Authors:	Prasad, Vijetashree (/browse?type=author&value=Prasad%2C+Vijetashree)
Advisor:	Banerjee, Madhuparna (/browse?type=author&value=Banerjee%2C+Madhuparna)
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Abstract: Jatropha curcas L. is oil yielding tree plant with high medicinal and commercial value. This plant has been identified as the promising plant for biodiesel production by Planning Commision's Task Force. As Jatropha is cross-pollinated crop so, genetic integrity of the plant can't be maintained through seed germination. The in vitro culture is one of the best techniques for mass propagation and crop improvement to increase productivity leading to full supply of the demand. In the present work, an efficient in vitro method for plantlet regeneration via shoot tips and leaves of J. curcas (variety- Mancheswar) was developed. The best survival percentage during surface sterilization of J. curcas (variety- Mancheswar) explants were achieved by treating shoot tips with 0.1% of HgCl2 for 10 minutes and leaves with 0.05% HgCl2 for 10 minutes. Shoot multiplication was induced on MS media supplemented with 2.0 mg/l of Kn, 1.5 mg/l IBA, 25.0 mg/l AdSO4, 10.0 mg/l ascorcic acid and 50.0 mg/l of citric acid. Highest number of shoots per explant (5-7 shoots) was observed after 60 days of inculation in the same media. Best callus growth was observed on MS media containing 1.0 mg/l of 2,4- D, 1.0 mg/l of kinetin and 1.0 mg/l of citric acid. Best shoot regeneration from callus was observed on MS media containing BAP (1.5 mg/l), kinetin (0.5 mg/l) and IAA (0.125 mg/l) as well as MS medium supplemented with 1.0 mg/l of BAP and 3.0 mg/l of 2-ip after 60 days of inoculation (4-6 shoots per callus clump). No root formation was observed under in vitro system. For rooting, a pulse treatment of excised shootlets, 10.0 mg/l of IBA was found effective under in vivo condition. In vitro anther/pollen culture is an important technique to induce haploids either by direct embryo formation or through callus formation. So, efforts have been made to establish culture by anther/pollen of J. curcas (variety- Kalyanpur and PKVJ MKVI). Callus was successfully induced from anther of both varieties of J. curcas on MS media supplemented with 1.0 mg/l of 2,4-D, 1.0 mg/l of kinetin and 1.0 mg/l of CA. No shoot regeneration from anther was observed in MS media supplemented with different hormonal concentrations and combinations. Only white globular structures were observed all over the callus clumps after 20 days of transfer on MS media supplemented with 1.0 mg/l of 2,4-D, 1.0 mg/l of kinetin, but shoot regeneration was not observed. Protoplasts were successfully isolated from both varieties of callus of J. curcas (variety- Kalyanpur and PKVJ MKVI) but protoplasts culture could not be established in liquid as well as solid NT and B5 media. In living organisms the reactive oxygen species (ROS) are known to cause damage to lipids, proteins, enzymes and nucleic acids leading to cell or tissue injury, which have been implicated in the processes of aging as well as in wide range of degenerative diseases. Many Indian medicinal plants are potential source of antioxidants. Natural antioxidants are secondary metabolites of plants that neutralize these oxidants. In the present work, phytochemical tests were done for the identification of different chemical constituents of J. curcas (var.- Mancheswar). The presence of different chemical constituents such as alkaloids, sugars, terpenoids, steroids, aminoacids, phytosterols, saponins, tannins and phenols from J. curcas was confirmed by phytochemical tests. Screening of antioxidant activity of the crude methanolic extracts of J. curcas (var.- Mancheswar) was done by using the spectrophotometric DPPH (1,1- diphenyl-2-picrylhydrazyl) as well as ABTS (2,2'-azinobis-(3-ethylbenzthiazoline-6-sulphonic acid) free radical scavenging method and DNA damage protecting activity was checked by inducing hydroxyl radicals on pBS SK II (-). Antioxidant activity by DPPH and ABTS assay showed that 50 µg/ml of crude methanolic extract of J. curcas was able to inhibit the DPPH radical formation by 91.92% and 30 µg/ml of plant extract was able to inhibit ABTS radical formation by 98.84% respectively. Addition of 20 µg/µl of plant extract to the reaction mixture of H2O2 indicated the significant protection to the damage of pBS SK II (-).

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