

Quality and Functional Characterization of Acetic Acid Bacteria Isolated from Farm-Produced Fruit Vinegars

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Supplementary files:

Figure S1. Ability of AAB isolates to produce acetic acid in CaCO₃ medium with different levels of ethanol (3, 5, 7, 9, 10, 12, and 15% (v/v)).

Table S1. Acetic acid production over a time course of days in liquid medium containing 5% (v/v) ethanol and 1% (v/v) acetic acid.

Figure S2. Images of clear zones and calibration curves of acetic acid indicating quantitative antibacterial activity of selected AAB strains.

Table S2. Quantitative antibacterial activity of selected AAB strains using calibration curve of acetic acid.

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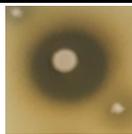
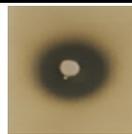
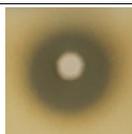
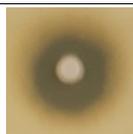
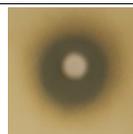
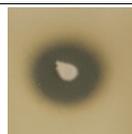
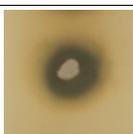
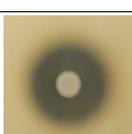
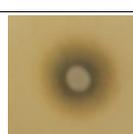
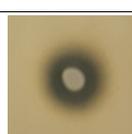
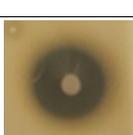
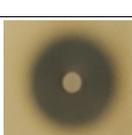
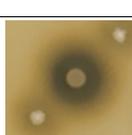
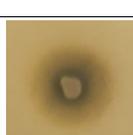
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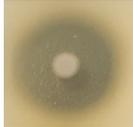
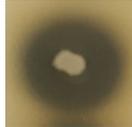
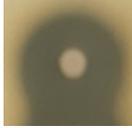
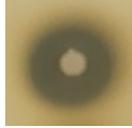
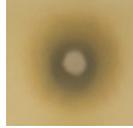
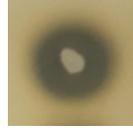
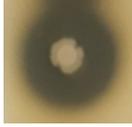
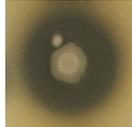
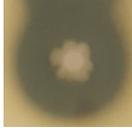
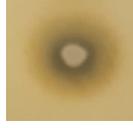
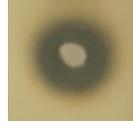
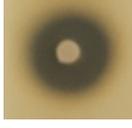
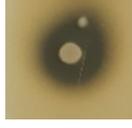
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Alcohol concentration	3%	5%	7%	9%	10%	12%	15%
Strain							
KSO 5	 a:20.3, b:5.30	 a:21.2, b:5.32	 a:18.3, b:4.92	 a:16.0, b:4.99	 a:14.9, b:4.48	 a:15.9, b:4.30	 a:8.85, b:3.41
KSO 6	 a:20.2, b:5.21	 a:22.3, b:5.68	 a:18.4, b:4.67	 a:16.3, b:4.95	 a:15.7, b:4.58	 a:15.1, b:4.17	 a:7.60, b:3.41
KSF 2	 a:12.3, b:3.61	 a:12.6, b:3.97	 a:6.22, b:3.93	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND
KSF 6	 a:10.6, b:3.81	 a:12.2, b:3.88	 a:5.96, b:3.85	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND
KSF 8	 a:11.7, b:4.33	 a:13.8, b:4.16	 a:8.70, b:4.02	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND
<i>Glu. saccharivorans</i> CV1	 a:14.3, b:5.04	 a:19.0, b:5.17	 a:13.9, b:5.54	 a:10.6, b:5.14	 a:10.6, b:4.74	 a:11.7, b:4.86	 a:6.30, b:3.42
<i>A. pomorum</i> 11998	 a:5.43, b:4.53	 a:4.18, b:3.80	 a:4.24, b:3.90	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND:
<i>A. syzygil</i> 12233	 a:18.0, b:4.34	 a:20.4, b:4.30	 a:12.2, b:3.99	 a:10.4, b:4.07	 a:8.42, b:3.54	 a:ND, b:ND	 a:ND, b:ND

