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Influence of various compounds on media sterilization in sugarcane meristem tip culture

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Sugarcane is negatively affected by diseases largely due to its vegetative propagation through the use of stem cuttings (setts). Quality seed assumes a great significance in any crop and so it is in sugarcane. Micro propagation is one of the most important techniques for commercial cloning of plants. Despite several clear advantages of *in vitro* culture techniques, some problems persist and do not satisfy the commercial interests, particularly the high costs of implementation and technical maintenance. In this context, one of the main problems is high energy expenditure and time taken for the preparation of material during the autoclaving phase of culture medium (Macek et al., 1995). Thus the present investigation was taken to screen out the best concentrations of chemical sterilants ($HgCl_2$, NaOCl, H_2O_2 and $AgNO_3$), fungicides (*Carbendazim, Propiconazole, Hexaconazole* and *Tebuconazole*) and natural extracts (aqueous extracts of Morinda citrifolia leaf, Azadirachta indica leaf and Allium sativum bulb) on the *in vitro* developed shoots of sugarcane using Meristem tip culture. Fresh tops of commercial sugarcane variety grown at the research farm of Regional Agricultural Research Station (RARS), Anakapalle, Andhra Pradesh, India were collected.

The data on survival (%), mean number of shoots per culture and mean shoot length (cm) in MS media supplemented with BAP (0.2mg/l), KN (0.1 mg/l) and commercial sugar (27g/l) on media sterilization with various concentrations of chemical sterilants like Mercuric chloride ($HgCl_2$), Sodium hypochlorite (NaOCl), Hydrogen peroxide (H_2O_2) and Silver Nitrate ($AgNO_3$) indicated that maximum survival (%), mean number of shoots per culture and shoot length of *in vitro* meristem tip cultures of sugarcane was recorded in 0.100 g/l NaOCl (92.07%, 12.02 and 12.49 cm). The data on the effect of MS media supplemented with BAP (0.2 mg/l), KN (0.1 mg/l) and commercial sugar (27 g/l) on media sterilization with various concentrations of Fungicides viz., Carbendazim, Propiconazole, Hexaconazole and Tebuconazole on survival (%), mean number of shoots per culture and mean shoot length (cm) indicated that, the maximum survival (%), mean number of shoots per culture and mean shoot length (cm) were maximum in carbendazim at 200 g/l (44.75, 5.43 and 6.12). The data on the effect of MS media supplemented with BAP (0.2mg/l), KN (0.1mg/l) and commercial sugar (27g/l) on media sterilization with various concentrations of Natural aqueous leaf extract of *Morinda citrifolia*, leaf extract of *Azadirachta indica* and bulb extract of Allium sativum on survival (%), mean number of shoots per culture and mean shoot length (cm) indicated that, maximum survival (%), mean number of shoots per culture and mean shoot length (cm) of *in vitro* meristem tip cultures of sugarcane was observed in aqueous extract of *Morinda citrifolia* leaf at 4.000 ml/l (64.78%, 7.48 and 7.55 cm). Among various alternatives for reducing cost in "biofactories" or commercial plant production laboratories, using NaOCl is a good alternative to replace the autoclaving procedure.

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Heterotic response for grain yield in rabi sorghum

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The present study was carried out at Sorghum Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during rabi 2013-14. Three male sterile lines were crossed with eighteen testers in line x tester design and produced 54 hybrids. Experiment was done during rabi 2013-14 by using twenty-one parents, their 54 possible hybrids along with one widely used standard check CSH-19R. The study was undertaken to estimate the amount of percent heterosis, heterobeltiosis, standard heterosis in rabi sorghum. Average heterosis, heterobeltiosis and standard heterosis were studied for all the characters. For average heterosis, eighteen hybrids recorded significant positive average heterosis for grain yield per plant. Maximum heterosis was shown by hybrid AKRMS-66-2A x Rb local 3 (108.10%) followed by AKRMS-66-2A x Rb-413-1 (91.41%), AKRMS-66-2A x (275 x 104 x 1201 x Ringini x18551 x 89022 36-2-1-1) (79.78%), AKRMS-66-2A x Rb-400 (76.08%), and AKRMS-80-1A x Rb-369-1 (75.47%). For heterobeltiosis, twenty-seven hybrids recorded significant positive better parent heterosis for grain yield per plant. Maximum heterosis was shown by hybrid AKRMS-66-2A x Rb local 3 (103.77%) followed by AKRMS-66-2A x Rb-413-1 (76.02%), AKRMS-68-1A x Rb local 6-3(67.04%), AKRMS-68-1A x Rb local 6-3 (61.37%) and AKRMS-66-2A x Rb-400 (59.70%). In case of standard heterosis, seventeen hybrids showed significant and positive useful heterosis for grain yield per plant. Maximum standard heterosis was exhibited by the hybrid AKRMS-68-1A x AKSV-219R (30.11%) followed by AKRMS-66-2A x Rb local 3 (28.22 %), AKRMS-80-1A x Rb-369-1 (27.95 %), AKRMS-80-1A x Rb-400 (26.89 %) and AKRMS-66-2A x Rb-413-1 (26.48 %). These five hybrids need to exploited for developing the promising heterotic hybrids in rabi sorghum.

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