

## **Enhancing somatic embryogenesis of Malaysian rice cultivar MR219 using adjuvant materials in a high-efficiency protocol**

### **ABSTRACT**

Enhancing of the efficient tissue culture protocol for somatic embryos would facilitate the engineered breeding plants program. In this report, we describe the reproducible protocol of Malaysian rice (*Oryza sativa* L.) cultivar MR219 through somatic embryogenesis. Effect of a wide spectrum of exogenesis materials was assessed in three phases, namely callogenesis, proliferation and regeneration. Initially, rice seeds were subjected under various auxin treatments. Secondly, the effect of different concentrations of 2,4-D on callus induction was evaluated. In the next step, the efficiency of different explants was identified. Subsequently, the effects of different auxins, cytokinins, l-proline, casein hydrolysate and potassium metasilicate concentrations on the callus proliferation and regeneration were considered. For the callogenesis phase, 2 mg L<sup>-1</sup> of 2,4-D and roots were chosen as the best auxin and explant. In the callus proliferation stage, the highest efficiency was observed at week eight in the MS media supplemented with 2 mg L<sup>-1</sup> of 2,4-D, 2 mg L<sup>-1</sup> of kinetin, 50 mg L<sup>-1</sup> of l-proline, 100 mg L<sup>-1</sup> of casein hydrolysate and 30 mg L<sup>-1</sup> of potassium metasilicate. In the last phase of the research, the MS media added with 3 mg L<sup>-1</sup> of kinetin, 30 mg L<sup>-1</sup> of potassium metasilicate and 2 mg L<sup>-1</sup> of NAA were selected. Meanwhile, to promote the roots of regenerated explants, 0.4 mg L<sup>-1</sup> of IBA has shown potential as an appropriate activator.

**Keyword:** Callogenesis; Proliferation; Root explants; Potassium metasilicate and regeneration