Alcohol concentration	3%	5%	7%	9%	10%	12%	15%
Strain							
JGB 20-11	 a:21.2, b:5.75	 a:22.6, b:5.65	 a:20.1, b:3.93	 a:11.4, b:4.23	 a:16.1, b:4.52	 a:9.71, b:3.76	 a:ND, b:ND
JGB 20-13	 a:22.5, b:6.32	 a:23.4, b:5.60	 a:17.3, b:5.07	 a:11.6, b:4.68	 a:15.3, b:3.84	 a:6.59, b:3.26	 a:ND, b:ND
JGB 21-17	 a:15.6, b:4.98	 a:22.2, b:6.23	 a:21.4, b:6.80	 a:8.96, b:5.12	 a:11.6, b:4.47	 a:8.84, b:3.51	 a:3.45, b:ND
JGB 21-20	 a:23.7, b:8.48	 a:26.0, b:8.04	 a:14.3, b:4.81	 a:11.5, b:4.86	 a:15.2, b:3.91	 a:11.5, b:3.64	 a:5.39, b:3.41
JGB 21-24	 a:15.2, b:4.80	 a:16.4, b:4.57	 a:13.3, b:4.26	 a:8.58, b:4.36	 a:7.19, b:4.23	 a:5.58, b:4.22	 a:ND, b:ND
JGA 10	 a:13.6, b:4.47	 a:13.9, b:4.02	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND
JGA 13	 a:13.3, b:4.99	 a:12.4, b:4.41	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND:
JGA 16	 a:11.1, b:4.05	 a:9.71, b:4.18	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND	 a:ND, b:ND

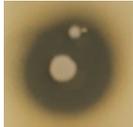
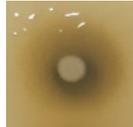
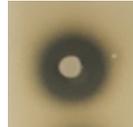
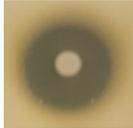
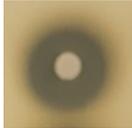
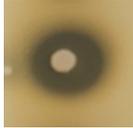
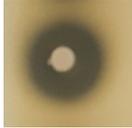
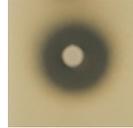
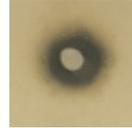
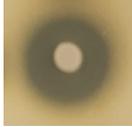
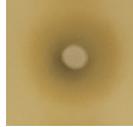
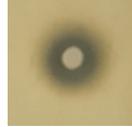
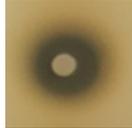
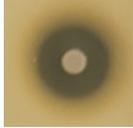
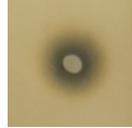
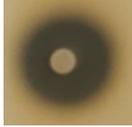
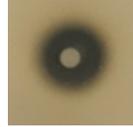
Alcohol concentration	3%	5%	7%	9%	10%	12%	15%
Strain							
GHA 2	 a:18.9, b:5.02	 a:19.6, b:5.45	 a:15.3, b:4.93	 a:11.4, b:5.09	 a:15.3, b:4.60	 a:12.2, b:3.79	 a:8.92, b:3.47
GHA 7	 a:20.4, b:5.59	 a:17.3, b:4.83	 a:14.4, b:4.47	 a:11.7, b:5.22	 a:17.8, b:4.20	 a:12.2, b:3.96	 a:12.3, b:3.48
GHA 20	 a:16.6, b:5.01	 a:16.7, b:4.40	 a:14.5, b:4.62	 a:11.3, b:4.83	 a:15.2, b:4.43	 a:11.7, b:4.16	 a:12.2, b:3.69
GHA 112	 a:13.9, b:4.73	 a:17.7, b:4.98	 a:13.7, b:4.20	 a:9.91, b:4.89	 a:14.9, b:4.52	 a:10.9, b:4.03	 a:8.14, b:3.42
GYA 14	 a:16.5, b:5.02	 a:17.1, b:4.89	 a:12.9, b:4.48	 a:7.15, b:4.25	 a:10.5, b:3.92	 a:7.78, b:3.53	 a:ND, b:ND
GYA 17	 a:16.1, b:4.75	 a:16.8, b:5.09	 a:12.8, b:4.51	 a:8.90, b:4.63	 a:12.3, b:4.04	 a:8.85, b:3.89	 a:6.89, b:3.07
GYA 23	 a:16.9, b:4.96	 a:18.6, b:4.90	 a:14.2, b:4.19	 a:6.90, b:4.51	 a:12.5, b:4.02	 a:8.78, b:2.60	 a:8.34, b:3.32

Figure S1. Ability of AAB isolates to produce acetic acid in CaCO₃ medium with different levels of ethanol (3, 5, 7, 9, 10, 12, and 15% (v/v)). This picture shows the clear zone on day 4 of culture (a: clear zone size; b: bacterial colony size; Units, mm). Symbols are defined in the Materials and Methods section of the manuscript.

