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Supplementary Materials

Salvia species: biotechnological strategies applied on *in vitro* cultures for the controlled production of bioactive diterpenoids

Roméo Arago Dougué Kentsop[1], Poonam Devi[2], Andrea Copetta[3], Barbara Ruffoni[3], Valentina Parisi[4], Angela Bisio[2] and Valeria Iobbi[2]

[1] Institute of Agricultural Biology and Biotechnology, National Research Council, Via Bassini 15, 20133 Milan, Italy; dougue@ibba.cnr.it
[2] Department of Pharmacy, University of Genova, Viale Cembrano 4, 16148 Genova, Italy; poonam.devi@edu.unige.it, angela.bisio@unige.it; valeria.iobbi@edu.unige.it
[3] Consiglio per la Ricerca e la Sperimentazione in Agricoltura – CREA Centro di ricerca Orticoltura e Florovivaismo, Sanremo (IM), Italy; andrea.copetta@crea.gov.it, barbara.ruffoni@crea.gov.it
[4] Department of Pharmacy, University of Salerno, Via Giovanni Paolo II 132, 84084 Fisciano, Italy; vparisi@unisa.it
* Correspondence: V.I. Valeria Iobbi: valeria.iobbi@edu.unige.it; A.B. Angela Bisio angela.bisio@unige.it

Table S1. Effect of microorganism interaction and their extracts on diterpenoids production in *in vitro Salvia* hairy roots cultures.

Salvia sp.	***A. Rhizogenes***	**Culture medium**	**Growth condition**	**Elicitors**	**Conc. Of elicitor**	**Elicitated on day**	**Time of elicitation (days)**	**Biomass growth vs CTRL**	**Diterpenes stimulated**	**Yield of control**	**Yield after elicitation**	**% Increase over the control**	**References**
S. miltiorrhiza	ATCC 15834	MS medium	0.3 g fresh root in 25 mL medium at 110–120 rpm in dark and at 25°C	*B. cereus*	0.2%	0	28	Inhibit	TT	0.20 mg/g DW	2.67 mg/g DW	1.250	[1]
									Volumetric TT	1.40 mg/L	10.4 mg/L	660	
				B. cereus (extract)	100 mg/L	0	28	Increase 50%	TT	0.17 mg/g DW	0.54 mg/g DW	100	
									Volumetric TT	1,15 mg/L	5.35 mg/L	250	
				B. cereus (root–bacteria co-culture supernatant collected on day 21)	5 mL (25% v/v)	0	28	Inhibit	TT	0.16 mg/g DW	0.79 mg/g DW	400	
									Volumetric TT	0.85mg /L	3.95 mg/L	360	
	ATCC 15834	MS medium	0.3 g fresh hairy roots 25 mL medium at 110–120 rpm in the dark and at 25°C	*B. cereus* (Bacterial cells)	2.5%	0	7	Inhibit 50%	TT	0.15 mg/g DW	2.78 mg/g DW	1.700	[2]
						18	7	Increase	Volumetric TT	1.82 mg/L	22.4mg/L	1.100	
				B. cereus (extract)	1g/L	0	7	Inhibit 50%	TT	0.17mg/g DW	2.04 mg/g DW	1.100	
				Bacterial polysaccharide (BPS)	100 mg/L	18	7	Increase 20%	TT	0.19 mg/g DW	1.59 mg/g DW	700	
									Volumetric TT	2,11mg/L	21.6 mg/L	900	
	C58C1	1/2 B5 medium	1.0 g fresh roots in 100 medium at 180 rpm in dark and at 25°C	*Trichoderma atroviride* D16 extract of mycelium (EM)	300 mg/L	21	18	Increase	DT-I	0.039 mg/g DW	1.338 mg/g DW	3.400	[3]
					150 mg/L	21	18	Increase	CT	0.037 mg/g DW	3.061 mg/g DW	8.200	
				Polysaccharide fraction (PSF)	180 mg/L	21	18	Increase	DT-I	0.052 mg/g DW	1.216 mg/g DW	2.200	
									CT	0.053 mg/g DW	1.216 mg/g DW	6.500	
	ATCC 15834	MS medium	Hairy roots (0.3 g FW) into 40 mL medium at 120	Endophytic bacteria *Pseudomonas brassicacearum* subsp. *neoaurantiaca* (B1)	0.025 %	21	9	Increase	TT	Not published	Not published	270	[4]
									DT-I	Not published	Not published	1.820	
									CT	Not published	Not published	1.030	

