

Study of morphological and molecular diversity of dill (*Anethum graveolens L.*) in Iran

Abstract

Dill (*Anethum graveolens L.*) is one of the most important spice and drug plants which belongs to carrot family. In order to evaluate the genetic diversity in different landraces of dill based on morphological and molecular markers, seeds of 37 accessions that collected from different area of Iran addition to one European accession were cultivated in Random blocks design in research fields and Agriculture at khordad 1386 in Department of Agriculture and Natural Resources in Shirvan. Then morphological traits of dill landraces were measured and studied genetic diversity using AFLP markers in Department of Plant Breeding and BioCenter, Faculty of Agriculture at azar 1386. Results of morphological traits assessment showed that essence yield, and height of first branch had maximum coefficient of variance, also in between traits, phenological traits had minimum coefficient of variance. Highest of correlation coefficient were between days to original and secondary flowers maturity that correlation were more than 0.98. Minimum correlation coefficient were between percentage of essence and 1000 seeds weight were 0.0059. Step-wise regression for essence yield showed that seed yield, percentage of essence and height of first branch were enter the model, respectively, and had 98 percentage of variations. Principal component analysis and Factor analysis showed that four factors justifies 82 and 85 percentage of data variations respectively. Cluster analysis based on morphological and molecular markers classified the accessions of *A. graveolens* in to four groups. Cluster analysis based on morphological traits was performed using Ward's method and Dice's similarity coefficients. In cluster analysis based on AFLP markers, 5-mer primers were used which (PIC were 54.47%). Cluster analysis based on molecular markers was performed using UPGMA method and Jaccard's similarity coefficients. Principal coordinates analysis showed that thirteen factors justifies 69 percentage of data variations. Mantel statistics revealed that the dendrogram was in conformity with similarity matrices, e.g. $r=0.8$. Results of cluster analysis showed that genetic diversity based on morphological traits and molecular markers was not according to the geographical diversity. Mantel statistics based on correlation between molecular markers and morphological traits were weak.

Keywords: Diversity, Dill(*Anethum graveolens L.*), AFLP, morphological traits



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