

Supplementary Materials

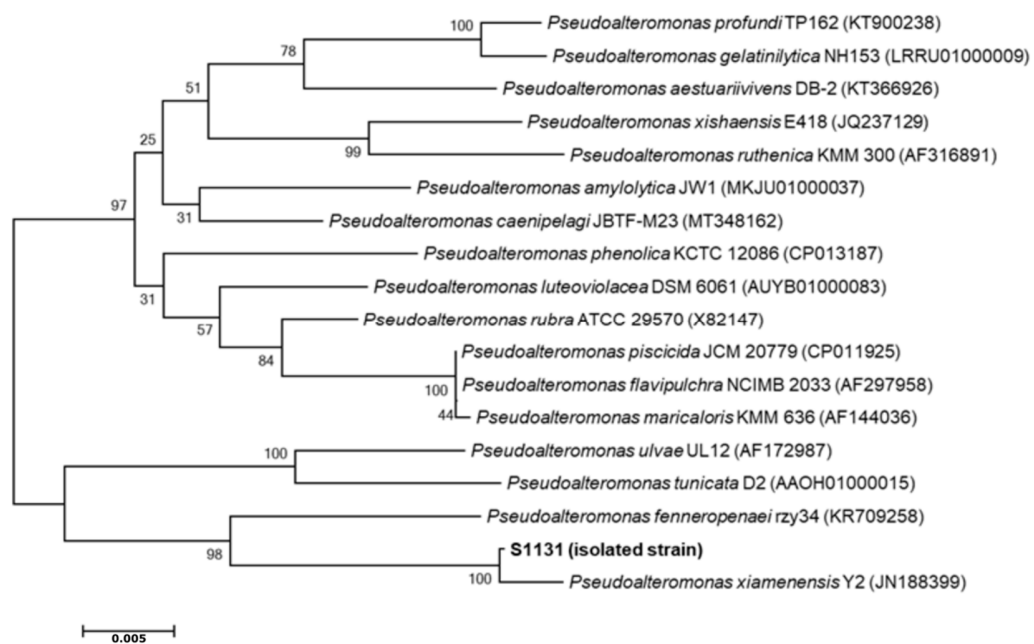


Figure S1. Phylogenetic tree based on 16S rRNA sequences showing the relationship of strain S1131 with type strains of the genus *Pseudoalteromonas*. Accession numbers are given in parenthesis. Bar, 0.005 substitutions per nucleotide position.