		rpm at 25°C and in the dark									
ATCC 15834	MS medium	Hairy roots (0.3 g FW) into 40 mL medium at 120 rpm at 25°C and in the dark	*Streptomyces pactum* Act12	2%	21	14	No difference	T-I	Not published	Not published	458	[5]
								T-IIA	Not published	Not published	1.077	
								DT-I	Not published	Not published	742	
								CT	Not published	Not published	1.221	
								TT	Not published	Not published	819	
				4%			Slightly inhibit 9.89%	T-I	Not published	Not published	467	
								T-IIA	Not published	Not published	936	
								DT-I	Not published	Not published	1.431	
								CT	Not published	Not published	3.263	
								TT	Not published	Not published	1.161	
C58C1	1/2 B5 medium		*Chaetomium globosum*D38	Not published	Not published	18	Not published	CT	Not published	Not published	1.390	[6]
								DT-I	Not published	Not published	700	
			Chaetomium globosum D38	90 mg/L		18		CT	Not published	Not published	1.880	
			Extract of Mycelium (EM)	60 mg/L		18		DT-I	Not published	Not published	2.000	

Table S2. Effect of methyl jasmonate and coronatine on diterpenoids production in *in vitro Salvia* hairy roots cultures.

Salvia sp.	***A. Rhizogenes***	**Culture medium**	**Growth condition**	**Elicitors**	**Conc. of elicitor**	**Elicited on day**	**Time of elicitation (days)**	**Biomass growth vs CTRL**	**Diterpenes stimulated**	**Yield of control**	**Yield after elicitation**	**% Increase over the control**	**References**
S. miltiorrhiza	ATCC 15834	6,7-V medium	Not published	MJ	Not published	18	9	Not published	CT, T-IIA	Not published Not published	0.571 mg/g DW 1.563 mg/g DW	2.280 520	[7]
	ATCC 15834	MS medium	Hairy roots (0.3 g) in 50 mL medium at 110–120 rpm on an orbital in darkness at 25ºC	MJ	100 µM	18	6	Inhibit	T-I CT T-IIA DT-I	Not published	Not published	200 290 100 30	[8]
		1/2 MS medium	Hairy roots into 50 mL medium at 100 rpm in the dark and at 25°C	MJ	100 µM	60	1.5	Not published	TT (T-I, T-IIA, CT, DT-I)	3.55 mg/g DW	11.33 mg/g DW	210	[9]
	R1601	MS medium	Hairy roots in 50 mL medium at 120 rpm and at 25°C	MJ	100 µM	18	7		TT CT T-IIA	Not published Not published Not published	1.46 mg/g DW 0.65 mg/g DW 0.36 mg/g DW	220 520 380	[10]
	ATCC 15834	6,7-V medium	Fresh hairy roots 0.2 g into 50 mL liquid medium at 110 rpm in the dark and at 25 °C.	MJ	100 µM	18	9	No difference	CT DT-I	Not published Not published	Not published 0.35 mg/g DW	76 81	[11]
S. sclarea	LBA 9402	1/2 B5 medium	Fresh hairy root 8.3 g into sprinkle bioreactor containing 2L at 26 °C under continuous cool-	MJ	125µM	23	7	Increase	Ferruginol Salvipisone Aethiopinone 1-Oxoaethiopinone	0.9 mg/g DW 3.3 mg/g DW 4.4 mg/g DW 2.9 mg/g DW	9.7 mg/g DW 12.6 mg/g DW 40.0 mg/g DW 5.2 mg/g DW	980 280 810 80	[12]

			white fluorescent light (40 μmolm^{-2} s^{-1})									
	ATCC 15834	1/2 MS medium	Hairy roots (1 g) into 100 mL at 120 rpm, at 23°C and in the dark	MJ	100 μM	21	7	No difference	Aethiopinone	0.38 mg/g DW	9.72 mg/g DW	2,400	[13]
									Ferruginol	1.93 mg/L	56.13 mg/L	2.800	
							28	Inhibit	Aethiopinone	4.40 mg/L	73.29 mg/L	1.500	
									Ferruginol	Not published	55.48 mg/L	-	
				Corona-tine	0.1 μM		7	No difference	Aethiopinone	0.38 mg/g DW	2.57 mg/g DW	600	
							28	No difference	Aethiopinone	4.40 mg/L	103.32 mg/L	2,300	
									Ferruginol	Not published	103.01 mg/L	5.300	
									Carnosic acid	Not published	36.75 mg/L	1.700	
S. castaneaDiel	ATCC 15834	6,7-V medium	Hairy roots were cultured in into 50 mL medium	MJ	200 μM	18	7	Increase	T-IIA	Not published	1.8 mg/g DW	99	[14]
									CT	0.34 mg/g DW	0.51 mg/g DW	50	

