Abstract

Wheat, a well-known food crop, consumed all around the world in different ways is estimated to be first domesticated about 9000 to 10000 years ago in the Middle East region. Not only bread wheat, but all the other forms of wheat species including durum and einkorn wheat acting as genetic reservoir are playing a major role in fulfilling the nutritional necessities of the world’s population. Notifying the importance of wheat in the two developing countries, India and Turkey, those are holding second and tenth position in the wheat production in the year 2012, present study was conducted to reveal the genetic diversity of selected Indian and Turkish wheat species (6x, 4x, 2x) and to determine their level of crucial macro-elements (Ca, Mg, K, P, S, Na) and micro-elements (Cu, Mn, Fe, Zn). For the DNA profiling, RAPD and ISSR markers were employed and the assessment of relative informativeness of the DNA marker systems has been done while ICP-AES analysis has been utilized for the estimation of elemental content. Data sets for both molecular and elemental part have been analysed. Combined dendrogram and matrix plot for both RAPD and ISSR primers on the basis of ploidy and geographical region has been drawn in an attempt to categorize collected wheat samples. Principal component analysis for estimating the correlations among different elements has been done. The combined dendrogram and scatterplot based on RAPD and ISSR primers were found to be in accordance with each other showing the clear separation of diploid variety from other tetraploid varieties, triticale varieties and hexaploid varieties confirming the evolution of wheat genome. In elemental analyses, significant information regarding some of the vital macro- and micro- nutrient concentrations in wheat varieties collected from different territories was provided. This work would serve as a support for the steps raised towards conservation, creation of sustainable agricultural systems and biofortification of wheat genotypes leading towards a contented and healthier world.

Keywords: element content, genetic polymorphism, ploidy, wheat