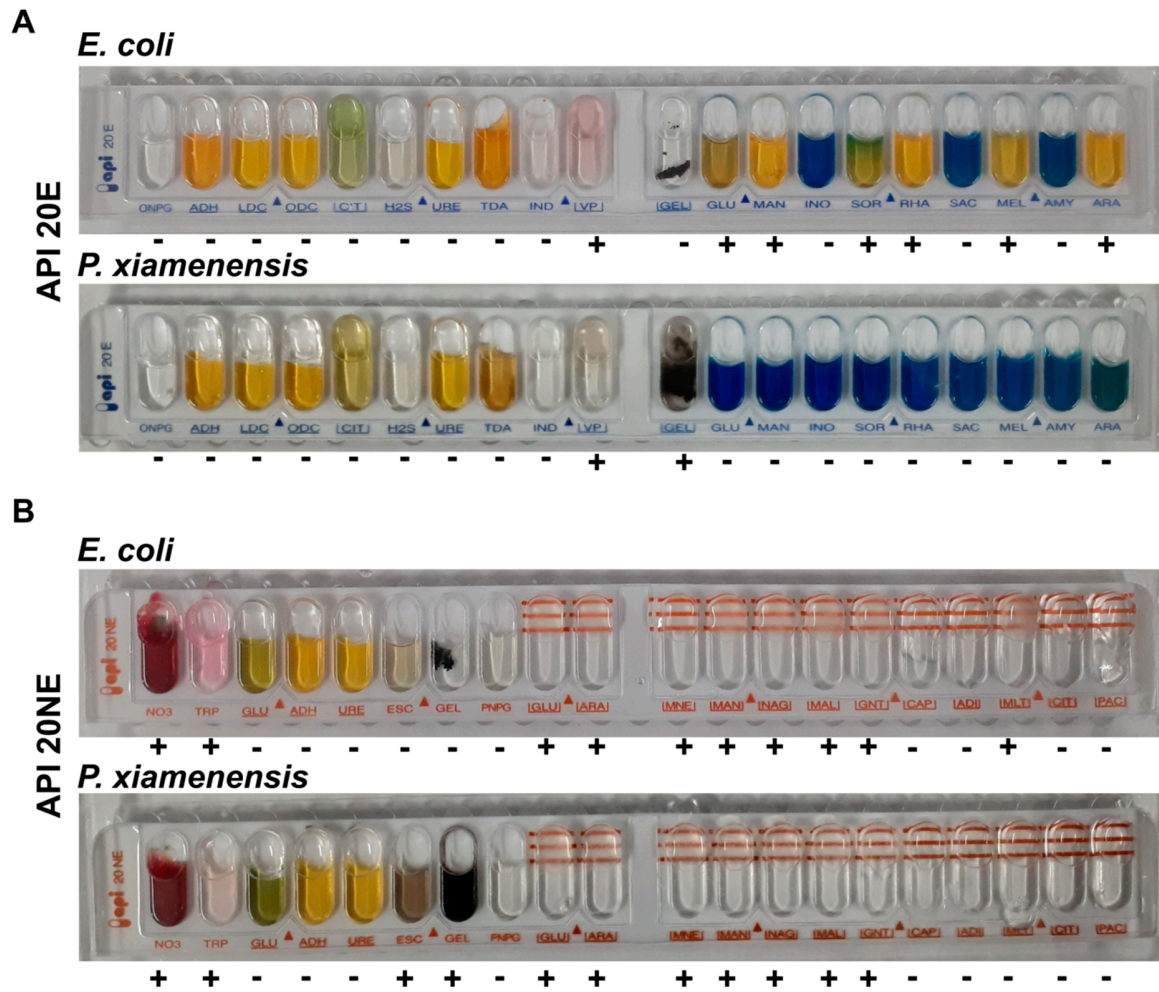
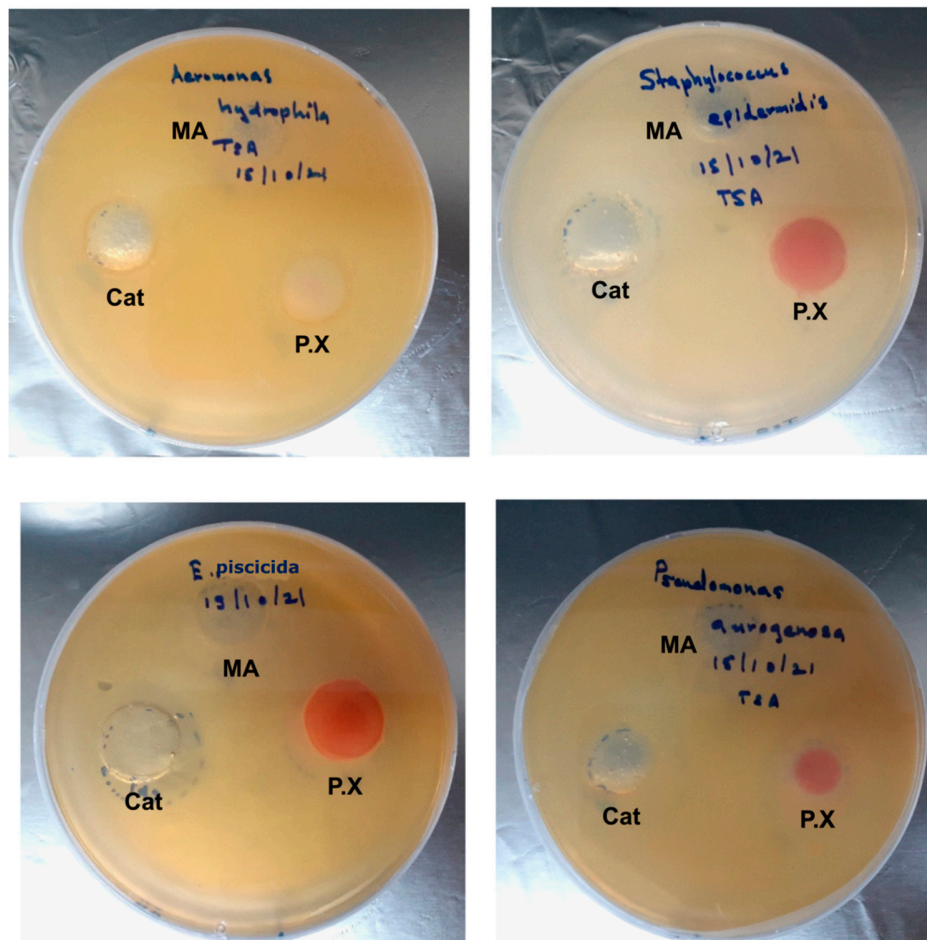