Table S3. Effect of elicitors on diterpenoids production in *in vitro Salvia* cell cultures.

Salvia sp.	Transformed or non	Culture medium	Growth condition	Elicitors	Conc. of elicitor	Elicitated on day	Time of elicitation (days)	Biomass growth vs CTRL	Diterpenes stimulated	Yield of control	Yield after elicitation	% Increase over the control	References
S. miltiorrhiza	*A. tumefaciens*	MS medium without NH_4NO_3	Fresh cell culture (ca. 0.4 g) into 20 mL medium in darkness at 25 °C	YE	4 g/L	7	15	Inhibit	TT (CT, T-IIA)	trace	12.23 mg/L	-	[15]
		B5 medium	3 g fresh weight in 100 mL at 140 rpm in darkness at 25°C for 16 days	YE	4 g/L	0	8	Inhibit	TT	Trace	20.1 mg/L	-	[16]
		6,7-V medium		YE	4 g/L	0	8	Inhibit	TT	Trace	22.2 mg/L	-	
		B5 medium	3.5 g cell into 50 mL medium at 140 rpm at dark and at 25°C	YE	0,1% (v/v)	4	5	Inhibit	CT	0 mg/L	11.5 mg/L	-	[17]
	-	MS with 0.5 mg/L 2,4-D, 1 mg/L KIN	Into 100 mL of at 27 ± 0.5 °C at 120 rpm in the dark.	SA	200 µM	18	7		CT	Data not shown	Not published	339	[18]
				Ag^+	60 µM	18	7		CT	Data not shown	Not published	1.707	
		MS medium with 2 mg/L 2,4-D and 2 mg/L 6-BA	0.3 g fresh cells in 25 ml medium at 110–120 rpm, at 25°C in the dark	SA	100 µM	18	7	Inhibit	CT	59.9 µg/g DW	390.0 µg/g DW	550	[19]
									T-IIA	57.6 µg/g DW	72.8 µg/g DW	30	
				Co	50 µM	18	7	Slightly inhibit	CT	59.9 µg/g DW	263.7 µg/g DW	340	
				Cd	25 µM	18	7	Inhibit	CT	59.9 µg/g DW	1,854.0 µg/g DW	3.000	

					T-IIA	57.6 DW	μg/g	369.0 μg/g DW	540
			6		Volumetric TT	1.9 mg/L		10.7mg/L	460
SO	50 g/L	18	7	Inhibit	CT	59.9 DW	μg/g	584.6 μg/g DW	880
					T-IIA	57.6 DW	μg/g	83.0 μg/g DW	40
Chitosan	100 mg/L	18	7	Inhibit	CT	59.9 DW	μg/g	597.2 μg/g DW	900
					T-I	81.6 DW	μg/g	276.0 μg/g DW	240
MJ	100 μM	18	7	Inhibit	CT	59.9 DW	μg/g	299.8 μg/g DW	400
					T-IIA	57.6 DW	μg/g	82.6 μg/g DW	40
Ag^{+}	25 μM	18	7	Inhibit	CT	59.9 DW	μg/g	1,817.5 DW	μg/g 2.900
					T-IIA	57.6 DW	μg/g	225.8 μg/g DW	290
			6		Volumetric TT	1.9 mg/L		11.7 mg/L	520
YE	100 mg/L	18	7	Inhibit	CT	59.9 DW	μg/g	2,011.4 DW	μg/g 3.300
					T-IIA	57.6 DW	μg/g	190.3 μg/g DW	230
			6		Volumetric TT	1.9 mg/L		9.2 mg/L	380

Table S4. Effect of yeast extract on diterpenoids production in *in vitro Salvia* hairy root cultures.

