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Isolation and Characterization of Novel MADS-Box Genes in Sweet Potato during Initial Root Development

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MADS-box genes are important transcription factors known to affect not only flower organ formation but also overall organ development, but they are not fully studied yet in sweet potato (*Ipomoea batatas* Lam.). In this study, we isolated seven novel MADS-box genes from sweet potato (*Ipomoea batatas* Lam. cv. Annouimo) during initial root development stage using the *de novo* transcriptome assembly sequencing method. Among them, two MADS-box genes expressed specifically in early root development stage. These genes named IbAGL6 and IbFUL1 after their similarity with MADS-box genes of other species by phylogenetic analysis. Both genes are composed of MADS-box domain and K-box domain. IbAGL6 showed 76% of similarity with SIAGL6 (AGAMOUS-like MADS-box protein AGL6 of *Solanum lycopersicum*) and belonged to AGL6 subfamily. IbFUL1 showed 95% of similarity with PnFUL1 (*Ipomoea nil* fruitfull-like protein) and belonged to AP1/FUL subfamily. IbAGL6 and IbFUL1 were specifically expressed in early stage of root development (within 10 days), but not expressed at 12 days after transplant. Through this study, novel MADS-box genes were founded in sweet potato which possibly affect to early root formation, and this may provide the basis for further studies of sweet potato tuberization.

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