Callus formation occurred after 10 days when cultures were incubated in dark at 25±2°C for 3 days and then kept in the light room under 16 hr light and 8 hr dark photoperiod. Callus was developed from cut ends of root explants and adventitious root tips only (Anju John and Prathapasenan, 1999). Even within the *indica* group, there were significant variations in the *in vitro* culture response among different genotypes (Hoque and Mansfield, 2004). Among the ARC lines, ARC 15759 expressed high frequency of callus induction (96.6%) than check Taipei 309 (86.7%). The lines ARC 18023 and ARC 18214 were at par with check (Fig. 1). High frequency callus induction was obtained when using maltose as carbon source instead of using sucrose (Fig. 2).

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Research Notes

Organic sources of nutrients on groundnut seed production

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India ranks first in groundnut acreage (6.4 million ha), which accounts for 23.87 per cent of the world total groundnut area. The average productivity of groundnut in India is 1125 kg ha^{-1}, which is far below the world's average of 1449 kg ha^{-1} (www.agrico.op.nic.in). In the wake of serious pollution problems and bio-magnification of toxic chemicals in the various biological systems, 'organic farming' is the right approach in the present day

agriculture. Organic agriculture is increasingly gaining social, political and scientific recognition for its contribution to sustainable agriculture. On a world scale, 23 million hectares are grown organically. Australia is leading with 10.5 million ha, followed by Argentina (3.2 million ha) and Italy (1.2 million ha). The European Union regulation 2092 / 91 for organic agriculture, stipulates that seeds and planting material for organic farming should be organically produced. Further the regulation will allow no more general derogation in the use of conventionally propagated seeds from 2004 onwards. In this background, it is now necessary for the conventional seed sector to make a commitment to scale up and supply the organic market with a sufficient quantity and an adequate quality of organically produced seeds in groundnut too, which is being consumed in larger quantity worldwide.

Field experiments were conducted during *rabi* (irrigated), 2003 and *kharif* (rainfed) 2004 at Oilseeds Research Station, TNAU, Tindivanam with the following treatments. T_1 - Composted poultry manure, T_2 - Composted pressmud, T_3 - Vermi compost, T_4 - Farmyard manure, T_5 – T_1 + Panchakavya (3%) spray on 25 and 35 DAS, T_6 -T_2 + Panchakavya (3%) spray on 25 and 35 DAS, T_7 - T_3 + Panchakavya (3%) spray on 25 and 35 DAS, T_8 - T_4 + Panchakavya (3%) spray on 25 and 35 DAS, T_9 -Recommended package of practices (NPK @ 17:34:54 kg ha^{-1} for irrigated and 10:10:45 kg ha^{-1} for rainfed crop and T_{10}- Control. The experiment was conducted in a Randomized Block Design and replicated thrice, using groundnut TMV 7 as test crop. The organics were applied to the plots equivalent to the N requirement of the crop for both seasons and the quantities were calculated based on the N content of the each nutrient. The N content of Composted poultry manure, Composted press mud, Vermicompost and Farm yard manure were 3.0, 1.5, 3.0 and 0.5 per cent, respectively and the quantity applied was 567,1139,567 and 3400 kg ha^{-1} for irrigated and 334, 670, 334 and 2000 kg ha^{-1} for rain fed crops. Gypsum was applied in bands for all the treatments except for Tio@ 200 kg ha^{-1} as basal and 200 kg ha^{-1} on 45 DAS. The kernels were treated with *Trichoderma viridi* @ 4 g kg^{-1} followed by slurry treatment with rhizobial culture @ 5 g kg^{-1} and dried under shade and sown. The package of practices was followed as per recommendation. The parameters like number of sound mature pods $plant^{-1}$, 100 pod weight (g), 100 kernel weight (g) and seed yield (kg ha^{-1}) were recorded besides, B:C ratio was worked out. The seed yield $plot^{-1}$ was recorded at harvest. The data were subjected to statistical scrutiny.