Salvia sp.	*A. Rhizogenes*	Culture medium	Growth condition	Elicitors	Conc. of elicitor	Elicitated on day	Time of elicitation (days)	Biomass growth vs CTRL	Diterpenes stimulated	Yield of control	Yield after elicitation	% Increase over the control	References
S. miltiorrhiza	ATCC 15834	6, 7-V medium	0.3 g fresh root segments in 50 mL medium at 140 rpm in darkness and at 25°C	YE	Not published	20 after renewal the medium	7	Increase	Intracellular CT	0.01 mg/g DW	0.96 mg/g DW	9.500	[20]
		MS medium	0.3 g fresh root in 25 mL medium at 110–120 rpm in dark and at 25°C	YE	100 μg/mL	18	4	Inhibit	TT	Not published	Not published	210	[21]
		MS medium	0.3 g fresh weight of roots into 40 mL medium at 110–120 rpm	YE	100 mg/L	18	12	Increase about 30%	Volumetric TT	3.59 mg/L	13.7 mg/L	280	[22]
									CT	0.124 mg/g DW	0.914 mg/g DW	640	
									TT	0.46 mg/g DW	1.37 mg/g DW	200	
						18, one day after X-5 resin was applied	repeated medium renewal, elicitation and resin replacement: thrice (days 30, 40, 50)	Increase	Volumetric TT (CT, T-I, T-IIA)	5.74 mg/L	87.5 mg/L	1.420	
									TT (CT, T-I, T-IIA)	0.56 mg/g DW	0.668 mg/g DW	19	

		MS medium	0.3 g fresh weight of roots into 40 mL medium at 110–120 rpm	YE	100 mg/L	21	9	Inhibit	TT	146.4 μg/g DW	732.4 μg/g DW	400 [23]
									Volumetric TT	1.77 mg/L	7.62 mg/L	330
		MS medium	0.2 g fresh weight of roots in 25 mL medium at 110–120 rpm	YE	25 mg/L	21	9	Inhibit	TT (CT, T-I, T-IIA)	0.2 mg/g DW	0.96 mg/g DW	380 [24]
									Volumetric TT	1.96 mg/L	9.92 mg/L	400
		6,7-V medium	0.2 g fresh hairy roots into 50 mL at 110 rpm in dark and at 25°C	YE	200 mg/L	18	6	Increase	DT-I	Not published	Not published	238 [25]
									CT	Not published	Not published	378
									T-I	Not published	Not published	100
S. castaneaDiels	ATCC 15834	6,7-V medium	Hairy roots were cultured in into 50 mL medium	YE	200 mg/L	18	7	Increase 73%	CT	Not published	2.84 mg/g DW	737 [14]
									T-IIA	Not published	2.52 mg/g DW	177
									DT-I	Not detected	1.95 mg/g DW	-
		6,7-V medium	0.2 g fresh hairy roots into 50 mL at 110 rpm in dark and at 25°C	YE	200 mg/L	18	6	Increase	DT-I	Not published	Not published	129 [25]
									CT	Not published	Not published	800
									T-I	Not published	Not published	3.614
									T-IIA	Not published	Not published	232

Table S5. Effect of Ag^+ on diterpenoids production in *in vitro Salvia* hairy roots cultures.

Salvia sp.	A. Rhizogenes	Culture medium	Growth condition	Elicitors	Conc. of elicitor	Elicitated on day	Time of elicitation (days)	Biomass growth vs CTRL	Diterpenes stimulated	Yield of control	Yield after elicitation	% Increase over the control	References
S. miltiorrhiza	ATCC 15834	MS medium	0.3 g fresh root in 25 mL medium at 110–120 rpm in dark and at 25°C	Ag^+	15 µM	18	12	Inhibit	TT	0.5 mg/g DW	2.3 mg/g DW	360	[26]
									Volumetric TT	7.3 mg/L	25.3 mg/L	250	
									Volumetric CT	1.76 mg/L	12.6 mg/L	500	
				Sucrose + Ag^+	15 µM	Suc. on day 16 and Ag+ on day 20	9	Increase	Volumetric TT	Not published	Not published	54 compare to Ag^+	
				Medium renewal + Ag^+	15 µM	Suc. on day 16 and Ag+ on day 20	9	Increase	Volumetric CT Volumetric T-IIA	Not published Not published	Not published Not published	50 compare to Ag^+ 120 compare to Ag^+	
		MS medium	0.3 g fresh root in 25 mL medium at 110–120 rpm in dark and at 25°C	Ag^+	30 µM	18	4	Inhibit	TT	Not published	Not published	20	[21]
		6,7-V medium	0.2 g fresh hairy roots in 50 mL medium at 110 rpm in the dark and at 25 °C	Ag^+	15 µM	18	6	No difference	DT-I T-I CT T-IIA TT	Not published Not published Not published Not published Not published	0.60 mg/g DW 0.82 mg/g DW 0.34 mg/g DW 0.42 mg/g DW 2.37 mg/g DW	156 46 42 340 120	[27]
		6,7-V medium	0.2 g fresh hairy roots into 50 mL at 110 rpm in dark and at 25°C	Ag^+	15 µM	18	6	No difference	DT-I CT T-I	Not published Not published Not published	Not published Not published Not published	65 64 85	[25]

