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A Review :

Biotechnological tools for crop improvement in spices

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Spices constitute an important group of agricultural commodity considered indispensable for flavouring foods and beverages, pharmaceutical, perfumery and cosmetic industries. India, the land of spices continues to be the largest producer, consumer and exporter of spices in the world. Cultivation of spices in India started from immemorial and presently out of 109 spices available in the world, 63 are grown in the country. Indian spices are unique and valued for their high intrinsic qualities.

Crop improvement in majority of spice crops is a difficult and time consuming programme due to long pre-bearing age. The productivity of many spice crops is considerably low due to various factors such as inadequate availability of high yielding varieties, absence of genotypes resistant to pest and diseases and absence of variability in many of the introduced crops. Biotechnology with its apparently unlimited potential offers new and exciting opportunities to solve the crop specific problems. This paper addresses the various biotechnological tools in the following areas.

- Micro propagation
- Assessment of genetic diversity
- Protoplast isolation
- Haploid production
- Exploiting somaclonal variation
- Management of biotic and abiotic stress
- *In vitro* conservation of germplasm

Micro propagation :

Plant tissue culture and micro propagation techniques have been under development for the last 3 decades. Through these techniques one can produce a large number of plants in a shorter period than possible via other conventional methods. The advantages of this method are not only in gaining time and number but also in getting uniform population with better performance, use of less space for multiplication, *In vitro* storage and conservation of germplasm and also getting disease free plants Herbal spices are fragrant herbaceous plants which the whole plants, twigs, leaves, flowers, fruits, seeds etc., fresh or dried are used as flavouring agents. Once an elite genotype is identified it can be multiplied rapidly through tissue culture. The key developments made in this line of work in some spice crops are listed below:

Assessment of genetic diversity:

Black pepper :

Molecular markers effectively augment the phenotypic characters in generic characterization. RAPD protocols were standardized for black pepper varieties and related species and RAPD polymorphism was used to estimate the genetic distance between them. Of the 8 primers tested, only 2 primers OPA 4 and 14 amplified for all the genotypes. It indicated that the released verities, Panniyur 1, Sreekara, Subhakara, Panchami genetically differed from each other to larger extent. The higher similarity index was obtained between Panniyur 1 and Subhakara. The RAPD profiles also indicated that Sreekara and Subhakara differed from each other though it is difficult to distinguish between them morphologically.

Vanilla :

Isozyme profiles of 10 genotypes using native PAGE was carried out. The gel was stained for superoxide dismutase and peroxidase. Leaf samples were homogenized in tris extraction buffer (Bhat *et al.*, 1992). The PAI expressed as