Biochemical investigation of Tall and Dwarf mutants in Coriander

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Received: February 24, 2019 Accepted: March 28, 2019

ABSTRACT: : *Mutation breeding is the one of the traditional method of crop improvement. Induction of mutation has become a proven way of creating variation within a crop variety. Coriandrum sativum L. belongs to family Apiaceae commonly called Coriander. It is a common green spice used in every part of India. In Maharashtra it is known as Kothembiri. In present investigation mutation breeding was carried out for morphological and biochemical improvement. Ethyl Methane Sulphonate (EMS) and Gamma rays are potential mutating agents which induced mutations in coriander leading to various mutants. From reported mutants biochemical content of Tall and dwarf mutant were analyzed, which showed variable result as compared to control.*

Key Words: *Gamma rays, EMS, tall mutant, dwarf mutant,*

INTRODUCTION

Coriandrum sativum Linn. belongs to family Apiaceae. It is commonly called as coriander. The whole plant and especially the unripe fruit is characterized by a strong disagreeable odour, hence the name coriander (from the Greek Koris, a bedbug). Coriander is a very common green spice used in every part of India popular as Dhania. In Maharashtra it is pronounced as Kothembiri. Coriander seeds and leaves are used as common food flavoring agent. It has great economic and nutritional value in Indian agriculture. Apart from all uses it is well known medicine in traditional medicinal stem like Ayurveda. This plant due to its uses and economic value has been undertaken in mutational study.

Mutation induction is an important method of breeding crop species. The utilization of inducedmutations for the improvement of crop plants has yields several mutants which have been used directly as newcultivarsGottschalk and Wolf (1983). Present paper reports data on tall and dwarf mutants induced by different concentrations/doses of EMS and Gamma rays.

MATERIAL AND METHODS

The seed material of *Coriandrum sativum* Linn, variety CS - 287 was released by Tamil Nadu Agriculture University, Coimbatore, and Tamil Nadu. Physical mutagen gamma ray and chemical mutagen EMS were used for the treatment. For experiment the seeds of each treatment along with control (untreated seeds) were sown in research field by Complete Randomized Block Design (CRBD) with three replications in order to raise the M1generation. Tall mutant and dwarf mutants were screened in M3 and M4 generations for biochemical tests such as essential oil from fruits and seeds by hydrodistillation method (Hesham H. A. Rassem et al 2016), carbohydrates by anthrone method (Hedge and Hofreiter, 1962) and protein from leaves and fruits and seeds (Lowery et al., 1951) and data was quantified.

RESULT AND DISCUSSION

TABLE NO.: 1- Effect of mutagen oncarbohydrates, leaf protein, Fruit and seed protein and Essential oil content of the morphological mutant of *Coriandrum sativum* L.

Sr. No	Morphological Mutants	Carbohydrates		Protein Leaf		Protein fruit		Essential oil	
		%	±SE	%	±SE	%	±SE	%	±SE
1	Control	5.01	±0.01	2.50	±0.02	2.15	±0.02	0.30	±0.01
2	Tall Mutant	5.31	±0.02	2.72	±0.01	2.25	±0.03	0.37	±0.02
3	Dwarf Mutant	3.73	±0.01	2.13	±0.01	2.14	±0.02	0.48	±0.03

±SE: Standard Error

The maximum amount of carbohydrate content was found in tall mutant and minimumin dwarf mutant. Similar trend in result was observed for protein content of fruit and leaves. The total amount of essential oil content in mutants has shown enhancement as compared to control. Total carbohydrate content showed significant increase in mutants while decrease in dwarf mutant. Dwarf mutant showed decreased values of carbohydrates content in Coriander. Similar result was reported by Amrutavalli (1979) in Bulgarian Coriander. She studied and stated that there was decrease in carbohydrate content of some chemically induced mutants.(Iwo *et al.,* 2013) reported that Gamma rays induced mutants of ginger were found to be more promising in rhizome yield and biochemical constituents like oleoresin content.Effect of Gamma rays on *Centellaasiatica* was studied by (Moghaddam *et al.,* 2011). They reported that the irradiated plants of *Centella* displayed higher total flavonoid content than the non-irradiated (control) plants. As the growth of plant increased there was increase in biochemical content. (Latif *et al.,* 2011) studied effect Gamma rays on bioactive components of Coriander. They reported that low doses of Gamma rays showed increased plant growth, phyto hormones, oil production and amino acid content.

CONCLUSION

From the above observations it is clear that there is a lot of scope for genetic improvement in Coriander through mutation breeding.Important features like high Carbohydrate, Protein and essential oil content can be improved through mutation breeding. Relatively very fewer fluctuations are induced by themutagens in the case of biochemical content in the different $M_3$and M_4mutants. The investigation of biochemical components indicated the application of mutation breeding in the development of superior genotypes carrying improved nutritional and medicinal values in Coriander.

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