	ACCC 10060	6, 7-V mediu m	0.3 g fresh root in 25 mL medium at 110 rpm in dark and at 25°C	La^{3+}	0.01 mM	18	1	Not published	T-I T-II CT	Not published Not published Not published	Not published Not published Not published	74.9 40.9 92.4	[28]
	ATCC 15834	6, 7-V mediu m	Hairy roots (0.2 g fresh mass) in 50 mL medium at 110 rpm in darkness and at 25±1ºC	Ce^{3+}	50 μM	18	3	No difference	DT-I CT	Not published Not published	0.875 mg/g DW 0.271 mg/g DW	271 393	[29]
S. castanea Diels	ATCC 15834	6,7-V mediu m	Hairy roots were cultured in into 50 mL medium	Ag^{+}	15 μM	18	7	Increase	T-IIA	Not published	Not published	80	[14]
		6,7-V mediu m	0.2 g fresh hairy roots into 50 mL at 110 rpm in dark and at 25°C	Ag^{+}	15 μM	18	6	Increase	CT T-I	Not published Not published	Not published Not published	233 67	[25]

Table S6a. Effect of others chemical compounds on diterpenoids production in *in vitro Salvia* hairy roots cultures.

Salvia sp.	*A. Rhizogenes*	Culture medium	Growth condition	Elicitors	Conc. of elicitor	Elicitated on day	Time of elicitation (days)	Biomass growth vs CTRL	Diterpenes stimulated	Yield of control	Yield after elicitation	% Increase over the control	References
S. miltiorrhiza		1/2 MS medium	Hairy roots into 50 mL medium at 100 rpm in the dark and at 25°C	SA	100 µM	60	1.5	-	TT (T-I, T-IIA, CT, DT-I)	3.55 mg/g DW	5.95 mg/g DW	63	[9]
	ATCC 15834	MS medium	0.2 g of fresh roots in 25 mL medium at 110–120 rpm in the dark and at 25ºC	Sorbitol	70 g/L	21	6	Slightlyincrease	TT	165.1 µg/g DW	723.6 µg/g DW	350	[23]
					50 g/L				Volumetric TT	1.69 mg/L	8.18 mg/L	380	
	ATCC 15834	MS medium	0.2 g fresh weight of roots in 25 mL medium at 110–120 rpm	Sorbitol	50 mg/L	21	9	Increase	TT (CT, T-I, T-IIA)	0.2 mg/g DW	0.67 mg/g DW	235	[24]
									Volumetric TT	1.96 mg/L	10.5 mg/L	436	
						21 with repeated Sorbitol and nutrient feeding every 5 days	Fromdays 21 to day 60	No difference	TT (CT, T-I, T-IIA)	0.36 mg/g DW	3.22 mg/g DW	794	
									Volumetric TT	3.01 mg/L	39.4 mg/L	1.200	
	ATCC 15834	MS medium without NH_4NO_3	0.3 g fresh hairy roots into 50 mL at 110–120 rpm in darkness and at 25°C	Abscisica cid (ABA)	200 µM	18	6	Inhibit	T-I CT DT-I T-IIA	0.7 mg/g DW 1.3 mg/g DW 3.2 mg/g DW 1.5 mg/g DW	1.1 mg/g DW 1.6 mg/g DW 3.9 mg/g DW 2.2 mg/g DW	110 170 60 90	[30]

