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Cost effective plant regeneration protocol for rough lemon (Citrus jambhiri Lush) using gum kondagogu as gelling agent in plant tissue culture media

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The goal of this study was to evaluate natural exudate gum from Cochlospermum gossypium (gum kondagogu) as gelling agent in plant tissue culture media to develop cost effective protocol. Nodal segments of rough lemon (Citrus jambhiri Lush) were cultured on MS medium supplemented with kinetin (KN) 2 mg l^{-1} and gelled with agar or gum kondagoggu alone and in combinations. Maximum 66.66% cultures showed shoot regeneration on 0.8% agar gelled medium (control) with an average shoot length of 0.74 cm. The shoot regeneration response on media gelled with 3% gum kondagogu was 63.88 % with an average shoot length of 0.79 cm. Use of agar (0.1 to 0.3%) along with gum kondagogu (2.5 and 3%) improves shoot regeneration response but there is decrease in average shoot length. Regenerated shoots were rooted on MS medium supplemented with Indole-3-butyric acid (IBA) 2 mg l^{-1} and gelled with agar or gum kondagoggu alone and in combinations. In agar gelled medium (control), 52.77 % cultures showed root regeneration with an average root length of 5.48 cm. In 3% gum kondagogu gelled medium maximum of 52.08 % cultures showed root regeneration with an average length of 5.53 cm. Addition of agar in 3% gum gelled medium decreases root regeneration response and average root length. Texture measurements revealed that firmness of gum gelled medium was nowhere near to that of agar. However, in their capability of supporting growth and differentiation of explants, they are equal to agar gelled medium. There was no significant difference in regeneration response of nodal explants on agar (0.8%) and gum (3%) gelled medium. Cost of gum kondagogu is 6.5 times less than that of agar so it can be used as gelling agent to reduce production cost of tissue culture raised plantlets.

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