and 20%) and shaking times (10, 20, 30 min) using shoots with fifteen replicates in a completely randomized design. Data was analyzed using a two-way ANOVA. According to the results, different treatments had significantly affected the survival rate of both Ragala and Rahangala pear varieties ($p < 0.05$). The shoots sterilized with 20% NaOCl for 20 minutes and established in MS medium with fungicide and antibiotic were the best sterilization treatments with the highest survival percentage. *In-vitro* raised pear shoots were separated from seedlings and transferred to five different 6-Benzyl Amino Purine (BAP) concentration (1.0, 1.5, 2.0, 2.5 and 3.0 mg L⁻¹) combinations with 0.1 mg L⁻¹ Naphthalene Acetic Acid (NAA) containing MS medium for stimulate the multiplication stage. The experiment was laid out in completely randomized design with twelve replicates and data was analyzed using a one-way ANOVA. There was a significant difference ($p < 0.05$) between the treatment combinations on the number of shoots and height. Among those, MS medium containing 2.5 mg L⁻¹ BAP + 0.1 mg L⁻¹ NAA was reported the best shoot regeneration. The above stated effective sterilization procedure along with shoot multiplication protocol could be used in development of complete *in-vitro* propagation protocol for commercial production of pears.

Keywords: BAP, *In-vitro* propagation, MS medium, NAA, Surface sterilization

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