

***Bacillus velezensis* LW-66: A Broad-Spectrum Biocontrol Agent Against Apple Tree Canker and Other Plant Fungal Diseases**

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Table S1. The inhibitory rates of the strain LW-66 against *V. mali*.

Strain	colony diameter/mm	Disease prevention effect/%
CK	87.00±0.50	
LW-1	43.00±0.87	55.70±1.10
LW-2	67.33±1.04	24.89±1.32
LW-3	46.00±1.00	51.90±1.27
LW-4	69.83±1.15	21.73±1.46
LW-5	34.33±1.04	66.67±1.32
LW-6	26.83±0.76	76.16±0.97
LW-7	55.00±1.00	40.51±1.27
LW-8	63.83±1.15	29.32±1.46
LW-66	15.67±0.29	90.30±0.37
LW-10	85.50±0.50	1.90±0.63
LW-11	34.83±0.29	66.03±0.37
LW-12	76.17±0.76	13.71±0.97
LW-13	81.50±1.00	6.96±1.27
LW-14	20.50±1.50	84.18±1.90
LW-15	25.83±0.76	77.43±0.97

Table S2. Inhibitory effect of the strain LW-66 on the growth of five plant pathogenic fungi on PDA plates

Type	LW-66		extract		CK
	colony diameter/mm	Disease prevention	Colony diameter/mm	Disease prevention	
		effect/%		effect/%	
<i>Valsa mali</i>	15.67±0.29	90.19±0.37	14.50±1.32	91.68±1.69	86.17±0.29
<i>Bipolaris sorokinianum</i>	21.50±1.00	79.39±1.53	20.67±0.76	80.66±1.17	73.50±1.32
<i>Exserohilum turcicum</i>	17.67±0.76	84.11±1.26	19.50 ±1.32	81.10±2.17	68.83±0.58
<i>Fusarium graminearum</i>	32.67±0.58	69.67±0.71	28.50±5.77	74.80±7.09	89.33±0.29
<i>Alternaria solani</i>	24.00±1.00	78.23±1.36	22.50±0.50	80.27±0.68	81.50±1.00

Table S3. Inhibitory effects of volatile substances from strain LW-66 on the mycelial growth of five plant pathogenic fungi

Type	colony diameter/mm	CK	Disease prevention effect /%
<i>Valsa mali</i>	14.17±0.76	82.33±1.04	91.70±1.03
<i>Bipolaris sorokinianum</i>	40.67±1.26	70.33±1.89	47.59±2.02
<i>Exserohilum turcicum</i>	43.83±2.08	86.33±0.76	54.26±2.66
<i>Alternaria solani</i>	38.83±0.76	84.00±0.50	59.43±1.00
<i>Fusarium graminearum</i>	61.00±1.73	86.83±0.76	32.77±2.20

Table S4. Genomic characteristics of *Bacillus* sp. LW-66 phylogenetic tree members.

Strain	Authority	Synonyms	Percent G+C	No. proteins	Bioproject accession	Biosample accession	Assembly accession ID	dDDH	Diff. G+C Percent
<i>B. bruguiera</i> FJAT-51639	Liu et al.2025(75)	<i>Bacillus bruguiera</i>	36.0	4851	PRJNA107039 9	SAMN39644 991	GCA_037104725. 1	10	10.63
<i>B. rhizoplanae</i> CIP 111899	Kämpfer et al., 2022(76)	<i>Bacillus rhizoplanae</i>	36.5	4267	PRJEB47722	SAMEA9995 628	GCA_917563915. 1	10.1	10.05
<i>B. cereus</i> ATCC 14579	Frankland et al, 1887(77)	<i>Bacillus cereus</i>	35.5	5316	PRJNA509739	SAMN10591 533	GCA_006094295. 1	10.1	11.16
<i>B. cytotoxicus</i> NVH 391-98	Guinebretiè re et al. 2013(78)	<i>Bacillus cytotoxicus</i>	36	3844	PRJNA13624	SAMN02598 310	GCA_000017425. 1	10.2	10.57
<i>B. pinisoli</i> GXH0341	Huang et al. 2023(79)	<i>Bacillus pinisoli</i>	37.0	3924	PRJNA786958	SAMN23765 204	GCA_023036475. 1	10	9.46
<i>B. suaedaesalsae</i> RD4P76	Xu et al. 2022(80)	<i>Bacillus suaedaesalsae</i>	36.0	3097	PRJNA700001	SAMN17817 098	GCA_016890225. 1	10	10.23
<i>B. ectoiniformans</i> DSM 28970	Zhu et al. 2016(81)	<i>Bacillus ectoiniformans</i>	41.0	3488	PRJNA695621	SAMN17620 071	GCA_016908875. 1	10.3	5.29
<i>B. lumedeiriae</i> B190/17	Costa et al. 2024(82)	<i>Bacillus lumedeiriae</i>	41.5	3231	PRJNA990794	SAMN36275 113	GCA_044891285. 1	10.3	4.87