Table S1. Acetic acid production over a time course of days in liquid medium containing 5% (v/v) ethanol and 1% (v/v) acetic acid.

Strain		EtOH (5%)					
		Growth (OD ₆₆₀)			Acidity (%)		
		1 day	4 days	6 days	1 day	4 days	6 days
Seongnam, Gyeonggi-do	KSO 5	0.25	0.44	0.42	2.47	5.62	4.92
	KSO 6	0.11	0.34	0.33	1.96	4.93	5.21
	KSF 2	0.25	0.32	0.38	1.98	5.18	5.09
	KSF 6	0.22	0.22	0.09	2.24	4.61	4.86
	KSF 8	0.33	0.16	0.39	2.08	5.22	5.10
Gochang, Jeollabuk-do	JGB 20-11	0.33	0.71	0.54	2.32	5.30	5.14
	JGB 20-13	0.26	0.62	0.63	2.45	5.40	5.32
	JGB 21-17	0.47	0.79	0.77	3.08	5.56	5.46
	JGB 21-20	0.28	0.64	0.74	2.16	4.90	4.70
	JGB 21-24	0.28	0.47	0.60	2.09	4.28	5.23
	JGA 10	0.31	0.60	1.51	1.99	5.32	4.68
	JGA 13	0.30	0.54	0.81	1.99	4.64	4.90
	JGA 16	0.28	0.44	0.58	1.93	3.88	5.18
Hongcheon, Gangwon-do	GHA 2	0.17	0.19	0.21	2.09	5.38	5.36
	GHA 7	0.17	0.34	0.33	1.96	5.10	5.17
	GHA 20	0.26	0.65	0.62	3.01	5.50	5.33
	GHA 112	0.16	0.22	0.20	2.06	4.39	4.57
Yecheon, Gyeongsangbuk- do	GYA 14	0.45	0.61	0.35	3.58	5.42	4.75
	GYA 17	0.50	0.40	0.22	1.86	4.87	5.12
	GYA 23	0.23	0.75	0.44	2.42	5.35	5.16
Control	AP 11998	0.12	0.48	0.79	1.13	4.86	4.40
	AC 12233	0.14	0.47	0.50	1.15	4.50	4.94
	GS CV1	0.27	0.57	0.69	2.12	5.24	5.11

Strain		EtOH (7%)							
		Growth (OD ₆₆₀)				Acidity (%)			
		1 day	4 days	6 days	8 days	1 day	4 days	6 days	8 days
Seongnam, Gyeonggi-do	KSO 5	0.09	0.23	0.25	0.28	1.25	5.08	5.21	5.72
	KSO 6	0.09	0.22	0.15	0.22	1.25	4.82	4.96	6.97
	KSF 2	0.12	0.10	0.09	0.09	1.38	4.76	6.77	7.25
	KSF 6	0.10	0.10	0.10	0.10	1.33	2.90	4.19	6.01
	KSF 8	0.12	0.09	0.10	0.09	1.39	2.51	4.57	6.85
Gochang, Jeollabuk-do	JGB 20-11	0.28	0.78	0.80	0.78	2.29	7.30	7.42	7.46
	JGB 20-13	0.27	0.69	0.69	0.71	2.20	7.43	7.43	7.54
	JGB 21-17	0.23	0.61	0.63	0.69	2.22	6.98	7.44	7.57
	JGB 21-20	0.17	0.51	0.61	0.67	1.92	4.99	7.13	7.28
	JGB 21-24	0.34	0.69	0.75	0.79	2.40	6.22	7.36	7.44
	JGA 10	0.16	0.47	0.53	0.66	1.45	7.43	7.33	7.36
	JGA 13	0.15	0.49	0.50	0.66	1.51	3.83	5.82	7.14
	JGA 16	0.13	0.38	0.58	0.65	1.28	4.66	7.22	7.00
Hongcheon, Gangwon-do	GHA 2	0.17	0.38	0.42	0.48	2.35	7.19	7.33	7.19
	GHA 7	0.34	0.67	0.66	0.66	2.44	7.44	7.42	7.44
	GHA 20	0.20	0.39	0.50	0.48	2.05	5.04	7.20	7.34
	GHA 112	0.15	0.32	0.40	0.47	2.04	5.50	7.49	7.34
Yecheon, Gyeongsangbuk-do	GYA 14	0.36	0.64	0.68	0.62	2.92	7.70	7.78	7.81
	GYA 17	0.26	0.36	0.41	0.38	2.00	4.51	6.38	7.02
	GYA 23	0.54	1.06	0.60	0.63	2.45	7.54	7.64	7.42
Control	AP 11998	0.12	0.44	0.65	0.63	1.22	4.32	6.66	6.98
	AC 12233	0.13	0.21	0.16	0.20	1.19	2.72	2.75	3.00
	GS CV1	0.22	0.40	0.47	0.53	1.73	3.20	4.24	5.38

