

Bacillus subtilis* CBR05 induces Vitamin B6 biosynthesis in tomato through the *de novo* pathway in contributing disease resistance against *Xanthomonas campestris* pv. *vesicatoria

Running Head: *B. subtilis* induced expression of VitB6 biosynthetic genes

Murugesan Chandrasekaran¹, Manivannan Paramasivan², and Se-Chul Chun^{3*}

¹Department of Food Science and Biotechnology, Sejong University, 209 Neungdong-ro, Gwangjin-gu, Seoul 05006, Republic of Korea. Email address: chandrubdubio@gmail.com

²Department of Microbiology, Bharathidasan University, Tiruchirappalli 620024, Tamilnadu, India. Email address: manivannan3065@gmail.com

³Department of Environmental Health Science, Konkuk University, 120 Neungdong-ro, Gwangjin-gu, Seoul 05029, Republic of Korea. Email address: scchun@konkuk.ac.kr

**Corresponding author*

Se-Chul Chun,

Department of Environmental Health Science,

Konkuk University, Seoul, Republic of Korea.

Phone: +82-2-450-3727

Fax: +82-2-450-3726

E-mail: scchun@konkuk.ac.kr

Table S1. Antioxidant enzyme activities

Treatment	Enzyme activities				
	Time	SOD (Units mg ⁻¹ protein)	CAT (Units mg ⁻¹ protein)	PPO (Units mg ⁻¹ protein)	POD (Units mg ⁻¹ protein)
Mock	0 h	1.51 ± 0.03 ^g	2802.26 ± 0.54 ⁱ	1.98 ± 0.21 ^g	1.65 ± 0.01 ^j
	24 h	3.58 ± 0.02 ^f	5261.97 ± 0.65 ^h	7.60 ± 0.02 ^e	2.71 ± 0.03 ⁱ
	48 h	4.20 ± 0.06 ^e	6224.27 ± 1.30 ^g	6.38 ± 0.09 ^f	4.58 ± 0.01 ^g
	72 h	3.75 ± 0.02 ^f	7217.17 ± 1.24 ^f	7.91 ± 0.05 ^e	6.24 ± 0.01 ^f
XCV	0 h	1.50 ± 0.03 ^g	2274.16 ± 0.83 ^j	1.32 ± 0.01 ^{gh}	0.86 ± 0.01 ^{jk}
	24 h	3.65 ± 0.06 ^f	7524.70 ± 0.59 ^f	8.65 ± 0.05 ^d	3.78 ± 0.05 ^h
	48 h	7.25 ± 0.04 ^{ab}	10540.97 ± 0.93 ^{de}	13.56 ± 0.03 ^b	8.14 ± 0.03 ^d
	72 h	4.02 ± 0.01 ^{cf}	11067.58 ± 0.70 ^c	8.94 ± 0.01 ^d	6.26 ± 0.01 ^f
XCV+CBR05	0 h	1.75 ± 0.01 ^g	2861.01 ± 0.24 ⁱ	1.71 ± 0.01 ^g	1.51 ± 0.01 ^{jk}
	24 h	7.71 ± 0.04 ^a	10893.04 ± 0.93 ^d	12.94 ± 0.04 ^{bc}	11.44 ± 0.04 ^a
	48 h	7.35 ± 0.01 ^{ab}	11179.15 ± 0.29 ^b	14.07 ± 0.05 ^b	10.55 ± 0.01 ^b
	72 h	4.55 ± 0.01 ^e	11347.46 ± 0.57 ^a	10.53 ± 0.02 ^c	8.93 ± 0.02 ^c
XCV+Pyridoxine	0 h	1.45 ± 0.02 ^g	2870.85 ± 0.39 ⁱ	1.41 ± 0.05 ^{gh}	1.43 ± 0.05 ^{jk}
	24 h	5.62 ± 0.03 ^d	10091.23 ± 0.37 ^d	10.62 ± 0.08 ^c	8.62 ± 0.02 ^{cd}
	48 h	5.27 ± 0.03 ^d	8218.03 ± 0.16 ^f	8.21 ± 0.06 ^{de}	7.21 ± 0.01 ^e
	72 h	4.52 ± 0.02 ^e	6225.07 ± 0.41 ^g	5.54 ± 0.06 ^f	5.52 ± 0.04 ^{fg}
XCV+Pyridoxine+CBR05	0 h	1.52 ± 0.02 ^g	2850.21 ± 0.62 ⁱ	1.51 ± 0.02 ^g	1.52 ± 0.01 ^{jk}
	24 h	6.53 ± 0.03 ^c	1008.32 ± 0.43 ^{de}	10.93 ± 0.03 ^c	10.32 ± 0.00 ^b
	48 h	5.80 ± 0.01 ^d	9001.20 ± 0.79 ^e	16.32 ± 0.00 ^a	10.25 ± 0.01 ^b
	72 h	3.61 ± 0.04 ^f	7254.02 ± 0.32 ^f	9.63 ± 0.02 ^d	6.12 ± 0.02 ^f

Mean ± SD of three replicates within a column followed by the different letters indicate a significant difference at $P \leq 0.05$.

Table S2. List of primers used in the study

Gene name	Host plants	Primer name	Primer sequence (5' 3') →
<i>Actin</i>	<i>S. lycopersicum</i>	<i>Actin-F</i>	AGG CAC ACA GGT GTT ATG GT
		<i>Actin-R</i>	AGC AAC TCG AAG CTC ATT GT
<i>PDX1.2</i>	<i>S. lycopersicum</i>	<i>PDX1.2-F</i>	GAT GCA GCT GGG TTG TGA TG
		<i>PDX1.2-R</i>	TCC AAA CCA CTG CTA GCC GC
<i>PDX1.3</i>	<i>S. lycopersicum</i>	<i>PDX1.3-F</i>	CAT GTG CGT TCC GTT ATG GG
		<i>PDX1.3-R</i>	TGA ACC ACA GGG AGC CTA CC
<i>PDX2</i>	<i>S. lycopersicum</i>	<i>PDX2-F</i>	CAA AGC TTC GGA ACG CGT TCA A
		<i>PDX2-R</i>	GTC AAT GAG TAG CCA TTT GAC C
<i>SOS4</i>	<i>S. lycopersicum</i>	<i>SOS4-F</i>	GCG TAT TTC ACG GGA ACT GG
		<i>SOS4-R</i>	CTT GAG ACA GCA AGC TCT GC