

Research Article

Biochemical and Molecular Analysis of Some Commercial Samples of Chilli Peppers from Mexico

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The genus *Capsicum* provides antioxidant compounds, such as phenolics and carotenoids, into the diet. In Mexico, there is a wide diversity of species and varieties of chilli peppers, a fruit which has local cultural and gastronomic importance. In the present study, the relationship of the carotenoid and phenolic profiles with the RAPD fingerprint of three different commercial cultivars of chilli peppers of seven regions of Mexico was investigated. Through RAPD, the species of chilli were differentiated by means of different primers (OPE-18, MFG-17, MFG-18, C51, and C52). The genetic distance found with OPE 18 was in the order of 2.6. The observed differences were maintained when the chromatographic profile of carotenoids, and the molecular markers were analyzed, which suggest a close relationship between carotenoids and the genetic profile. While the chromatographic profile of phenols and the molecular markers were unable to differentiate between genotypes of chilli peppers. In addition, by using infrared spectroscopy and statistical PCA, differences explained by geographic origin were found. Thus, this method could be an alternative for identification of chilli species with respect to their geographic origin.

1. Introduction

Chilli peppers (*Capsicum annuum* L.) are used in a multitude of food preparations and are marketed in different regions. The greatest genetic variety of *C. annuum* L. can be found in Mexico, where there are chilli peppers of many different shapes, sizes, and colours [1], and they are among the most frequently consumed products. The genus *Capsicum* is classified into the family of Solanaceae, which is constituted by 25 wild and 5 domesticated species (*C. annuum* L., *C. frutescens* L., *C. chinense* Jacq, *C. baccatum* Jacq, and *C. pubescens* L.), including more than 200 varieties [2, 3]. Of these five domesticated species, *C. annuum* L. is the most

commonly cultured [4]. Chilli peppers have been object of study mainly due to containing capsaicin, which produces different pungency levels [5], as well as carotenoids and phenolic compounds, which are used as natural pigments and antioxidant agents [6]. Chilli peppers may have different content and profiles of such compounds, depending on the genotype and variety, maturity of the fruit, and the environmental conditions of the cultures [7].

In order to preserve, manage, and improve the different chilli species, the evaluation of the extent of genetic variation within species, as this has now become a fundamental tool in biology and agriculture. Among the main criteria used for that purpose are morphological and molecular markers [8].