

Growth stimulatory effect of quorum sensing signal molecule N-Acyl-homoserine lactones-producing multi-trait *Aeromonas* spp. on wheat genotypes under salt-stress

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Table S1 Occurrence and functional annotation of AHLs in spent culture supernatant of <i>Aeromonas</i> spp. in literature					
Strains	Isolates origin	AHLs detection and quantification methods	AHLs produced	Findings of study	References
<i>A. hydrophila</i> AH-1	Natural isolate	TLC (CV026)/HPLC-HR-MS	C4-HSL++, C6-HSL	Increased serine protease activity (virulence determinants)	(Swift et al. 1997)
<i>A. salmonicida</i> NCIMB 1102 ^T	Salmon isolate				
<i>A. hydrophila</i> AH-1	Natural isolate	TLC (CV026, pSB536)/HPLC-HR-MS-NMR	C4-HSL++, C6-HSL	Increased exoprotease production (biofilm determinants)	(Lynch et al. 2002)
<i>Aeromonas</i> sp. (n = 3)	Activated sludge isolate	TLC (CV026, pZLR4)	C6-HSL, or 3-oxo-C6-HSL, C4-HSL, C6-HSL, 3-oxo-C8-HSL or C8-HSL	Putative role in bioaggregate formation	(Morgan-Sagastume et al. 2005)
<i>A. hydrophila</i> ATCC7966 ^T	Diseased fish isolate	TLC (CV026, pZLR4)/HPLC-HR-MS	C4-HSL	Regulate expression of virulence phenotypes	(Bruhn et al. 2005)
<i>A. hydrophila</i> 96-3-35			C4-HSL, C6-HSL		
<i>A. salmonicida</i> NCIMB 1110			C4-HSL, C6-HSL		
<i>A. salmonicida</i> 02-9-1			C4-HSL, C10-HSL, C6-HSL, 3-oxo-C6-HSL		
<i>A. hydrophila</i> strains (n = 8)	Faeces and foods isolate	TLC (CV026)	C4-HSL	<i>Aeromonas</i> strains produced C4-HSL under a different salt, temperature and pH conditions.	(Medina-Martinez et al. 2006)
<i>A. caviae</i> strains (n = 5)	Foods isolate				
<i>A. hydrophila</i>	Natural isolate	GC-MS	C8-HSL, C12-HSL, C14-HSL	GC-MS is more comprehensive and reliable technique for AHLs detection	(Cataldi et al. 2007)
<i>A. salmonicida</i>	Salmon isolate		C8-HSL, C10-HSL C12-HSL, C14-HSL		
<i>A. culicicola</i> 3249 ^T	Mosquito midgut isolate	GC-MS	C6-HSL, isoC7-HSL, 3OH-isoC7-HSL, 3OH-C8-HSL, 3OH-isoC9-HS	First report of methyl-branched AHLs in bacterial QS systems and power of GC-MS technique to identify unknown AHLs	(Thiel et al. 2009)
<i>A. hydrophila</i> (n = 4)	Peritoneal fluid, pus, stool and blood	TLC (CV026)	C4-HSL	C4-HSL is abundantly produces as compared to C6-HSL in clinical isolates	(Chan et al. 2011)
<i>A. hydrophila</i> (n = 6)			C4-HSL, C6-HSL		
<i>A. hydrophila</i> (n = 10)			C4-HSL, putative C5-HSL, C6-HSL		
<i>A. sobria</i> 159	Stool and bile		C4-HSL		
<i>A. sobria</i> 222			C6-HSL, 2 UI-HSL		

