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QUICK *IN VITRO* MICROPROPAGATION OF *ARACHIS HYPOGAEA* L.

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Nutritional balance in the medium plays most important role for getting regeneration in RG-141 variety of *Arachis hypogaea*. Our studies revealed that IBA and NAA were best growth promoting hormones, when used up to 5.0 mg/l for quick and complete regeneration of this particular variety. Further growth of the plant with quick propagation in the soil was also achieved successfully.

Keywords : *Arachis hypogaea*; Micropropagation; Regeneration.

Introduction

Groundnut an oilseed belonging to the world's most important crop as a source of both fats and proteins, improvement of which is of great interest, thus an efficient plant regeneration is a prerequisite in improvement of such an oil seed crop. There has been a large number of reports on plant regeneration in legumes through organogenesis or somatic embryogenesis[1-5]. Present study describes the quick micropropagation method for *Arachis hypogaea* L. species.

Materials and Methods

Seeds of *Arachis hypogaea* L. RG-141, were procured from Durgapura Agricultural Research Station, Jaipur, where it is grown successfully. Seeds for *in vitro* studies were surface sterilized with 0.1% mercuric chloride solution for 4-5 minutes and were then thoroughly washed 2-3 times with sterile distilled water. These seeds were then germinated on sterilized paper bridges in *in vitro* conditions. From the two week old seedlings, nodal regions were excised for the explants and were inoculated on Murashige and Skoog's (MS)[4] medium, congealed with 0.8% agar and 3% sucrose was also added. All media were adjusted to pH 5.8 prior to autoclaving. Cultures were incubated at 25 ± 2°C under continuous fluorescent light.

Results and Discussion

Results are summarised in Table 1 when NAA (1.0 mg/l) with BAP (5.0 mg/l) were incorporated to MS medium, profuse callusing was obtained, ultimately leading to complete regeneration. Development of complete plantlets from the time of inoculation took almost 3-4 weeks. Surprisingly, the callus formation lowered down to a great extent when 2,4-D (1.0 mg/l) and Kn (0.5 mg/l) were used in place of NAA and BAP. However, rooting could not be obtained but only shoots were formed. For further rooting of these developed shoots, they were later on transferred to MS medium, containing IAA (5.0 mg/l). Thus, by these findings it can be concluded that adhering callus at the base impede the process of root multiplication and further survival of *in vitro* regenerated plantlets in the soil, as the same was reported by Suryaprakash *et al*[5]. in *Cicer arietinum* L.

Usually, micropropagation is achieved in 3 steps i. e. establishment of the explant, shooting and then rooting and hardening for planting into soil[6]. All the three steps are essential if rooting does not occur on the same medium. To achieve quick micropropagation, present experimental technique was simplified by eliminating the requisite of separate medium for rooting, along with the elimination of intermediatory callusing prior to

regeneration. Nodal segment, when inoculated on MS medium, incorporated with NAA (1.0 mg/1) or IBA (3.0 mg/1) complete plantlet regeneration was achieved within 2 weeks, without any callusing phase.

In contrast to high regeneration frequencies induced by 2,4-D in legumes, in our experiment it rather inhibited the process of regeneration as reported by Tomar and Gupta[7] in *Albizia* species which also supports our findings. The *in vitro* regenerated plants were then finally transferred to the soil for their further growth and survival. Thus, these findings would be of great help and of considerable interest for the breeders as far quick regeneration of *Arachis hypogaea* L. plant *in vitro* is concerned especially of RG-141 variety.

References

1. Bovo O A , Mroginski L A and Rey H Y 1986,

Table 1. Nodal segment culture responses in *Arachis hypogaea*.

S. No.	Hormone	Concentration (mg/1)	Response			
			Shoot length	Rooting	Callus growth	Time taken for regeneration right from inoculation (in days)
1.	2,4-D + Kn	1.0 0.5	L^{++}	R^{++}	C^{+}	30-40
2.	NAA + BAP	1.0 5.0	L^{+}	R^{+}	C^{++}	15-20
3.	NAA	1.0	L^{++}	R^{+++}	-	7-14
4.	IBA	3.0	L^{++}	R^{+++}	-	7-14

Relative values are :

L^{+} = 5-7 cm length, L^{++} = 10-15cm length

R^{+} = 1-2 roots, R^{++} = 2-4 roots, R^{+++} = 6-9 roots

- = nil, C^{+} = low callus formation, C^{++} = profuse callusing.

Fig. 1-3: Response of nodal explant of *Arachis hypogaea* 1. Plantlet regeneration on MS medium incorporated with NAA = 1.0 mg/1 + BAP = 5.0 mg/1; 2. Complete plantlet formation on MS medium with NAA = 1.0 mg/1; 3. *in vitro* regenerated plantlets in soil.

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2. Elke B Brandt and Dieter Hess 1994, *In vitro Cell Dev. Biol. 30* 75
3. Mroginski L A and Kartha K K , 1984, *Plant Breeding Reviews 2* 215
4. Murashige T and Skoog F 1962, *Physiol. Plant. 15* 473
5. Suryaprakash, Chowdhury J B , Jain R K and Chowdhury V K 1992, *Ind. J. Exp. Biol. 30* 1149
6. Hiraoka N and Oyangi M 1988, *Plant Cell Rep. 7* 39
7. Tomar U K and Gupta S C 1988, *Plant Cell Rep. 7* 382