IN VITRO PROPAGATION OF POTATO

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Extended Summary

Potato is one of the most productive and widely grown non cereal edible food crop in the world. Potato ranks third in Bangladesh behind rice and wheat production. It has multipurpose use in our daily consumption. The potential value of tissue culture in crop improvement has been widely recognized. The seed potato produced by tissue culture method proved better performance as compare to import one. *In vitro* regeneration of potato combined with conventional multiplication method can boost up the potato production of our country. Hence, the rationale of the present investigation was to establish an efficient regeneration protocol development, callus induction and microtuber production in potato.

Six popular potato varieties viz. Diamont, Cardinal, Granulla, Provinto, Ultra, Dheera were used as experimental materials. Varietal response on *in vitro* regeneration under different hormonal concentration and combination were studied. MS medium supplemented with 0.5, 1.0, 1.5, 2.0, 4.0 mg/L of KIN and IAA in combination of both were employed for *in vitro* regeneration. Among the different treatment the combination 2.0mg/L of KIN and IAA showed best response to multiple shoot and root regeneration. The same concentration also takes minimum time for regeneration. The interaction between hormonal concentration and varietal potentiality for all the parameter showed significant difference at 5% level of probability. The *in vitro* regeneration and multiplication potentiality was the highest in the variety Granulla followed by Cardinal and Diamont.

In vitro microtuber formation potentiality of potato was investigated to establish a rapid disease free seed production system in potato. MS medium supplemented with 4 mg/L of KIN showed the best performance in respect of multiple shoot regeneration and microtuber formation. Simple MS medium was not able to produce any micro tuber under *in vitro* condition. Dark condition better responded to tuberization than light condition. Among the three different explants (nodal segment, sprout and shoot apex) nodal cutting showed the best performance on days to microtuber formation and average weight of microtuber. MS + 6% sucrose + 4 mg/L KIN combination of treatment was best for *in vitro* tuberization among the parameters under study.

Off-season sprouting ability and *in vitro* regeneration potentiality were investigated to establish a rapid multiplication protocol in three potato varieties viz. Diamant, Cardinal and Granulla. It reveals that, sprout initiation time, sprout length and number were directly proposonate to the higher concentration of GA_3 application. Higher concentration (400 ppm) showed better performance for all the parameter under studied. The cultivar Granulla showed best response in callus induction and *in vitro* regeneration under 2,4-D application.

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