Strain		EtOH (9%)									
		Growth (OD ₆₆₀)					Acidity (%)				
		1 day	4 days	6 days	8 days	10 days	1 day	4 days	6 days	8 days	10 days
Seongnam, Gyeonggi-do	KSO 5	0.10	0.11	0.28	0.52	0.45	1.12	1.20	2.41	6.11	4.86
	KSO 6	0.11	0.10	0.45	0.54	0.32	1.13	1.12	3.40	4.96	4.72
	KSF 2	0.16	0.12	0.11	0.08	0.09	1.13	1.12	1.08	1.08	1.86
	KSF 6	0.13	0.13	0.11	0.10	0.10	1.10	1.06	1.16	2.22	5.11
	KSF 8	0.13	0.16	0.11	0.08	0.10	1.12	1.08	1.08	1.39	3.19
Gochang, Jeollabuk-do	JGB 20-11	0.15	0.84	0.86	0.86	0.84	1.69	7.81	8.00	7.96	7.52
	JGB 20-13	0.16	0.29	0.28	0.27	0.36	1.67	2.70	2.68	2.66	2.48
	JGB 21-17	0.09	0.62	0.70	0.78	0.81	1.15	7.64	7.97	8.12	7.64
	JGB 21-20	0.09	0.45	0.52	0.61	0.70	1.13	3.23	4.92	6.96	7.42
	JGB 21-24	0.09	0.42	0.58	0.70	0.71	1.18	3.47	5.35	6.43	7.09
	JGA 10	0.19	0.18	0.17	0.15	0.50	1.14	1.08	1.13	1.14	3.76
	JGA 13	0.15	0.16	0.16	0.13	0.11	1.10	1.06	1.13	1.06	1.02
JGA 16	0.17	0.17	0.17	0.17	0.11	1.16	1.09	1.15	1.04	0.97	
Hongcheon, Gangwon-do	GHA 2	0.09	0.45	0.52	0.49	0.51	1.12	5.38	7.87	7.60	7.43
	GHA 7	0.11	0.46	0.52	0.58	0.58	1.36	4.57	6.97	7.79	7.39
	GHA 20	0.10	0.74	0.70	0.72	0.74	1.21	8.20	7.91	7.98	7.67
	GHA 112	0.10	0.35	0.42	0.41	0.47	1.46	3.80	5.47	7.68	7.28
Yecheon, Gyeongsangbuk- do	GYA 14	0.11	0.50	0.54	0.39	0.39	1.42	6.79	7.92	7.78	7.24
	GYA 17	0.10	0.29	0.48	0.45	0.31	1.25	3.85	5.32	7.01	7.16
	GYA 23	0.11	0.46	0.59	0.55	0.49	1.56	6.23	7.79	7.74	7.33
Control	AP 11998	0.17	0.46	0.69	0.70	0.82	1.20	3.29	7.55	7.50	7.20
	AC 12233	0.17	0.16	0.16	0.16	0.15	1.10	1.18	1.09	1.07	1.02
	GS CV1	0.10	0.60	0.66	0.69	0.66	1.19	5.58	7.54	7.56	7.14

