Genetic Variation of Anoectochilus formosanus Revealed by ISSR and AFLP Analysis

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摘要.

Abstract

Anoectochilus formosanus is an expensive medicinal folk herb in Taiwan. The plant has been used to treat hypertension, diabetes, and hepatitis by native people for a long time. In this study, 4 typical lines of A. formosanus, red-stem, green-stem, narrow-leaf, and round-leaf, were collected and screened to identify the line-specific SSR (single sequence repeat) markers. In addition, we found the narrow-leaf line exhibited the highest polysaccharide content (3.39 ± 0.74%, polysaccharide wt/plant dried wt) which is more than twofold of the lowest content of the red-stem line (1.27 ± 0.41%). In the culture program construction, the extent of the somaclonal variation among 20 regenerated shoots from the same parental individual of a narrow-leaf line was revealed using the amplified fragment length polymorphism (AFLP) technique. The aim of this study is to preliminarily investigate the genetic variation of A. formosanus through polymorphic marker screening, which will benefit to the cultivation of A. formosanus with high polysaccharide content in future work. The results showed that 6 out of 81 primers screened, generating a total of 26 markers, were able to differentiate the 4 lines in the inter single sequence repeat (ISSR) analysis. On the other hand, 17 sets of AFLP primers were chosen to detect the somatic variation among the excised shoots derived from the same individual. The genetic variation among the regenerated shoots ranged from 0.00% to 5.43%. The primer pair B6 exerts the most powerful selection ability in the AFLP analysis among 20 somaclonal samples used, whereas the E4 primer pair the lowest. The AFLP primer pairs become useful tools for selecting the lowest somaclonal variation from the regenerated shoots of A. formosanus under the tissue culture program.