ABSTRACT

Seed propagation is the common propagation method used in cinnamon cultivation. But, it has several constraints and problems such as seeds are seasonal, recalcitrant and unevenly matured etc. Above all, homogenous plantation of cinnamon would not be established with saplings of cross-pollinated seeds. Further, as other vegetative propagation methods are also seemed to be not much success and therefore, *in-vitro* propagation would be good alternative.

The research was conducted under two main streams *i.e. in-vitro* propagation through embryos and isolated axillary buds collected from green-house grown seedlings. Due to successful method for *in-vitro* propagation of cinnamon has been limited, embryo culture was developed initially in half strength MS medium in order to optimize the culture condition of axillary buds.

An appropriate surface sterilization procedure with a higher viability rate for explants (embryos with ½ portion of cotyledon) was selected and 15% Clorox® for 20 min was very effective in minimizing pathogenic contaminants (100% non-contaminants) as well as browning (33.1 mean rank value of browning appearance).

Embryonic axis with ½ of cotyledon portion was suitable type of explants for *in-vitro* establishment giving maximum culture initiation (90%).

Out of tested antioxidants and absorbents, 1 g l^{-1} activated charcoal was effective for establishment of *in-vitro* cultures, recording minimum browning effect (34.9 mean rank value of non-browning appearance), enhancing stem elongation (19.5 mm height) and leaf initiation (2.06 leaves / plantlet) after 14 days of culturing.

Incorporation of GA_3 at the rate of 2 mg l^{-1} was help to induce initial growth (1.71 shoots / plantlet, 3.23 cm stem height and 2.42 leaves / plantlet after 30 days of culturing).

Presence of yeast extract (0.8 g l^{-1}) in the culture medium was enhanced the stem elongation.

Incorporation of 1.0 g l^{-1} activated charcoal into the medium was beneficial for the purpose of elongation of tap root in embryo cultures (3.65 cm after 21 days of culturing).

Treatment combination of 0.1 mg l^{-1} NAA + 4.0 mg l^{-1} BAP + 1.0 g l^{-1} activated charcoal in full strength MS medium was effective for adventitious root elongation on *in-vitro* micro-stem cuttings and given the highest root length (6.7 cm) after 8 weeks of incubation period.

Coir dust was the best potting medium for acclimatization giving maximum percentage of survival (90%).

Aqueous solution of 0.1% $HgCl_2$ solution with 6 min exposure time was effective for surface sterilization of axillary buds, while minimizing browning effect (61.5% non-browning appearance) and contaminations (69.23 non-contaminants).

Incorporation of 1.0 g l^{-1} activated charcoal into the half strength MS basal medium was advantageous in minimizing browning effect.

Anderson's Rhodondendron medium was suitable for the culture establishment as it given maximum number of shoots (2.2 / bud) and healthy green appearance which retained over 8 weeks of culture period.

Treatment combination of 3.0 mg l^{-1} BAP + 0.1 mg l^{-1} NAA in full strength MS medium was beneficial for multiple bud formation of axillary buds (5.6 shoots / bud).

Incorporation of 1.0 mg l^{-1} activated charcoal + 0.5 mg l^{-1} NAA + 3.0 mgl^{-1} BAP into full strength MS medium was the most effective treatment combination for adventitious root elongation of axillary buds and given the highest root length (9.5 cm) after 8 weeks of culturing.

Coir dust was the best potting medium for acclimatization of axillary buds under controlled environment (85% survival).

Therefore, the findings of the research could be used as a protocol for *in-vitro* propagation of cinnamon (*Cinnamomum verum* Presl.).