Figure S2. Biochemical characterization of *P. xiamenensis*. (A) API 20E assay results of *P. xiamenensis* as compared to *E. coli* DH5α. (B) API20NE assay results of *P. xiamenensis* as compared to *E. coli* DH5α. + mark indicates positive reaction and – mark indicates the negative reaction.



MA: Marine agar (0.8% soft agar)
 Cat : Chloramphenicol 50 µg/mL
 P.X: *P. xiamenensis*

Figure S3. Assessment of antimicrobials secretion of *P. xiamenensis*. Agar diffusion test was conducted to assess the inhibition ability of *P. xiamenensis* on *A. hydrophila*, *S. epidermidis*, *E. piscicida*, and *P. aeruginosa*. The test bacterium was inoculated into the soft agar and overlayed on the pre-solidified agar plates. Wells were cut and filled with marine agar containing *P. xiamenensis*. MA: Marine agar (0.8 % soft agar), Chl: chloramphenicol (50 µg/mL), P.X: *P. xiamenensis*.

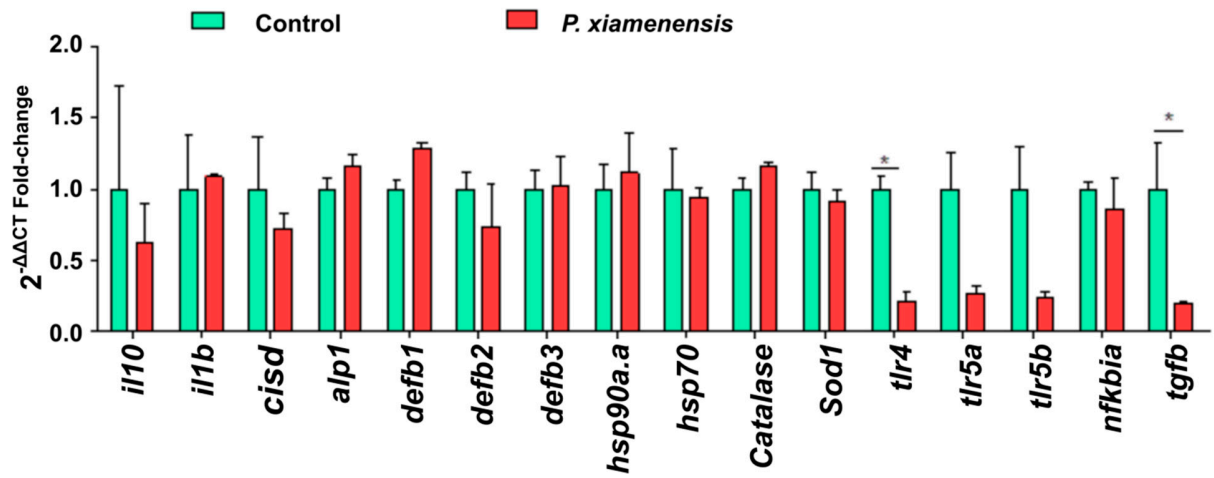


Figure S4. Quantitative real-time PCR for cytokines. Relative mRNA expression of immune-modulatory genes in *P. xiamenensis* enriched zebrafish larvae. Zebrafish larvae (60 hpf) were enriched with *P. xiamenensis* three times at 60 hpf, 6 dpf, and 9 dpf and were sampled at 10 dpf for isolating the RNA. Relative expression-fold is presented as mean \pm standard error. The asterisk marks are used to indicate statistical significance (t-test *, $p < 0.05$).