Strain		EtOH (10%)									
		Growth (OD ₆₆₀)					Acidity (%)				
		1 day	4 days	6 days	8 days	10 days	1 day	4 days	6 days	8 days	10 days
Seongnam, Gyeonggi-do	KSO 5	0.10	0.12	0.13	0.11	0.10	1.08	1.13	1.22	1.08	1.07
	KSO 6	0.09	0.10	0.10	0.12	0.09	1.08	1.16	1.25	1.09	1.04
	KSF 2	0.15	0.17	0.14	0.13	0.10	1.03	1.20	1.19	1.09	1.06
	KSF 6	0.13	0.21	0.12	0.10	0.10	1.07	1.15	1.22	1.14	1.09
	KSF 8	0.14	0.14	0.15	0.12	0.11	1.09	1.27	1.22	1.12	1.04
Gochang, Jeollabuk-do	JGB 20-11	0.09	0.71	0.85	0.88	0.88	1.14	5.24	8.14	8.50	8.24
	JGB 20-13	0.09	0.47	0.61	0.68	0.72	1.13	3.58	5.45	7.07	7.61
	JGB 21-17	0.09	0.49	0.56	0.67	0.71	1.02	5.90	8.70	8.64	8.41
	JGB 21-20	0.08	0.09	0.09	0.09	0.38	1.02	1.06	1.19	1.13	3.66
	JGB 21-24	0.09	0.35	0.71	0.78	0.76	1.07	3.84	6.43	7.92	7.73
	JGA 10	0.20	0.20	0.18	0.16	0.09	1.06	1.20	1.18	1.13	1.09
	JGA 13	0.15	0.14	0.14	0.12	0.09	1.03	1.13	1.18	1.12	1.08
JGA 16	0.18	0.19	0.16	0.12	0.10	1.04	1.15	1.27	1.07	1.13	
Hongcheon, Gangwon-do	GHA 2	0.09	0.09	0.20	0.45	0.55	1.02	1.04	1.98	5.45	7.52
	GHA 7	0.09	0.29	0.43	0.36	0.41	1.07	3.85	7.60	8.16	7.94
	GHA 20	0.09	0.15	0.18	0.34	0.43	1.06	2.15	3.73	5.54	7.76
	GHA 112	0.09	0.41	0.50	0.56	0.57	1.10	3.86	6.95	8.86	8.69
Yecheon, Gyeongsangbuk- do	GYA 14	0.11	0.48	0.43	0.49	0.61	1.09	5.72	8.82	8.96	8.60
	GYA 17	0.11	0.42	0.56	0.67	0.57	1.10	4.51	7.78	8.22	8.02
	GYA 23	0.10	0.44	0.52	0.57	0.62	1.07	5.10	7.72	8.12	7.90
Control	AP 11998	0.15	0.14	0.14	0.14	0.13	1.10	1.31	1.21	1.09	1.07
	AC 12233	0.16	0.16	0.17	0.16	0.15	1.08	1.32	1.24	1.10	1.07
	GS CV1	0.09	0.09	0.09	0.05	0.67	1.03	0.90	0.97	8.94	7.48