<i>A. salmonicida</i> subsp. <i>Achromogenes</i> Keldur265-87	Diseased fish isolate	TLC (CV026)/HPLC-HR-MS	C4-HSL	Virulence and pigment production are regulated by C4-HSL produced.	(Schwenteit et al. 2011)
<i>Aeromonas</i> sp. strain GC1	Activated sludge isolate	TLC (CV026)/NSI-MS/LC-ESI-MS	C4-HSL, C6-HSL, C8-HSL, C12-HSL	AHLs dependent production of extracellular degradative enzymes such as chitinase, elastase lipase, and cellulase is reported.	(Chong et al. 2012)
<i>A. tjernbergiae</i> B017	Urban river biofilm isolates	TLC (CV026, A136)	C6-HSL	<i>Aeromonas</i> sp. comprise a major AHLs producing group of river biofilm.	(Huang et al. 2012)
<i>A. aquariorum</i> B2M05			C4-HSL, 1 UI-HSL		
<i>A. hydrophila</i> B015			C4-HSL, C6-HSL, 1 UI-HSL		
<i>A. hydrophila</i> B1M18			C4-HSL, 2 UI-HSL		
<i>A. jandaei</i> B087			C4-HSL, 1 UI-HSL		
<i>A. media</i> Bill			C4-HSL, 2 UI-HSL		
<i>A. media</i> B026					
<i>A. media</i> B1M53			C4- HSL, C8-HSL, 3-OH-C8-HSL		
<i>A. salmonicida</i> B079			C4-HSL, 1 UI-HSL		
<i>A. veronii</i> B025			3-OXO-C8-HSL, 1 UI-HSL		
<i>A. veronii</i> MTCC 3249, originally isolated as <i>A. culicicola</i>	Mosquito midgut isolate	TLC (CV026)/HPLC-MS/NMR/IR	C4-HSL++, C6-HSL, C14-HSL, 6-carboxy-C6-HSL	Single strain produces so many AHLs under control of single system and first report of carboxyl-AHL production in <i>Aeromonas</i> genus and or any bacterial genera.	(Jangid et al. 2012)
<i>A. hydrophila</i> strains (n = 35)	Activated sludge isolate	TLC (CV026, VIR07)	C4-HSL, C6-HSL	<i>Aeromonas</i> spp. comprise a major AHLs producing group of activated sludge possibly affecting waste water treatment process.	(Ochiai et al. 2013)
<i>A. punctate</i> strains (n = 16)					
<i>A. sobria</i> strains (n = 22)					
<i>A. media</i> strains (n = 24)					
<i>A. veronii</i> strains (n = 4)					
<i>A. jandaei</i> strains (n = 1)					
<i>A. hydrophila</i> strains (n = 24)	fresh water or diseased fish	TLC (CV026)	C4-HSL, C6-HSL	83 % of the isolates produced β haemolysin and	(Chu et al. 2013)

				produced cytotoxic activity, 75% shown proteolytic activity and 50% displayed DNase activity.	
<i>A. hydrophila</i> S1-073	Rhizosphere of <i>Salix babylonica</i> (willow)	TLC (CV026, A136)	C4-HSL, C6-HSL, 1 UI-HSL	<i>Aeromonas</i> represented the most abundant group (66.7 %) of willow rhizosphere	(Zeng et al. 2014)
<i>A. media</i> S1_063			C4-HSL, 2 UI-HSL		
<i>A. media</i> S1_008			Not determined		
<i>A. media</i> S1_060					
<i>A. veronii</i> S1_078					
<i>A. veronii</i> S1_080					
<i>A. trota</i> S2_007	Rhizosphere of <i>Phragmites australis</i> (reed)		C4-HSL, 1 UI-HSL	<i>Aeromonas</i> represented 22.2% of reed rhizosphere	
<i>A. aquariorum</i> S2_004			Not determined		
<i>A. Caviae</i> Strain YL12	Compost isolate	TLC (CV026)/MALDI-TOF-MS	C4-HSL, C6-HSL	AHLs production was density dependent.	(Lim et al. 2014)
<i>Aeromonas</i> spp. (n = 22)	Different foods isolates	TLC (CV026, JB523, NT1)	C4- HSL, putative C5-HSL, C6-HSL, C7-HSL	All the food isolates of <i>Aeromonas</i> shown diverse profile of AHLs and first-time reporting C7-HSL. No co-relation was found between AHLs profile and biofilm formation.	(Nagar et al. 2015)
<i>A. hydrophila</i> strain KOR1	Mangrove rhizosphere soil isolate	Whole-genome shotgun project	C4-HSL, C6-HSL	Putative role of facilitator in nitrogen fixation	(Yin et al. 2015)
<i>A. hydrophila</i> KCTC 11533	Surface water	TLC (CV026)	C4-HSL	Salinity affects both AHLs production and biofilm formation.	(Jahid et al. 2015)
<i>Aeromonas</i> spp. (n = 5)	Spoiled refrigerated turbot	RP-TLC (CV026)/GC-MS	3-oxo-C6-HSL, C8-HSL, C10-HSL, C12-HSL	AHLs production was density dependent and exogenous addition of AHLs reduced biofilm formation.	(Zhang et al. 2016)
<i>A. sobria</i> AS7	Spoiled turbot	TLC (CV026, A136)/GC-MS	C4-HSL, C6-HSL, C8-HSL, C10-HSL, C12-HSL	C4-HSL and C8-HSL were found to be involved in population growth and while C6-HSL was not found to be involved in spoilage.	(Li et al. 2016)