	ATCC 15834	Not published	Not published	ABA	210 µM	20	7	Not published	T-I	Not published	Not published	440	[30]
									CT	Not published	Not published	850	
									DT-I	Not published	Not published	50	
									T-II A	Not published	Not published	80	
	BCRC 15010	B5 liquid medium	(1.5 cm, ~5.4 mg dw) root in 70 mL medium at 100 rpm in the dark and at 25±2°C	(ABA) abscisica cid	1.0 mg/L	0	84	No difference	T-I	0.216 mg/g DW	0.452 mg/g DW	109	[31]
									T-IIA	0.120 mg/g DW	0.341 mg/g DW	200	
									CT	0.374 mg/g DW	1.038 mg/g DW	200	
									TT	0.71 mg/g DW	1.831 mg/g DW	150	
				TDZ	1.0 mg/L			Increase	T-I	0.216 mg/g DW	0.393 mg/g DW	100	
									T-IIA	0.120 mg/g DW	0.195 mg/g DW	50	
									CT	0.374 mg/g DW	1.310 mg/g DW	250	
									TT	0.71 mg/g DW	1,957 mg/g DW	170	

Table S6b. Effect of other elicitors on diterpenoids production in *in vitro Salvia* hairy root cultures.

Salvia sp.	*A. Rhizogenes*	Culture medium	Growth condition	Elicitors	Conc. of elicitor	Elicitated on day	Time of elicitation (days)	Biomass growth vs CTRL	Diterpenes stimulated	Yield of control	Yield after elicitation	% Increase over the control	References
S. miltiorrhiza	ATCC 15834	MS medium	0.3 g fresh root in 25 mL medium at 110–120 rpm in dark and at 25°C	BABA	2 mM	18	4	Inhibit	TT (CT, T-I, T-IIA)	0. 24 mg/g DW	1.09 mg/g DW	350	[32]
		MS medium	Hairy roots (0.3 g) in 50 mL medium at 110–120 rpm on an orbital in darkness at 25ºC	SNP	100 μM	18	6	No difference	T-I, CT, T-IIA DT-I	Not published	Not published	80 170 180 60	[30]
		MS medium without NH_4NO_3	0.3 g fresh hairy roots into 50 mL at 110–120 rpm in darkness and at 25°C	Polyethylene glycol (PEG)	2 % (w/v)	18	6	Inhibit	T-I CT DT-I T-IIA	0.7 mg/g DW 1.3 mg/g DW 3.2 mg/g DW 1.5 mg/g DW	0.9 mg/g DW 2.1 mg/g DW 3.9 mg/g DW 2.0 mg/g DW	70 100 60 70	[30]
	ACCC 10060	6, 7-V medium	at 110–120 rpm at 25 ± 1 °C in darkness	Smoke–water (SW)	SW 1:1000 (v/v)	18	3	Not published	T-I	Not published	Not published	230	[33]

Table S7. Effect of physical elicitors on diterpenoids production in *in vitro Salvia* hairy root cultures.

Salvia sp.	***A. Rhizogenes***	**Culture medium**	**Growth condition**	**Elicitors**	**Conc. of elicitor**	**Elicitated on day**	**Time of elicitation (days)**	**Biomass growth vs CTRL**	**Diterpenes stimulated**	**Yield of control**	**Yield after elicitation**	**% Increase over the control**	**References**
S. miltiorrhiza	R1601	MS medium	Hairy roots in 50 mL medium at 120 rpm and at 25°C	UV-B	40 μW/cm²	18	40 min		TT CT	Not published Not published	0.38 mg/g DW 0.13 mg/g	80 240	[10]
	LBA1334	1/2 B5 medium	0.3 g fresh hairy roots in dish under LED light intensity of 110 μmol m-2 s-1 for 16 h per day	Light 9R (100% red) 9IR (100% far-red) 6R3IR (R:IR=100:26)	Light intensity of 110 μmol m^{-2} s^{-1} for 16 h per day	28	7	No difference	T-IIA	Not published Not published Not published	Not published Not published Not published	40 20 60	[34]

Table S8. Effect of combination of elicitors on diterpenoids production in *in vitro Salvia* hairy roots cultures.

