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ASSESSING THE RESPONSE OF INDIGENOUS LOQUAT CULTIVAR MARDAN TO PHYTOHORMONES FOR IN VITRO SHOOT PROLIFERATION AND ROOTING

Key words: *Eriobotrya japonica*, Micropropagation, Sterilization of loquat, Plant growth regulator, Shoot proliferation, Rhizogenesis.

Introduction

- Loquat cultivar Mardan has large, round, and attractive fruit with an orange yellow skin and sweet tasting pulp, which can help it to capture local and export markets (Hussain, 2009).
- Plant cell, tissue, and organ culture techniques are becoming an integral part of propagation systems for year-round supply of clonal plant material on a mass scale in a very short time span, which is impossible by conventional approaches (Al-Sulaiman and Barakat, 2010).
- Clonal propagation of loquat using in vitro techniques has been carried out earlier, but there is a need to optimize cultivar specific protocols as no trials have been made for indigenous loquat genotypes. Shoot tip culture is highly reliable and is the preferred technique for obtaining disease-free stock (Panjaitan *et al*., 2007)
- Protocols standardized following this study will be conducive for the micropropagation of elite loquat genotypes on a commercial scale, which will finally uplift the national horticulture industry and export potential.

Materials and Methods

- **Culture establishment**
  - Shoot tips (3–4 cm in size) of loquat cultivar Mardan were collected from the orchard of Tret (Murree, Pakistan)
  - After removing leaves, hairs, and dirt, explants were placed under running tap water with one drop of Tween 80 and detergent for 30 min
  - After washing explants were surface sterilized with different conc. of NaOCl (5%, 7%, 10%, 12%, 14% (v/v)) for 12 min and HgCl2 (0.01%, 0.05%, 0.10%, 0.20%, 0.25% (w/v)) for 2 min

- **Shoot Proliferation**
  - For shoot proliferation Murashige and Skoog (MS) media supplemented with various combinations of cytokinins (BAP (0.0,0.5,1.0,1.5,2.0 mg/L), 2iP (0.0,3,6,9,12 mg/L), and kinetin (0.0,0.5,1.0,1.5,2.0 mg/L) was used.

- **Rooting**
  - Uniform sized (1.5 cm) micro-shoots were transferred to rooting MS medium (half strength) supplemented with different levels of IBA (0.0,0.50,1.00,1.50,2.00,2.50 mg/L) in combination with NAA (0.0,0.25,0.50,0.75,1.00,1.25 mg/L) and PBZ (0.0,0.25,0.50,0.75,1.00,1.25 mg/L)

Results and Discussion

- **Culture Establishment**
- **Effects of NaOCl and HgCl2 on in vitro culture establishment of loquat cultivar Mardan**
  - Treatment with 10% NaOCl showed significant results with an increased survival percentage (70%).
  - Treatment with 14% NaOCl resulted in minimum survival (2%) and maximum necrosis (90%)

Effects of Cytokinins on Shoot Development

- **Number of shoots**
- Treatment TC3 yielded the maximum number of shoots (4.84) followed by TC4 (3.25)
- **Shoot length**
- Longer shoots (1.97 and 1.92 cm) were obtained with treatments TC2
- Treatment TC4 showed decreased shoot length (1.56 cm)
- **Number of leaves**
- The maximum number of leaves (4.26) was observed in treatment TC3
- The leaf count was lesser (2.16) of the control treatment

Effects of Auxins on Root Development

- **Number of roots**
- The maximum number (12.06) was obtained in treatment TA4
- Rooting was highly impoverished in the control treatment (TA0)
- **Root length**
- Maximum root length (13.07 cm) was obtained in treatment TA4
- Root length was lowest in the control treatment (TA0)
- **Rooting percentage**
- Highest rooting %age (99.71%) was recorded in treatment TA3
- Minimum rooting %age (16.66%) was recorded in control treatment.

Conclusion

- The current study documents the protocol optimization for Loquat micropropgation.
- Results reveal that sodium hypochlorite is an effective sterilant for surface disinfection of loquat shoot tips in vitro.
- This research gives standardized doses of PGRs to achieve considerably higher shoot and root growth for mass scale, healthy and clonal production of this economically important fruit crop.
- It will consequently lead to the establishment of certified loquat nurseries in the scenario of SPS measures of WTO.