<i>Aeromonas</i> sp. strain GLY-2107	Lake Taihu isolate	TLC (CV026)/UPLC-HRMS/MS	C4-HSL, C6-HSL	AHLs regulate the algicidal activity.	(Guo et al. 2016)
<i>A. veronii</i> bv. <i>veroni</i>	Fermented surimi	LC-MS/MS	C4-HSL, C6-HSL, C8-HSL	AHL-based quorum sensing system of <i>Aeromonas</i> spp. involved in the regulation of spoilage.	(Zhao et al. 2018)
<i>A. veronii</i> LP-11	Sturgeon fish isolate	TLC (CV026 & KYC55)/ HPLC/QqQ-MS/ QTOF-MS	C6-HSL, 3-oxo-C8-HSL, 3-OH-C8-HSL, C8-HSL	Putative role AHLs in sturgeon spoilage	(Gui et al. 2018)

AHL, N-acyl homo serine lactone; HSL, homo serine lactone; UI-HSL, Unidentified homo serine lactone; HPLC-HR-MS, high performance liquid chromatography/high resolution mass spectrometry; GC-MS, Gas chromatography-mass spectrometry; HPLC-MS-NMR, high performance liquid chromatography/mass spectrometry-nuclear magnetic resonance; NSI-MS, nano spray ionization-mass spectrometry; LC-ESI-MS, liquid chromatography/electro spray ionization-mass spectrometry; TLC, thin layer chromatography; RP-TLC, reverse plate-thin layer chromatography; CV026, reporter strain *Chromobacterium violaceum* CV026; pZLR4, reporter strain *Agrobacterium tumefaciens* NTL4 (pzLR4); A136, reporter strain *Agrobacterium tumefaciens* A136; KYC55, reporter strain *Agrobacterium tumefaciens* KYC55; ++, major AHLs produced.

