Effects of Light Intensity and Plant Growth Regulators on in vitro Regeneration of Wild Strawberry (Fragaria vesca)

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Strawberry is one of the economically important crops globally, and genetic engineering involving genome editing of strawberry has been conducted to enhance the quality and production of strawberry fruits. An efficient in vitro regeneration procedure depending on genotype is crucial in most genetic engineering methods. Fragaria vesca, known as woodland strawberry, is an ideal model plant for genomics studies due to its small genome size, 12–16 weeks of a short life cycle, unfolded whole genome sequence (‘Hawaii 4’), and sequence similarity with other commercial rosaceous species. This study was conducted to establish an in vitro protocol for plant regeneration of two different F. vesca accessions (‘KNR01’ and ‘KNY01’) from leaf discs. The regeneration efficiency depended on the combinations of plant growth regulators (BA, TDZ, IBA) and light intensity during culture. MS medium containing 1.5 mg·L⁻¹ TDZ and 0.5 mg·L⁻¹ IBA produced the most shoot regeneration for both genotypes. Light intensity affected the in vitro regeneration of both genotypes since strong light caused the rare differentiation of shoot primordium from the explants and further necrosis of the primordia. The developed protocol is being applied in knock-out of the polygalacturonase gene (PG1) of the strawberries via genome-editing technology.

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