

## Sustainable Mass Production of Valuable Plant Species Through Efficient Micropropagation

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Micropropagation is important for both multiplication and preservation of a wide range of crops, including many food crops. Even though the agricultural sector has been harnessing its advantages in achieving increased crop production, recent times have seen a need of innovative improvements since contemporary systems rely significantly on conventional methods. Furthermore, numerous plant species are being revealed to possess medicinal and other valuable properties, but difficult to culture using conventional methods. Therefore, methods that facilitate efficient mass propagation of economically important species have become vital. Our results represent new developments with regard to improved growth medium for *Solanum tuberosum* L. (potato) and effective surface sterilization methods for explants of difficult-to-propagate species. Enhanced mesos (CaCl<sub>2</sub>, MgSO<sub>4</sub>, KH<sub>2</sub>PO<sub>4</sub> in Murashige and Skoog (MS) medium improved the overall quality of *S. tuberosum*, as indicated by longer shoots and larger leaves with dark color, compared with MS medium only. The quantitative ion analysis revealed a significant role of the minerals; calcium, magnesium, potassium, phosphorus, and iron on improved overall quality of plantlets. We present new methods and developments for the micropropagation of Japanese medicinal plants including *Polygonatum macranthum* (Maxim.) Koidz. Seed germination of *P. macranthum* was achieved within nine weeks through the use of the new surface sterilization method, in contrast to 19 months taken under natural conditions. The results could facilitate the mass propagation of difficult-to-propagate species of economic importance.

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