Salvia sp.	*A. Rhizogenes*	Culture medium	Growth condition	Elicitors	Conc. of elicitor	Elicitated on day	Time of elicitation (days)	Biomass growth vs CTRL	Diterpenes stimulated	Yield of control	Yield after elicitation	% Increase over the control	References
S. miltiorrhiza	ATCC 15834	MS medium	0.3 g fresh root in 25 mL medium at 110–120 rpm in dark and at 25°C	BABA + YE	1 mM + 100 µg/mL	BABA on day 15 and YE on days 18	3 days after adding YE	Inhibit	TT (CT, T-I, T-IIA)	1 mg/g DW	2.26 mg/g DW	126	[32]
									Volumetric TT	3.2 mg/L	20.1 mg/L	530	
	ATCC 15834	MS medium	0.2 g of fresh roots in 25 mL medium at 110–120 rpm in the dark and at 25°C	YE + Sorbitol	100 mg/L + 50 g/l	21	9	Inhibit	TT (CT, T-I, T-IIA)	146.4 µg/g DW	1481.6 µg/g DW	900	[23]
									Volumetric TT	1.77 mg/L	16.3 mg/L	800	
	ATCC 15834	MS medium	0.2 g fresh weight (fw) of roots in 25 mL medium at 110–120 rpm	YE + Sorbitol	25 mg/L + 50 g/L	21	9	Increase	TT (CT, T-I, T-IIA)	0.20 mg/g DW	1.57 mg/g DW	700	[24]
									Volumetric TT	1.96 mg/L	27.8 mg/L	1.300	
						21 with repeated Sorbitol +YE and nutrient feeding every 5 days	Fromdays 21 to day 60	No difference	TT (CT, T-I, T-IIA)	0.36 mg/g DW	18.1 mg/g DW	4.900	
									Volumetric TT	3.01 mg/L	143.6 mg/L	4.670	
	ACCC 10060	6,7-V medium	The rootwas transferred to 50 mL medium at 80 rpm in dark and at at 25°C	YE + Ag+	2.5 mg/mL + 100 µM	18	5	Not published	DT-I CT	Not published Not published	Not published Not published	760 700	[35]
				YE + MJ	2.5 mg/mL + 200 µM	18	5	Not published	TT	Not published	Not published		
				MJ + Ag+	200 µM + 100 µM	18	5	Not published	TT, DT-I	Not published Not published	Not published Not published	170 380	

							CT	Not published	Not published	290	
			YE+ Ag+ + MJ	2.5 mg/mL + 100 μM + 200 μM,	18	5	Not published	DT-I	Not published	Not published	800	
								CT	Not published	Not published	660	
R1601	MS medium	Hairy roots in 50 mL medium at 120 rpm and at 25°C	UV-B + MJ	40 μW/cm² after 100 μM MJ	18	UV (40 min) MJ (9 days)	Inhibit	CT	Not published	0.97 mg/g DW	890	[10]
								T-I	Not published	0.93 mg/g DW	510	
								TT	Not published	2.26 mg/g DW	570	
								Volumetric TT	Not published	28.21 mg/L	390	
						UV (40 min) MJ (7 days)		T-IIA	Not published	0.46 mg/g DW	240	

Table S9. Effect of combination of elicitors on diterpenoids production in *in vitro Salvia* cell cultures.

Salvia sp.	Transformed o non	Culture medium	Growth condition	Elicitors	Conc. of elicitor	Elicitated on day	Time of elicitation (days)	Biomass growth vs CTRL	Diterpenes stimulated	Yield of control	Yield after elicitation	% Increase over the control	References
S. miltiorrhiza	*A. tumefaciens*	B5 medium	3 g fresh weight in 100 mL at 140 rpm in darkness at 25°C for 16 days	YE + light (L)	4 g/L + 4000 lux.	0	8	Data not shown	TT	No detectable	1.92 mg/L	-	[16]
				YE + dark (D)	4 g/L	0	8		TT	No detectable	8.76 mg/L	-	
			3.5 g of fresh cell into 50 mL medium containing 20 g sucrose/L at 140 rpm in darkness and at 25°C	YE + SA	YE 0,1% (v/v) + SA 200 μM	3 and 24 h after add YE	5	Inhibit	CT	0 mg/L	18.9 mg/L	37	[17]
	-	MS medium without NH_4NO_3	Fresh cell culture (ca. 0.4 g) into 20 mL medium in darkness at 25 °C	YE + SA	0.12 mL + 200 μM	7	15	Inhibit	TT (CT, T-IIA)	Hardly detectable	15.07 mg/L	-	[15]

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