



Effect of Different media supplemented with Plant Growth Regulators for Enhancement of Corm multiplication in Saffron (*Crocus sativus* L.) under protected conditions

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ABSTRACT

Saffron (Crocus sativus L.) is economically as well as medicinally an important flowering plant, generally known as golden condiment. As generative propagation in nature is practically impossible, growing can be maintained asexually with daughter corms year after year. Demand of the corm is increasing year after year, due to the various factors affecting corm production. Plant growth regulators have important roles in plant growth and development. The externally applicable chemicals belong to different action classes and each one has a crucial and effective role at different plant growing stages. In our study we used different media combinations along with phytohormones, which revealed, maximum corm multiplication (05) in media combination comprising of Cocopeat+Vermiculite+Soil (1:1:1) supplemented with colchicines (0.5%)+GA3(100ppm)+NAA(200ppm)+CCC (500ppm) and vermiculite+soil (3:1) supplemented with GA3(150ppm)+NAA(150ppm)+CCC (400ppm) as compared to control, with least number of corms(2.3). Hence the growth regulators when applied exogenously to saffron can enhance the corm multiplication rate, if used in proper concentration and combination along with different media.

Keywords: Saffron, Growth regulators, Media, Flower, Enhancement

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INTRODUCTION

Saffron (*Crocus sativus* L.) also called as golden condiment is an important medicinal cormous flowering plant having perennial nature. It is a sterile triploid, reproduces vegetatively, and belongs to family Iridaceae. Jammu and Kashmir is having monopoly in this crop having area of 5361 hectares with a production of 173.82 quintals earning state exchequer of 43 crores annually. The average productivity in Jammu & Kashmir State is reported to be declining year after year due to several factors [1]. Less rainfall or drought like situations during active period of corm multiplication or at the time of flowering, inadequate soil nutrients and above all the incidence of many biotic factors like pests and corm rot disease are the major constraints in harvesting the maximum flower yields [4]. Because of impossibility of generative propagation in nature, every year growing is maintained asexually with daughter corms. Demand of the corm is increasing year after year due to the various factors affecting corm production. For this reason the studies on enhancement of corm multiplication is gaining importance. However, the yield and quality production of corm is low which needs to be increased by adopting improved propagation techniques. Plant growth regulators have significant role in modifying the growth and flowering of plants [5]. Present study was undertaken to find out the effect of plant growth regulators on enhancement of corm multiplication in saffron.

MATERIAL AND METHODS

Saffron corm multiplication experiment was conducted under controlled conditions during 2017-18 at ICAR-Central Institute of Temperate Horticulture Srinagar J&K. Saffron corms of size 15-30 mm in diameter, varied between 3-6g provided from non-treated growing areas were used as initial mother corms. Before planting corms were treated with fungicide Bavistin@2gm/L of water. Planting of saffron corms was done in seven different media, which were given seven different phytohormones treatments

(T1-T7) respectively as shown in table1. Corms were placed 10x10 cm distance between and within rows in 5 cm depth in to the soil on 15th of July 2017. Experiment was conducted in a randomized block design with three replications. Plant growth regulators used were dissolved first in requisite solvents then after in distilled water for use [3]. The solution of growth regulators was applied directly to the media at once 5 days after corm planting, when initially plant growth was observed. The treated plots were regularly irrigated with distilled water in the same amount weekly. Corm multiplication data from each treatment was taken and statistically analyzed using OPSTAT software available on website <http://hau.ernet.in/about/opstat.php> [6].

The corm data shown in table 1, revealed that, maximum corm multiplication with maximum number of daughter corms (05) were obtained in T6 media combination comprising of Cocopeat+Vermiculite+Soil (1:1:1) supplemented with colchicines (0.5%)+GA3(100ppm)+NAA(200ppm)+CCC (500ppm) and T4 media combination of Vermiculite+soil (3:1) supplemented with GA3(150ppm)+ NAA(150ppm)+CCC (400ppm) (Fig. 1), while as the T7 where soil and water (Control) was used, produced least number of corms(2.3). Statistical analysis also showed that there is significant difference between the treatments; T1, T2 and T5 were statistically at par. On an average the size of daughter corms in all the treatments was 3-4 g.

The role of plant growth regulators for flower enhancement has already been studied in other flower crops like gladiolus, where flower quality parameters, maximum number of florets/ spike, floret length, length of spike were recorded highest with foliar spray of GA3 200 ppm and CCC 750 ppm [5]. Influence of growth hormones and media on enhancement of flowering in saffron under protected conditions has been studied [7]. Aysun [3] studied the effect of growth regulators on various growth characters of saffron and reported that concentration of 10 mg L⁻¹ paclobutrazol caused an increase in daughter corm number and healthy daughter corm yield. According to another study 1 mg L⁻¹ Indole Butyric Acid (IBA) showed the best corm initiation and corm number [8].

Table: Influence of media and phytohormone application on corm multiplication in saffron under protected conditions

Treatment s	Media	Plant Growth Regulators	Avg. No. of microcorms
T1	Cocopeat +Soil(1:1)	Colchicines(0.5%)+GA3(150ppm)+NAA (150ppm)+CCC (500ppm)	2.8
T2	Cocopeat+Soil (3:1)	GA3(150ppm)+ NAA(150ppm)+CCC (200ppm)	2.9
T3	Vermiculite+Soil(1:1)	GA3(100ppm)+ NAA(150ppm)+CCC (500ppm)	3.6
T4	Vermiculite+soil (3:1)	GA3(150ppm)+ NAA(150ppm)+CCC (400ppm)	5.0
T5	Cocopeat+Vermiculite (1:1)	GA3(50ppm)+ NAA(50ppm)+CCC (50ppm)	3.6
T6	Cocopeat+Vermiculite+Soil (1:1:1)	Colchicines(0.5%)+GA3(100ppm)+NAA(200ppm)+ CCC (500ppm)	5.0
T7	Soil (Control)	Dist. water	2.3
C.D	0.60		

GA3-Gibberlic acid, CCC-Cycocel, NAA-Napthalene acetic acid



Fig 1: Corm multiplication in different media along with different concentrations of growth regulators

CONCLUSION

In conclusion the growth regulators when applied exogenously to saffron can enhance the corm multiplication rate when used in proper concentration and combination, which was also confirmed from our study. Hence growth regulators along with different media can play an important role in enhancing

the corm multiplication rate in saffron for better returns and economic benefits under controlled conditions.

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