



Detection and identification of grape varieties in must and wine using nuclear and chloroplast microsatellite markers

M.M. Baleiras-Couto*, J.E. Eiras-Dias

INIAP, Estação Vitivinícola Nacional, Quinta da Almoinha, 2565-191 Dois Portos, Portugal

Received 11 August 2005; received in revised form 29 September 2005; accepted 30 September 2005

Available online 5 December 2005

Abstract

Characteristics such as production yield, alcoholic level, acidity and anthocyanin levels vary among grape varieties. Since these characteristics are highly correlated with the final wine quality, it is important to be able to detect and correctly identify the grape varieties (cultivars) present in musts and wines. This is particularly relevant in controlling the quality and authenticity of monovarietal wines.

In this study, molecular methods based on residual DNA analysis of *Vitis vinifera* L. cultivars were applied to musts and wines produced from five different cultivars, namely Touriga Franca, Fernão Pires, Tinta Barroca, Tinto Cão and Marselan. Initially, three DNA extraction methods were compared and optimised for the isolation of DNA from must and wine and then six nuclear and two chloroplast microsatellite markers were used to identify single-varietal and blends of two varieties of musts prepared in laboratory and single-varietal wines produced in microvinifications.

Preliminary results on multivarietal musts indicated a possible relationship between the proportion of each variety in the mixture and the signal intensity of the alleles obtained in an automatic sequencer, suggesting that it could be possible to quantify the presence of each variety in the mixture.

A method for DNA extraction from wine was developed and shown to be adequate for microsatellite amplification. Results have shown for the first time that markers targeting short DNA fragments at chloroplast genomes are useful tools to detect grapevine DNA in wines. This suggests that it may be possible to apply these techniques in controlling wine quality and origin certification, as well as in detecting wine falsification.

© 2005 Elsevier B.V. All rights reserved.

Keywords: *Vitis vinifera* L.; Wine characterisation; Grapevine identification; DNA markers; Nuclear simple sequence repeats (SSR); Chloroplast simple sequence repeats (cpSSR)

* Corresponding author. Tel.: +351 261 712500; fax: +351 261 712426.

E-mail address: evn.m.baleiras.couto@mail.net4b.pt

(M.M. Baleiras-Couto).