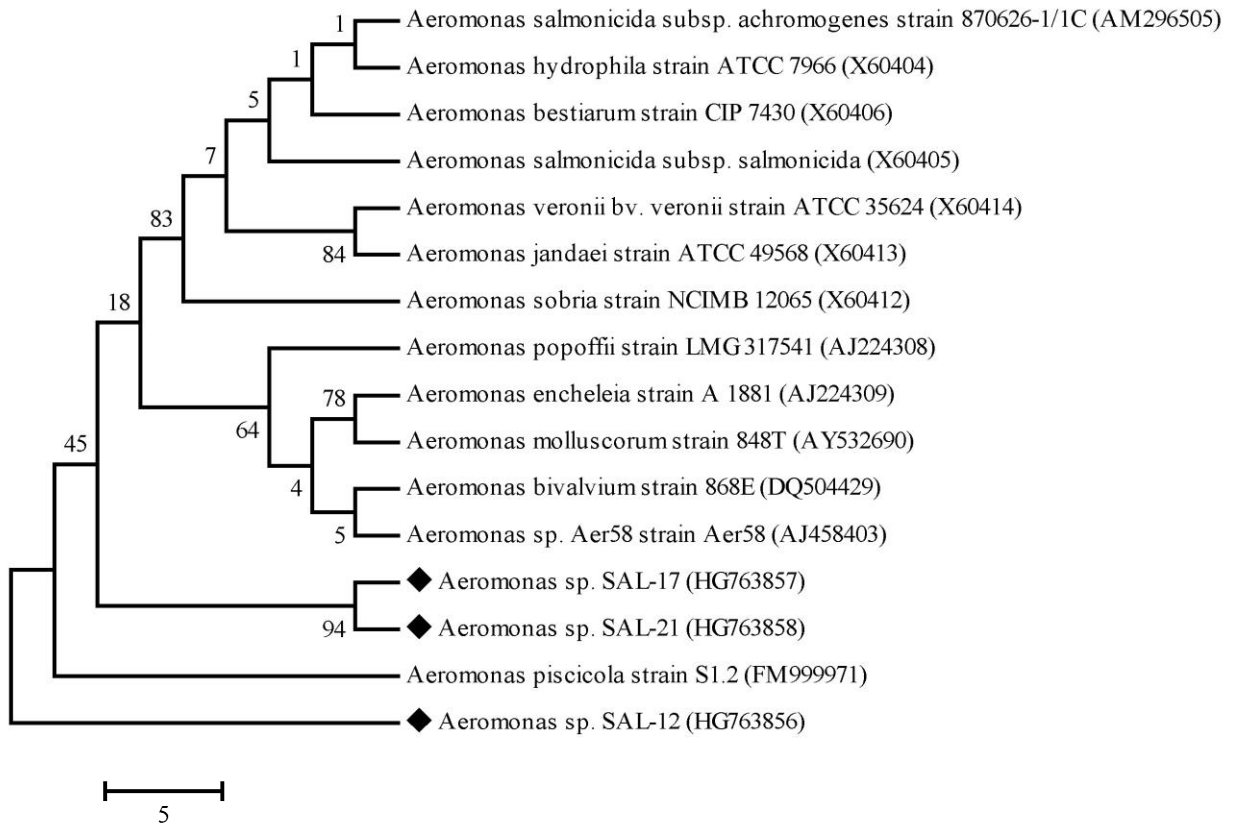


Figure S1: Phylogenetic relationship of *Aeromonas* spp. SAL-12, SAL-17 and SAL-21 based on the sequences of 16S *rRNA* along with closely related sequences obtained from GenBank. Bootstrap value was 1000 and nucleotide sequence divergence is shown by bar. The tree was generated in MEGA6 using maximum likelihood method.

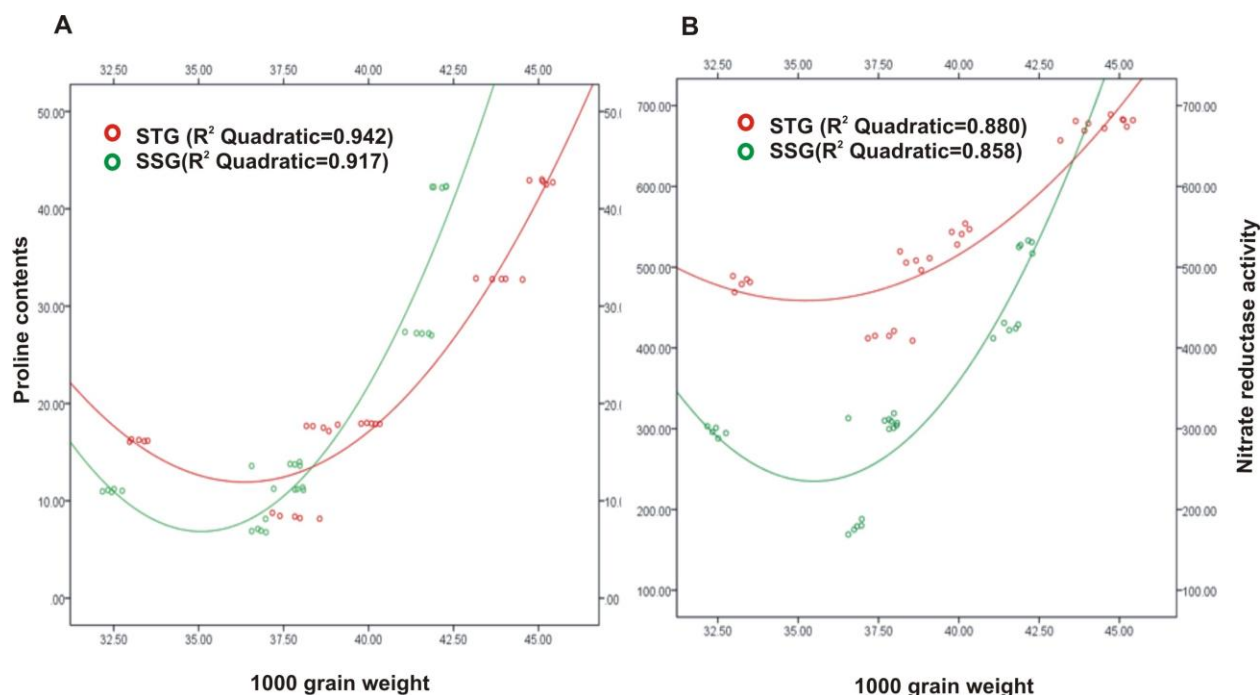


Figure S2: Grain yield response to proline contents and nitrate reductase activity as a function of bacterial inoculation in two different wheat genotypes grown in two saline and normal soil. The data from all treatments was jointly loaded on the graph to evaluate the overall response. Graph shows the quadratic relationship of grain yield to plant proline and nitrate reductase activity with significant high R^2 -values.

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