In the present study, seed yield is determined by number of pegs formed and proportion of pegs that produced mature pods, number of mature pods $plant^{-1}$ and number of kernels pod^{-1} (Desai *et al.,* 1999). In the present study, the number of sound mature pods $plant^{-1}$ was higher in recommended dose of fertilizer applied plots in both the seasons. However, comparatively larger number of sound mature pods $plant^{-1}$ (12.5) was obtained during *rabi* (irrigated), 2003 than *kharif* (rainfed), 2004 (9.9). The plots applied with composted pressmud + panchakavya recorded 10.9 and 8.6 mature pods $plant^{-1}$ during *rabi* (irrigated), 2003 and *kharif* (rainfed), 2004, respectively followed by composted pressmud alone applied plots in both the seasons (Table-1). This might be due to the improved soil physical condition that facilitated the peg penetration (Sankarareddy, 1988) and also the composted pressmud might have supplied all essential nutrients particularly calcium, sulphur and zinc for the production of bold pods (Anumary *et al.,* 2000). Pressmud

would favour building up of available phosphorus (Sriramachandrasekaran, 2001). This cumulative effect of nutrient present in composted pressmud might have contributed for increased level of mature pods and ultimately increased the yield.

In the present study, 100 pod weight and 100 kernel weight were higher in recommended dose of fertilizer applied plots followed by composted pressmud + panchakavya applied plots, which was on par with pressmud applied plots (Table 1). Seed yield was maximum (2152 kg ha^{-1} for *rabi* (irrigated), 2003 and 1399 kg ha^{-1} for *kharif* (rainfed), 2004) in plots applied with recommended dose of fertilizer, followed by composted pressmud + panchakavya applied plots (1870 kg ha^{-1} for *rabi* (irrigated), 2003 and 1217 kg ha^{-1} for *kharif* (rainfed), 2004), which was on par with composted pressmud alone applied plots in both the seasons. With respect to benefit cost ratio, (20% increase in cost of organic seed was given as premium price), recommended dose of fertilizers applied plots recorded a higher B:C ratio of 3.03 followed by composted pressmud + panchakavya applied plots (3.16) during *rabi* (irrigated), 2003 whereas, during *kharif* (rainfed), 2004, the plots applied with composted pressmud + panchakavya recorded a higher B:C ratio of 2.11.The increased yield in inorganic fertilizer applied plots may be due to the immediate availability of nutrienets and balanced supply of N, P and K as required by the plants, whereas the organics were applied to the field on equal 'N' base only. Accumulated nutrients from the continuous application of organics gradually mineralized and utilized by the successive crops which sustain the productivity. The presence of beneficial bioactive compounds such as GA_3, IAA *etc*., in panchakavya (Somasundaram, 2003) and increased level of phosphorus and potassium and other essential nutrients present in composted pressmud might have contributed to increased yield.

Increased yield due to the application of pressmud either separately or in combination with inorganic fertilizer was reported by Sriramachandrasekaran (2001) and Manikandan (2003) in groundnut. Thus the study revealed that application of composted pressmud + panchakavya enhanced the yield attributes and seed yield.

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Research Notes

Field germinability and storability of rice seeds treated with maleic hydrazide spray

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Investigations were carried out at Rice Research Station, Ambasamudram to induce seed dormancy in rice seeds (Var. ASD 16) and to arrest sprouting in field under inclement weather condition at Ambasamudram during the harvest of the 1st season (Kar) crop, maleic hydrazide at 200 ppm and 500 ppm concentration spray was given to the standing crop of rice 10, 15, 20 & 25 days prior to harvest.

Weekly evaluation of germination potential of maleic hydrazide sprayed seeds in the field prior to harvest indicated that no seed was found germinated after two weeks of harvest. Maleic hydrazide sprayed seeds require more than one month to attain mean seed certification standard (MSCS) level of seed germination. The treated seeds were forwarded for storage under ambient condition along with control and tested for its germination and drymatter production at regular monthly interval (Table 1)

The mean data recorded for germination (%) and dry matter production (mg/10 seedlings) were statistically analysed by Factorial Randomized Block Design, as suggested by Panse and Sukhatme (1957).

The highest germination percentage of 92.0 was recorded by the control plot seeds (T_1) at one month after storage (P_1). At the end of 9 months of storage the germination percentage of T_1 and T_2 were 82.0 and 75.6 respectively. The drymatter production (mg/ 10 seedlings) varied from 138.9 to 129.2 among treated and untreated seeds for different periods of storage (Table 2).

In general the seed germination percentage and drymatter production declined as the period of storage prolonged. The level of decline in percent germination was higher in untreated seeds than the treated seeds.