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Genetic and epigenetic variability of wild and cultivated watercress (*Rorippa nasturtium aquaticum*)

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Epigenetic modifications, such as methylation of cytosine in DNA of plants and animals, play an important role in several biological processes such as gene silencing. In plants, studies of the changes of DNA methylation patterns are relevant because these changes determine their capability to adapt to variable environmental stress conditions, modulating the synthesis of secondary metabolites. The aim of the current study was to compare the cytosine methylation status of wild and cultivated watercress (*Rorippa nasturtium aquaticum*) genome using the methylation sensitive amplified polymorphism (MSAP) method to generate basic knowledge for the development of strategies for manipulating the epigenome of this plant. For estimating the epigenetic variability, a binary matrix coded by 1 (presence) or 0 (absence), based on the amplified fragments obtained by *EcoRI/HpaII*, was constructed. The hemimethylated fragments were excluded from the analysis. Genetic variability was determined considering only the amplified fragments obtained by *EcoRI/MspI*. The results of the MSAP assay, using 8 primer combinations (Table 1), revealed variable numbers of methylated loci per primer combination for both, wild and cultivated watercress. The results revealed that cultivated watercress had higher epigenetic and genetic variability than wild watercress (Table 2). The results also indicated that for wild watercress, genetic variability was higher than that of cultivated watercress. The results of a cluster analysis based on the epigenetic determination clearly discriminated between wild and cultivated watercress. A cluster analysis based on the genetic results showed a similar discrimination (Figure 1).

Biography

Marcela Verónica Gutiérrez Velázquez has completed her Biochemical Engineering at the Instituto Tecnológico de Durango, México, where she also completed her Master's in Biochemical Engineering. Currently, she is pursuing her PhD in Biotechnology at the Centro Interdisciplinario de Investigación para el Desarrollo Integral Regional unidad Durango del Instituto Politécnico Nacional.

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