	Ruiz-García								
<i>B. velezensis</i> NRRL B-41580	et al. 2005(83) de Los Santos	<i>Bacillus velezensis</i>	46.5	3790	PRJNA299292	SAMN04196 551	GCA_001461825. 1	94.2	0.12
<i>B. cabrialesii</i> TE3	Villalobos et al. 2019(84)	<i>Bacillus cabrialesii</i>	44.0	3991	PRJNA504313	SAMN10390 288	GCA_004124315. 2	26.6	2.23
<i>B. spizizenii</i> TU-B-10	Dunlap et al. 2020(85)	<i>Bacillus spizizenii</i>	44	4296	PRJNA68561	SAMN02603 352	GCA_000227465. 1	26.6	2.62
<i>B. subtilis</i> ATCC 6051	Skerman et al. 1980(86)	<i>Bacillus subtilis</i>	43.5	4424	PRJNA553198	SAMN12236 531	GCA_031316525. 1	25.7	3.19
<i>B. licheniformis</i> ATCC 14580	Skerman et al., 1980(86)	<i>Bacillus licheniformis</i>	46.0	4187	PRJNA103756 3	SAMN38186 259	GCA_034478925. 1	14.8	0.24
<i>B. paralicheniformis</i> KJ-16	Dunlap et al., 2015(87)	<i>Bacillus paralicheniformis</i>	46.0	4319	PRJNA282685	SAMN03573 918	GCA_001042485. 2	14.7	0.69
<i>B. maqinnsis</i> Bos-x6-28	Ma et al. 2024(88)	<i>Bacillus maqinnsis</i>	40.0	3306	PRJNA112801 6	SAMN42024 221	GCA_040500475. 1	15.0	6.23
<i>B. pumilus</i> ATCC 7061	Skerman et al. 1980(86)	<i>Bacillus pumilus</i>	41.5	3900	PRJNA29785	SAMN02470 256	GCA_000172815. 1	12.6	4.78
<i>Escherichia coli</i> ATCC 11775	Skerman et al. 1980(86)	<i>Escherichia coli</i>	50.5	4723	PRJNA472652	SAMN10252 913	GCA_003697165. 2	9.4	4.2

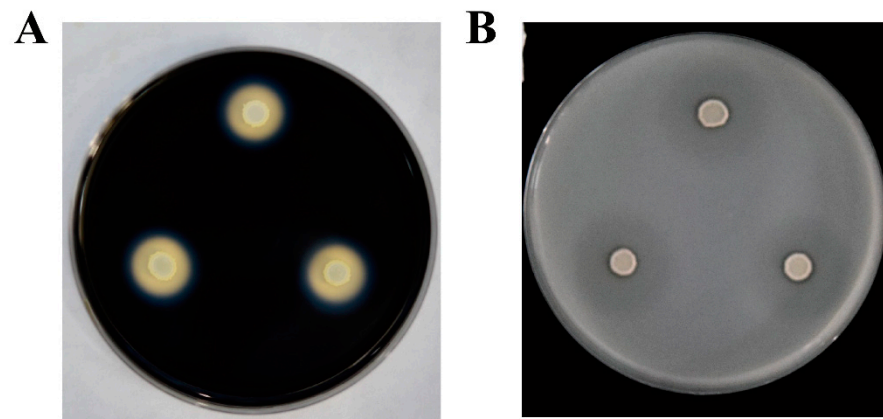


Figure S1. Analysis of the extracellular enzyme activities of strain LW-66. (A) Amylase activity of strain LW-66. (B) Protease activity of strain LW-66.

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