Table S1: Bacterial strains and primers used in the study

Bacterial strain/Gene name	Reference/Accession number	Primer name	Primer sequence 5'-3'
Bacteria strains			
<i>Pseudoalteromonas xiamenensis</i> S1131	Gamma proteobacteria This study		
<i>Edwardsiella piscicida</i>	Lab isolate		
<i>Salmonella typhimurium</i>	ATCC14028, Lab stock		
<i>Salmonella epidermidis</i>	Lab isolate		
<i>Aeromonas hydrophila</i>	Lab isolate		
<i>Pseudomonas aeruginosa</i>	Lab isolate		
Genes			
Toll-like receptor 2 (<i>tlr2</i>)	NM_212812.1	tlr2-F tlr2-R	TCTCCGCTCTGGTTTCAC GGTCCCACAGTTGAGTATG
Toll-like receptor4 (<i>tlr4</i>)	AY388400.1	tlr4-F tlr4-R	GGAATAATGGGCAGCCGTAAG AGCGACACCAGGAAGTATCAATG
Toll-like receptor5a (<i>tlr5a</i>)	AY389449.1	tlr5a-F tlr5a-R	ACTCCGCTGTGCTTTGA GTTTAGACACCACGCAATGG
Toll-like receptor5b (<i>tlr5b</i>)	BC163185.1	tlr5b-F tlr5b-R	GAAACATTCACCCTGGCACA CTACAACCAGCACCACCAGAATG
Myeloid differentiation primary response factor 88 (<i>myd88</i>)	DQ100359.1	myd88-F myd88-R	AACAACCTTCGCTGGATAA GTTACTGGAATCGCCTCA
Interleukin-1 β (<i>il1 β</i>)	AY340959.1	il1 β -F il1 β -R	TCAAACCCCAATCCACAGAG TCACTTCACGCTCTTGGATG
ZF NF-kappaB inhibitor alpha-like protein B (<i>nfkbia</i>)	AY163841.1	nfkbia-F nfkbia-R	GGGTTGGATTTCGTTAAAAG CGTGGATAATGGCGAGATGTAG
Tumor necrosis factor- α (<i>tnfα</i>)	AY427649	tnf α -F tnf α -R	AGAAGGAGAGTTGCCTTTACCGCT AACACCCTCCATACACCCGACTTT
Interleukin-6 (<i>il6</i>)	JN698962.1	il6-F il6-R	TCAACTTCTCCAGCGTGATG TCTTTCCTCTTTTCCTCCTG
Interleukin-10 (<i>il10</i>)	AY887900.1	il10-F il10-R	CCCTATGGATGTCACGTCATG CATATCCCGCTTGAGTTCCTG
Transforming growth factor β (<i>tgfβ</i>)	XM_687246	tgf β -F tgf β -R	CCCAAGGAACCAGAAGTAGAAG GGATCTTCTATGGTGTGCTGAA
Mucin 2.1 (<i>muc2.1</i>)	NC_007136.7	muc 2.1-F muc 2.1-R	AATATGCCTTGCGGAACAAC GTGCTGAGGTTGCAGAATGA
Mucin 5.1 (<i>muc5.1</i>)	XM_009297795.1	muc 5.1-F muc 5.1-R	TGGCAACTTGGCTGATGATA TCGTACACGACGACAGTAGA
Mucin 5.2 (<i>muc5.2</i>)	XM_009297793.1	muc 5.2-F muc 5.2-R	GGTGTCTGTCCGATCAATC TCATCCTTGTCGCCATTGTA
Mucin 5.3 (<i>muc5.3</i>)	ENS DARG00000089847	muc 5.3-F muc 5.3-R	GGGGAAACTACACCAGCAA TGTGAATTCTGTGCCAGAGC
Intestinal alkaline phosphatase1 (<i>alp1</i>)	JX847416.1	alp1-F alp1-R	GTTCCCTTAGAATCCGAGACAC GGCCACATAGTTCTGCTCTT
Intestinal alkaline phosphatase 2 (<i>alpi.2</i>)	JX847417.1	alpi.2-F alpi.2-R	CAGCAGGATTCGATGGATGT ATTGAGAGCGATGCGTGATG
Intestinal alkaline phosphatase (<i>alpi3</i>)	JX847418.1	alp3-F alp3-R	ATCTCTCCAGGGCGTTTATG CAGTGGATGTGTCTGGGTTT
Beta defensin $\beta 1$ (<i>def $\beta 1$</i>)	NM_001081553.1	defb1-F	CTGCTTGCTCTGTCTGCTACT

