International Journal of Plant Biology

MDPI

Article

Elicitor-Mediated Enhancement of α-Tocopherol in Cell Suspension Cultures of *Nicotiana tabacum*

Harish Mani Chandra [1,2], Balamurugan Shanmugaraj [1,3,*] and Sathishkumar Ramalingam [1,*]

[1] Plant Genetic Engineering Laboratory, Department of Biotechnology, Bharathiar University, Coimbatore 641046, India; mc.harishin@tvu.edu.in
[2] Department of Biotechnology, Thiruvalluvar University, Serkkadu, Vellore 632115, India
[3] Department of Biotechnology, Karpagam Academy of Higher Education, Coimbatore 641021, India
* Correspondence: balasbm17@gmail.com (B.S.); rsathish@buc.edu.in (S.R.)

Methyl Jasmonate

Effect of elicitors on α-tocopherol accumulation in tobacco cell suspension culture							
MeJA (varying conc.)	Days						
	1	2	3	4	5	6	7
Control	0.54 ± 0.03	0.79 ± 0.01	1.16 ± 0.03	1.23 ± 0.04	1.31 ± 0.1	1.4 ± 0.17	1.56 ±0.26
50 µM	1.4 ± 0.2	2.02 ± 0.2	3.95 ± 0.35	5.89 ± 0.43	7.4 ± 0.26	9.6 ± 0.15	10.2 ± 0.3
100 µM	1.6 ± 0.1	3.2 ± 0.4	8.2 ± 0.43	13.1 ± 0.35	20.9 ± 0.5	27.9 ± 0.45	27.5 ± 0.25
150 µM	1.9 ± 0.3	3.8 ± 0.26	10.4 ± 0.2	18.3 ± 0.4	26.4 ± 0.23	34.2 ± 0.49	36.1 ± 0.26
200 µM	2 ± 0.17	3.7 ± 0.17	10.5 ± 0.4	18.6 ± 0.3	23.4 ± 0.45	31.9 ± 0.66	33.3 ± 0.36

Fold increase in α-tocopherol accumulation in tobacco cell suspension culture after addition of MeJA							
MeJA (varying conc.)	Days						
	1	2	3	4	5	6	7
50 µM	2.5	2.5	3.4	4.7	5.6	6.8	6.5
100 µM	2.9	4	7	10.6	15.9	19.9	17.6
150 µM	3.5	4.8	8.9	14.8	20	24.9	23.1
200 µM	3.7	4.6	9	15	17.8	22.7	21.3

Salicylic Acid

Effect of elicitors on α-tocopherol accumulation in tobacco cell suspension culture							
SA (varying conc.)	Days						
	1	2	3	4	5	6	7
Control	0.5 ± 0.03	0.77 ± 0.01	1.14 ± 0,03	1.27 ± 0.04	1.38 ± 0.1	1.46 ± 0.17	1.66 ± 0.26
50 µM	1 ± 0.26	1.9 ± 0.2	2.86 ± 0.36	3.4 ± 0.0	3.9 ± 0.17	4.18 ± 0.26	4.6 ± 0.25
100 µM	1.66 ± 0.26	3.36 ± 0.17	7.26 ± 0.36	9.71 ± 0.3	9.3 ± 0.17	9.71 ± 0.41	9.3 ± 0.2
150 µM	2.3 ± 0.2	6.23 ± 0.5	9.7 ± 0.3	11.5 ± 0.36	13 ± 0.23	14.3 ± 0.25	15.6 ± 0.37
200 µM	2.56 ± 0.25	5.3 ± 0.34	9.33 ± 0.15	11.2 ± 0.15	12.8 ± 0.23	14.17 ± 0.25	15.2 ± 0.41

Fold increase in α-tocopherol accumulation in tobacco cell suspension culture after addition of SA							
SA (varying conc.)	Days						
	1	2	3	4	5	6	7
50 µM	2	2.4	2.5	2.67	2.75	2.86	2.77
100 µM	3.3	4.3	6.3	7.6	6.7	6.6	5.7
150 µM	4.6	5.84	8.5	9	9.4	9.79	9.2
200 µM	5.1	6.8	8.1	8.8	9.2	9.7	9.15

Yeast Extract

Effect of elicitors on α-tocopherol accumulation in tobacco cell suspension culture							
YE (varying conc.)	Days						
	1	2	3	4	5	6	7
Control	0.5 ± 0.03	0.77 ± 0.01	0.89 ± 0.03	1 ± 0.04	1.12 ±0.1	1.46 ± 0.17	1.6 ± 0.2
50mg	0.5 ± 0.2	0.89 ± 0.18	1.09 ± 0.05	1.3 ± 0.06	1.6 ± 0.16	2.2 ± 0.15	2.5 ± 0.19
100mg	0.6 ± 0.26	1.15 ± 0.17	1.6 ± 0.16	1.87 ± 0.2	2.2 ± 0.17	2.91 ± 0.31	2.96 ± 0.2
150mg	0.8 ± 0.19	1.43 ± 0.2	2.1 ± 0.3	2.6 ± 0.16	4.13 ± 0.23	5.2 ± 0.25	5.4 ± 0.37
200mg	0.8 ± 0.17	1.41 ± 0.17	1.9 ± 0.4	2.7 ± 0.3	3.9 ± 0.45	4.82 ± 0.36	5.4 ± 0.36

Fold increase in α-tocopherol accumulation in tobacco cell suspension culture after addition of YE							
YE (varying conc.)	Days						
	1	2	3	4	5	6	7
50mg	1	1.19	1.21	1.3	1.42	1.5	1.56
100mg	1.2	1.4	1.6	1.8	1.96	1.99	1.85
150mg	1.6	1.85	2.3	2.6	3	3.4	3.37
200mg	1.6	1.83	2.1	2.7	3	3.3	3.3