RESEARCH PAPER

Asian Journal of Bio Science (April, 2010) Vol. 5 Issue 1 : 92-98

Effect of plant growth harmones on the shoot regeneration system of groundnut (*Arachis hypogaea* L.) var. Kadiri 3

RAJASEKHAR PINNAMANENI

Centre for Biotechnology, Acharya Nagarjuna University, NAGARJUNA NAGAR (A.P.) INDIA

(Accepted : March, 2010)

Groundnut or peanut (*Arachis hypogaea* L.) is one of the principal economic crops of the world. The cotyledons, shoot apices, leaflets and embryo were selected as the explants to study the shoot regeneration system of groundnut from different explants of Kadiri 3. From the above set of experiments cotylydonary explants showed better response in shoot initiation medium (SIM), so that it was used in all the experiments on the optimization of regeneration system. The cotylydonary explants from mature seeds of peanut variety Kadiri 3 were cultured on different media formulations containing varying concentrations of BA and 2,4-D. Amongst the different media tested, MS containing 20 µM BA and 10 µM 2,4-D produced the highest frequency (73.3%). The explants bearing shoot buds were cut into two to four pieces and transferred on to shoot elongation medium, MS medium with 2 µM BA showed better response and the shoots were micropropagated on SEM through nodal explants for clonal multiplication and eventually rooted on MS medium containing 5 µM NAA where the other auxins didn't show any promising results when compared with the NAA.

Key words : Groundnut, Regeneration, Growth harmones

INTRODUCTION

The grain legumes are an important group of crops with major source of dietary protein and oil. Groundnut (*Arachis hypogaea* L.) is one of the world's most important oilseed crops. Besides income for the farmers, groundnut provides an inexpensive source of high quality nutrition. Groundnut seeds contain 44-56% oil and 22-30% protein on a dry seed basis. Due to lack of resistance to biotic and abiotic stresses in cultivated groundnut, the productivity remained low despite large acreage under cultivation (Savage and Keenan, 1994). The wild genotypes of *Arachis* are valuable sources of resistant genes against several pests, pathogens besides high oil and protein content (Cherry, 1977; Stalker and Simpson, 1995; Lynch and Mack, 1995; Holbrook and Stalker, 2003).

The multiplication and maintenance of wild *Arachis* germplasm is labour-intensive and involves specific protocols because many accessions are grown mostly under greenhouse/glasshouse conditions. For instance, the field-grown wild plants are uprooted and the soil has to be shifted to harvest the seeds (Stalker, 1997). Therefore, there is a limited supply of wild germplasm from the gene bank and it becomes difficult to maintain wild species of *Arachis* for its use in breeding programme.

Plant regeneration until the recent past in cultivated and in wild groundnut has been achieved either directly via organogenesis or indirectly through somatic embryogenesis (Kanyand *et al*., 1994; Li *et al*., 1994; Rani and Reddy, 1996a; Rani and Reddy, 1996b; Venkatachalam *et al*., 1999; Victor *et al*., 1999; Little *et al*., 2000). However, the reports on plant regeneration with intervening callus phase are few in cultivated genotypes and less in wild *Arachis* (Venkatachalam *et al*., 1996; Still *et al*., 1987; Vajranabhaiah *et al*., 1993; Li *et al*., 1993). The standardization of *in vitro* plant regeneration protocols with intervening callus phase would certainly help in the mass scale propagation of the wild species and also facilitate germplasm conservation *in vitro* (Gagliardi *et al*., 2002).

In addition, the protocol can also be exploited for generating new genetic variability in groundnut by somatic hybridization through protoplast fusion as has been demonstrated in other legumes (Arcioni *et al*., 2001).

Further, this is an attempt to study the effect of different plant growth regulators on morphogenetic response of shoot base-derived callus.

MATERIALS AND METHODS

Explant material and sterilization :

The cotyledons, shoot apices, leaflet and embryos were selected as the explants to study the shoot regeneration system. The different explants from groundnut variety Kadiri 3 were surface sterilized in 0.1% mercuric chloride with 1-2 drops of tween-20 for 7 min on the shaker. Explants were rinsed 3-4 times with sterile