Strain		EtOH (12%)							
		Growth (OD ₆₆₀)				Acidity (%)			
		1 day	5 days	7 days	9 days	1 day	5 days	7 days	9 days
Seongnam, Gyeonggi-do	KSO 5	0.09	0.10	0.09	0.08	1.34	1.14	1.10	1.09
	KSO 6	0.09	0.10	0.09	0.08	1.08	1.07	1.07	1.10
	KSF 2	0.10	0.12	0.11	0.10	1.14	1.12	1.09	1.13
	KSF 6	0.20	0.11	0.11	0.09	1.14	1.09	1.12	1.13
	KSF 8	0.10	0.11	0.11	0.09	1.15	1.01	1.04	1.09
Gochang, Jeollabuk-do	JGB 20-11	0.09	0.10	0.09	0.09	1.19	1.12	1.12	1.12
	JGB 20-13	0.10	0.42	0.57	0.61	1.22	4.81	7.06	7.56
	JGB 21-17	0.09	0.25	0.29	0.48	1.20	2.35	3.73	4.79
	JGB 21-20	0.09	0.10	0.23	0.26	1.25	1.15	2.08	2.69
	JGB 21-24	0.10	0.45	0.52	0.60	1.18	4.26	7.68	8.09
	JGA 10	0.14	0.35	0.36	0.53	1.14	2.78	4.45	6.25
	JGA 13	0.17	0.15	0.44	0.56	1.20	1.15	4.12	8.69
	JGA 16	0.14	0.38	0.42	0.57	1.14	3.10	5.51	7.18
Hongcheon, Gangwon-do	GHA 2	0.10	0.11	0.65	0.79	1.14	1.27	5.41	8.41
	GHA 7	0.10	0.11	0.12	0.38	1.19	1.03	1.55	5.26
	GHA 20	0.09	0.10	0.20	0.53	1.25	1.02	2.48	6.80
	GHA 112	0.09	0.09	0.09	0.08	1.13	1.07	1.04	1.22
Yecheon, Gyeongsangbuk- do	GYA 14	0.10	0.23	0.25	0.33	1.07	2.82	4.33	6.22
	GYA 17	0.10	0.19	0.14	0.14	1.14	2.22	2.32	2.27
	GYA 23	0.26	0.50	0.56	0.66	1.18	6.14	8.02	8.38
Control	AP 11998	0.12	0.14	0.19	0.45	1.12	1.12	1.66	5.14
	AC 12233	0.15	0.23	0.25	0.24	1.15	1.93	3.34	4.31
	GS CV1	0.10	0.10	0.23	0.30	1.18	0.98	1.93	4.08

Strain		EtOH (15%)							
		Growth (OD ₆₆₀)				Acidity (%)			
		1 day	5 days	7 days	9 days	1 day	5 days	7 days	9 days
Seongnam, Gyeonggi-do	KSO 5	0.09	0.10	0.10	0.09	1.07	1.09	1.10	1.14
	KSO 6	0.09	0.09	0.09	0.08	1.06	1.06	1.08	1.13
	KSF 2	0.11	0.13	0.10	0.09	1.02	1.09	1.08	1.12
	KSF 6	0.13	0.11	0.11	0.09	1.02	1.04	1.12	1.10
	KSF 8	0.12	0.12	0.10	0.10	1.06	1.04	1.07	1.13
Gochang, Jeollabuk-do	JGB 20-11	0.10	0.10	0.10	0.09	1.06	1.07	1.13	1.14
	JGB 20-13	0.10	0.10	0.09	0.08	1.03	1.09	1.12	1.13
	JGB 21-17	0.10	0.11	0.11	0.09	1.03	1.04	1.09	1.16
	JGB 21-20	0.10	0.10	0.09	0.09	1.06	1.08	1.06	1.15
	JGB 21-24	0.10	0.10	0.09	0.08	1.04	1.09	1.09	1.09
	JGA 10	0.15	0.13	0.11	0.08	1.01	1.07	1.13	1.13
	JGA 13	0.18	0.15	0.11	0.09	1.04	1.14	1.09	1.14
	JGA 16	0.15	0.14	0.11	0.09	1.09	1.02	1.09	1.07
Hongcheon, Gangwon-do	GHA 2	0.10	0.09	0.09	0.09	1.03	0.94	1.03	0.95
	GHA 7	0.09	0.09	0.10	0.09	1.07	0.97	1.04	1.01
	GHA 20	0.09	0.09	0.09	0.08	1.03	1.04	1.08	1.06
	GHA 112	0.09	0.09	0.09	0.09	1.06	1.06	1.07	1.08
Yecheon, Gyeongsangbuk- do	GYA 14	0.10	0.11	0.11	0.09	1.07	1.07	1.10	1.09
	GYA 17	0.11	0.10	0.09	0.09	1.07	1.08	1.09	1.12
	GYA 23	0.12	0.12	0.11	0.09	1.07	1.10	1.10	1.12
Control	AP 11998	0.11	0.12	0.12	0.09	1.04	1.06	1.10	1.12
	AC 12233	0.16	0.15	0.15	0.12	1.08	1.08	1.07	1.07
	GS CV1	0.10	0.09	0.09	0.14	1.04	0.90	0.91	0.92