Beta defensin $\beta 2$ (<i>def $\beta 2$</i>)	NM_001081554.1	defb1-R	GCAAACACACTCCTTGTCTG
		defb2-F	CTTCATTACATTGCCTGCACTT
Beta defensin $\beta 3$ (<i>def $\beta 3$</i>)	NM_001081555.1	defb2-R	GTACCCACACGTCCAATTCT
		defb3-F	CCAATGATACAGACGTGCAGAG
Heat shock protein (<i>hsp70</i>)	NM_002154.4	defb3-R	GCAGCCACGATAACCAATCA
		hsp70-F	GACCTGCCAATCGAGAATCA
Heat shock protein (<i>hsp90a.a</i>)	NM_131328.1	hsp70-R	CCGCTCCTTCTCCAGTTTATC
		hsp90a.a-F	CATCGCTAAATCTGGCACAAG
Heat shock protein (<i>hsp90ab1</i>)	NM_131310.3	hsp90a.a-R	GCCACCAGATACGCAGAATAA
		hsp90ab1- F	GAAGAGGAGAAGGCAGAGAAAG
CDGSH iron-sulfur domain (<i>cisd</i>)	NM_131710.2	hsp90ab1-R	CGAGCCGACATCTTCAATCT
		cisd-F	GAACCCTCAGACGAACACTAAG
Catalase	NM_001752.4	cisd-R	GGGAAGCCCAGGTTGTATTT
		catalase-F	AGGGTGCTGCTCCAAATTAC
Superoxide dismutase (<i>sod1</i>)	NM_011434.2	catalase-R	TGTTGAATCTCCGCACTTCTC
		sod1-F	GGTTCCACGTCCATCAGTATG
β - actin	AF025305	sod1-R	GTCTCCAACATGCCTCTCTTC
		β actin- F	AATCTTGCGGTATCCACGAGACCA
		β actin- R	TCTCCTTCTGCATCCTGTCAGCAA

Table S2. Analytical Profile Index (API) 20E and 20NE biochemical test results of *P. xiamenensis*

***P. xiamenensis*: API 20E**

Test	Results
β -galactosidase	-
Arginine dihydrolase	-
Lysine decarboxylase	-
Ornithine decarboxylase	-
Citrate utilization	-
H ₂ S production	-
Urease production	-
Tryptophan deaminase	-
Indole production	-
Voges-Proskauer reaction	+
Gelatinase production	+
Glucose	-
Mannitol	-
Inositol	-
Sorbitol	-
Rhamnose	-
Saccharose	-
Melibiose	-
Amygdalin	-
Arabinose	-

***P. xiamenensis*: API 20NE**

Test	Results
Potassium nitrate	+
Tryptophan	+
Glucose (fermentation)	-
Arginine	-
Urea	-
Aesculin	+
Gelatine	+
pNPGb	-
Glucose (Utilization)	+
Arabinose	+
Mannose	+
Mannitol	+
N-Acetyl-glucosamine	+
Maltose	+
Gluconate	+
Caprate	-
Adipate	-
Malate	-
Citrate	-
Phenyl-acetate	-