

Induction and establishment adventitious rooting from cotyledon and hypocotyl segments of *Gossypium hirsutum*

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Objectives

This study was investigated to develop efficient protocols for adventitious root cultures of cotyledon and hypocotyl explants of cotton (*Gossypium hirsutum*). Adventitious roots were induced from cotyledon and hypocotyl explants cultured on MS medium with different concentrations of exogenous auxins. The adventitious root is a good model system for in vitro production of gossypol from *Gossypium hirsutum*.

Materials and methods

○Plant material

Seeds of *G. hirsutum* were surface-sterilized with 70% ethanol for 30 s and subsequently rinsed with sterile distilled water. Then seeds were soaked overnight in sterile water at room temperature. After the initiation of germination, seed coats were removed and keep in 70% bleach for 10 min, and then rinsed three times sterilized water. Sterilized seeds were placed in on 25 ml of agar - solidified culture medium in Petri dishes. After radicle emergence, seed were transfferd to agenta GA-7 boxes containing Murashige Skoog (MS) salts.

○Adventitious root induction by exogenous auxins

Both cotyledon and hypocotyl from 5- to 6-d-old seedlings were used as explant sources for root induction. They were cut into small segments (0.5 - 1.0 cm) and culture on agar-solidified MS medium supplemented with diffirent concentration of IAA, IBA, NAA for inducing adventitious root. Each test at a range of five concentration between 0.1mg and 1mg L⁻¹.

Result

Root induction from cotyledon was most pronounced with IAA treatment, with the greatest rooting response occurring between 1mg L⁻¹ and 1.5 mg L⁻¹. The rooting percentage in the IAA 1mg L⁻¹ treatments (91.70%) was the highest among all auxin treatments (Fig 1). When increase concentration of IAA from 0.1mg L⁻¹ to 1mg L⁻¹ rooting percentage was incese considerably and get highest pick at IAA 1mg L⁻¹. Increasing concentration of IAA to 1.5mg L⁻¹, the rooting percentage was slightly decrease (90%) but it is not significant difference when compared with IAA 1mg L⁻¹ treatments.

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Table 1. The influency of auxins on number and length of adventitious roots produced by *Gossypium hirsutum* cotyledon explants after 28day.

Auxins	Concentration (mg/L)	No. of root/explant	Length of root/explant
IAA	0.1	1.8±0.1	1.3±0.1
	0.5	3.25±0.1	1.55±0.1
	1	4.85±0.2	2.1±0.2
	1.5	4.7±0.2	1.95±0.1
	2	2.85±0.2	1.40±0.1
IBA	0.1	1.95±0.2	1.45±0.1
	0.5	1.8±0.2	1.15±0.1
	1	1.35±0.2	1±0.1
	1.5	1.2±0.3	1.05±0.2
	2	Nd	Nd
NAA	0.1	1.45±0.2	1.50±0.1
	0.5	1.95±0.2	1.65±0.2
	1	2.0±0.1	1.85±0.2
	1.5	1.55±0.1	1.4±0.1
	2	Nd	Nd

Nd: Not detected

Table 2. Efficiency of different external auxins on adventitious root production from hypocotyl explant of *Gossypium hirsutum*.

Auxins	Concentration (mg L)	Percentage of rooting (%)	No. of root/explant	Length of root/explant
IAA	0.1	17.95±1.9	1.20±0.1	1.3±0.2
	0.5	24.1±1.8	1.85±0.2	1.7±0.2
	1	14.9±2.5	1.35±0.1	1.55±0.1
	1.5	13.05±1.8	1.30±0.1	0.95±0.2
	2	Nd	Nd	Nd
IBA	0.1	15.2±1.1	1.30±0.2	1.2±0.1
	0.5	45.5±1.1	1.40±0.2	1.2±0.2
	1	58.6±2.0	2.40±0.3	1.65±0.2
	1.5	63±2.1	1.45±0.2	1.4±0.1
	2	46.2±1.7	1.30±0.1	1.35±0.2
NAA	0.1	7.6±2.7	1.30±0.1	1.25±0.1
	0.5	14.3±2.6	1.50±0.1	1.45±0.3
	1	13.95±1.3	1.05±0.2	1±0.2
	1.5	10.5±	1.00±0.1	0.8±0.1
	2	Nd	Nd	Nd

Nd: Not detected