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The Epigenetic Interplay Of Somaclonal Variation In Ananas Comosus Var. MD2 Grown In Vitro And Its Histone Deacetylation Perspective

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Abstract—Pineapple(*Ananas comosus* (L.) Merr.) has been highlighted as commercially high-value and economically important tropical fruit according to Malaysian National Key Economic Areas (NKEA). Biotechnology practices such as plant tissue culture has risen as an effective tool to ease pineapple regeneration and propagation. However, somaclonal variation may arise when the plants are not able to withstand tissue culture stress. Histone deacetylase (HDAC) is one of the enzyme involved in somaclonal variation occurrence. In this study, formation of somaclonal variants of *A. comosus* was induced by application of plant growth regulators at high concentrations, sodium chloride (NaCl) and abscisic acid (ABA). The plantlets grown at high concentrations of indole-3-butyric acid (2.0 mg L^{-1}) and 6-benzylaminopurine (4.0 mg L^{-1}) produced the highest number of stunted plantlets (1.9 ± 0.1 cm). The shortest plantlets were also observed on Murashige and Skoog (MS) media containing 1.0 % NaCl with mean of plantlet height of 1.4 ± 0.3 cm. Meanwhile, regeneration medium supplemented with 1.0 mg L^{-1} ABA produced the shortest plantlet length which is 1.7 ± 0.1 cm. Higher level of HDAC enzyme activity was observed in the somaclonal variants, compared to those in control conditions. Highest value was recorded in plantlets grown on the media supplemented with 1.0 mg/L ABA (109 333.33 ± 4.40 ng/min/mg). Further analysis was also done to investigate the epigenetic mechanism caused by HDAC, by testing on the phenotypic reversion (stunted to normal phenotype). More than 85 % of all the variants from all treatments were able to revert back to normal phenotype after grown on the MS media without any supplementation of plant growth regulators for 8 weeks.

Keywords—*Ananas comosus*, somaclonal variant, histone deacetylase, reversion, epigenetic