**Assessment of diversity in Kasuri methi (*Trigonella corniculate* L.) using morphological and molecular markers with physiological character analysis**

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**Abstract**

Kasuri methi (*Trigonella corniculata* L.) an annual herb which is mostly grown in Northern India in rabi season. The demand for Kasuri methi is increasing every year but the production is decreasing due to decreasing availability of water. To increase its adaptability in other areas and breeding drought tolerant varieties, the genetic divergence evaluation in Kasuri methi germplasm is essential. Selection of breeding parents and conserving germplasm depends on availability of genetic diversity among Kasuri methi genotypes. Therefore, it was realized important to characterize available germplam of Kasuri methi using morphological, physiological and molecular parameters. Environmental factors and crop development stages have an impact on a plant's morpho-physiological traits. When compared to morphological and physiological examination, molecular indicators take far less time and are not affected by the environment or the stages of plant development.

The study was done with 18 genotypes for morpho-physiological and 24 genotypes were used for molecular analysis. For morphological studies minimal descriptors provided by NBPGR, New Delhi was used. Relative water content (RWC), chlorophyll, carotenoid content and membrane stability index were recorded during the flowering stage for physiological studies. The RWC and MSI showed significant variation among genotypes while carotenoid and chlorophyll content showed non-significant variation.

Based on the results of the study it can be concluded that morphophysiological characters along with molecular markers such as SSR markers are an efficient method for analysing the biodiversity among Kasuri methi genotypes and sufficient diversity exists in the genotypes. Based on the morphological characters the maximum dissimilarity was observed between JKM13 and JKM6. On the basis of molecular characters, the maximum dissimilarity exists between JKM6 and PS2. Both the cases JKM6 is standing out of others in the dendrograms which ranged from 0.600 to 0.967. The maximum similarity was found between PS6 and PS7, the minimum similarity was found between JKM6 and PS2. Both the cases JKM6 is standing out of others in the dendrograms.

**Key word: Kasuri methi, dendrogram, molecular markers**