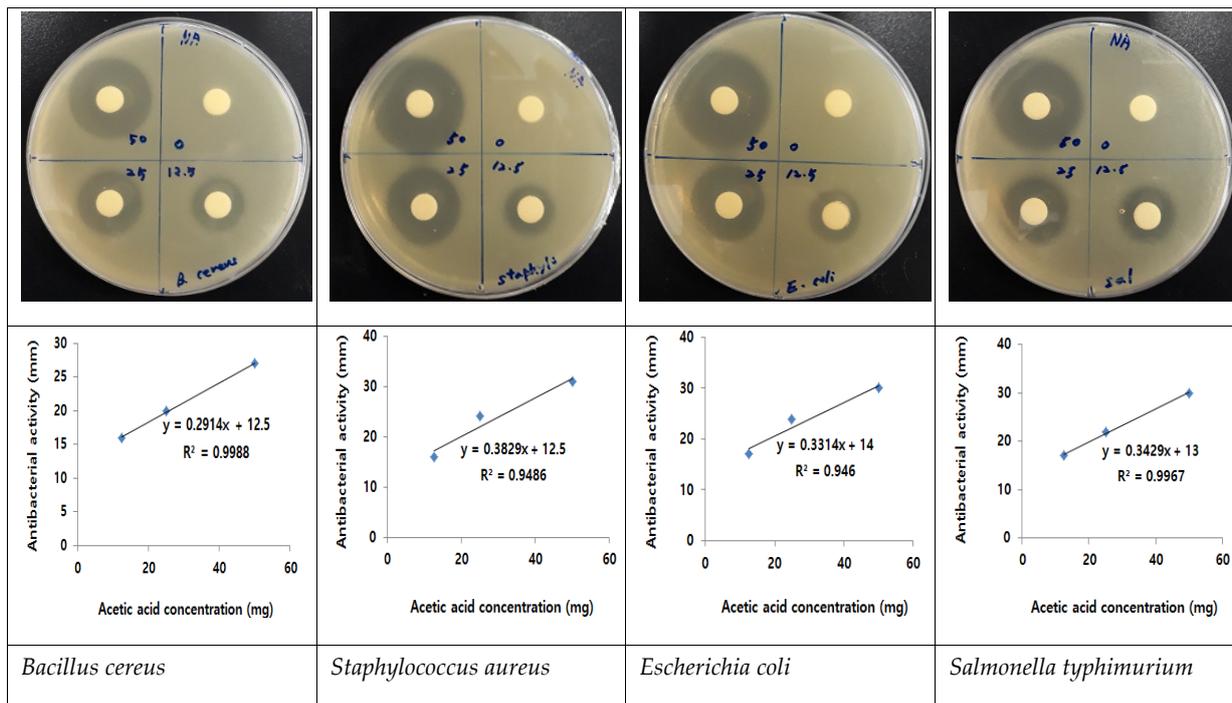


Figure S2. Images of clear zones and calibration curves of acetic acid indicating quantitative antibacterial activity of selected AAB strains

Table S2. Quantitative antibacterial activity of selected AAB strains using calibration curve of acetic acid.

No.	Strain name	Titratable acidity (%)	Antibacterial activity (mg/40 μ L)			
			<i>B. cereus</i>	<i>Staphylococcus aureus</i>	<i>E. coli</i>	<i>Salmonella typhimurium</i>
			Gram positive		Gram negative	
1	<i>A. cerevisiae</i> KSO 5	4.17	17.54	24.78	17.62	21.03
2	<i>A. pasteurianus</i> JGB 20-11	5.66	27.35	29.33	27.79	25.20
3	<i>A. pasteurianus</i> JGB 21-17	5.53	26.36	33.27	20.04	21.17
4	<i>A. pasteurianus</i> JGB 21-20	5.59	27.49	33.27	22.66	21.35
5	<i>A. pasteurianus</i> GHA 7	5.47	20.83	27.27	22.75	28.00
6	<i>A. pasteurianus</i> GHA 20	5.59	18.63	26.74	26.04	27.33
7	<i>A. pasteurianus</i> GYA 23	5.52	20.73	29.38	20.76	25.28