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Title:	Crocus sativus L. (Saffron): In vitro studies with special reference to karyotyping and antioxidant potential
Publisher:	Birsa Agricultural University, Kanke, Ranchi, Jharkhand
Language:	en_US
Type:	Thesis
Pages:	92
Agrotags:	null
Keywords:	Crocus sativus L. (Saffron): In vitro studies with special reference to karyotyping and antioxidant potential

Abstract:	Crocus sativus L. is grown in small area with a limitation for healthy planting material. The plant is sterile, so its improvement through breeding is quite difficult. Use of saffron stigma in medicinal purpose is well reported. In the present work, efficient in vitro methods for microcorm production via shoot tips and corm of Crocus sativus L. was developed. Best survival percentage during surface sterilization of Crocus sativus L. explants were achieved by treating shoot tips with 0.2% of HgCl2 for 25 minutes and corms with 0.2% HgCl2 for 40 minutes. Media was prepared on the basis of earlier reports on in vitro propagation of saffron with some modification as well as new compositions. Out of these media C11 was found to be the best among all used during experiments. Bud breaking from corm was induced on C11 media (MS media supplemented with 2.0 mg/L of NAA, 5.0 mg/L of BAP, 100.0 mg/L of AdSO4 and sucrose 4%). Highest mean number of buds (2.4) was observed after 150 days of inoculation in the same media. From corm, highest mean number of minicorm per explant (4.3) was observed after 150 days of inoculation in the same media. When apical buds was inoculated on C11, kept at culture room condition (light 3000 lux and temperature 25 ± 2º C) highest mean number of microcorm was 34.6 which was reduced to 32.8 when kept at dark at 4-8º C after 125 days. Initial induction of microcorm in dark condition was more rapid than culture room condition but after 100 days of interval induction rate was reduced, in comparison to culture kept under light. Moreover, mean weight of microcorm/ culture bottle kept at dark was 1.085 times more than that of kept at culture room condition. After emergence of apical bud from microcorm on C11 media, microcorms from C11 media were transferred to different media. Maximum mean number of buds/ culture bottle was 24.2, which was observed on C11 media. Multiplication of microcorms from single microcorm was observed in the same media. Overall study revealed that out of different media, C11 was the best for inducing in vitro response. The combination of phytohormones used in this media was not reported earlier. Callus growth was observed on C11 and C31 (MS media supplemented with 2,4- D 1.0 mg/L, kinetin 1.0 mg/L and sucrose 3%) media. Later when the callus which was proliferating on C31 media was subcultured to C31 and C30 media (MS media supplemented with 2,4-D 0.5 mg/L, kinetin 1.0 mg/L and sucrose 3%), somatic embryos was induced. Leaf was emerged from apical buds, when inoculated on different media with or without section of corm. Abnormalities in leaf were also observed. No positive results were obtained, when stigma was used as explant and inoculated on MS basal with various concentrations and combinations of hormones and other additives. However, some of the stigma was found alive after 200 days of inoculation. Attempts were made to harden plant but no positive results were obtained. The sterility of Crocus sativus L. is well reported; to study its chromosome, karyotyping was done. During this study, somatic chromosome number was found 3X=2n= 24, range of chromosome length was 4.16-9.17 µm, total volume of chromosome was 312.57 µm3, absolute chromosome length was 158.67 µm and karyotype formula was A3B15C6. Antioxidant activity by DPPH and ABTS assay showed that 200 µg/ml of crude methanolic extract of Crocus sativus was able to inhibit the DPPH radical formation by 42.8% and 99.01 µg/ml of plant extract was able to inhibit ABTS radical formation by 36.84% respectively. Addition of 10, 20 and 30 µg/µl of plant extract to the reaction mixture of H2O2 indicated the significant protection against damage of pUC 18.
Description:	Crocus sativus L. (Saffron): In vitro studies with special reference to karyotyping and antioxidant potential
Subject:	Biotechnology
Theme:	Crocus sativus L. (Saffron): In vitro studies with special reference to karyotyping and antioxidant potential
These Type:	M.Sc
Issue Date:	2008
Appears in Collections:	Thesis (/handle/1/93550)

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