Identification of potato cultivars and somaclonal variations by RAPDs

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ABSTRACT

Random amplified polymorphic DNA (RAPD) markers were used to characterize and detect somaclonal variations in calli of five commercial potato cultivars (Solanum tuberosum L.), commonly cultivated in Egypt. Six decamer primers amplified using DNA segments which were polymorphic. Fragments shared among the cultivars were also observed. Primer 1 can be used to fingerprint and distinguish the five potato cultivars by the RAPDs 1107, 750 & 507 bp. Somaclonal variations were detected within the calli and were found to be genotype- dependent. Among the studied cultivars, Diamond showed the least somaclonal variations.

Key words: *Potato, RAPD, PCR, fingerprinting, cultivar identification, somaclonal variations.*

INTRODUCTION

Until recently, the identification and characterization of plants was essentially based on external characteristics such as morphological traits or productivity (Kim *et al.*, 1998). Such classical phenotypic features are still extremely useful but can be widely influenced by environmental conditions. The morphology of the same plant may extremely vary depending on external conditions. Fundamental genetic characters may be masked and make the identification very difficult. Moreover, this visual identification is time-consuming because it requires that the plant be grown to a suitable developmental stage before certain characteristics can be scored.

DNA-based markers allow to overcome some of the limitations of the morphological determination. RAPD (Random Amplified Polymorphic DNA) clearly allows the direct comparison of the genetic material of individual plants; avoiding any environmental influences on gene expression.

Genetic fingerprinting using RAPD technology is very useful in varietal identification and a guarantee for parentage in plant breeding as well as in detection of somaclonal variation.

In vitro culture techniques provide an alternative means of plant propagation and a tool for crop improvement (Vasil, 1988). Plantlets derived from *in vitro* culture might exhibit somaclonal variations (Larkin and Scowcroft, 1981) which is often heritable (Breiman *et al.*, 1987). Any system which significantly reduces or eliminates tissue culture-generated variations can be of much practical utility. The variations may be due to several factors such as genotypes used (Breimen *et al.*, 1987), pathways of regeneration, and parameters employed for assessing the effect of *in vitro* culture, such as gross morphology and cytology (Swedlund and Vasil, 1985), field assessment, and molecular studies (Breiman *et al.*, 1989;