

Table S1. IMViC test result of presumptive *Escherichia coli* isolated from 3 aquaculture farms and 6 rivers in Northwest Coast of Borneo

Isolate code	Indole	H ₂ S	Motility	MR	VP	Citrate	Presumptive identity
Positive control	+	-	+	+	-	-	<i>E. coli</i>
Negative control	-	-	+	-	-	+	<i>Enterobacter aerogenes</i>
FW1-A	+	+	-	-	-	-	Unknown
FW1-B	+	+	-	-	-	-	Unknown
FW8-A	+	+	-	-	-	-	Unknown
FW10-A	+	+	-	-	-	-	Unknown
RBK-S2-A	+	-	+	+	-	-	<i>E. coli</i>
RB-S3-A	+	+	-	-	-	-	Unknown
RBT-S1-A	+	-	+	+	-	-	<i>E. coli</i>
RBT-S2-A	+	-	-	-	-	-	Unknown
RBT-S3-A	+	-	+	+	-	-	<i>E. coli</i>
RDM-S1-A	+	-	+	+	-	-	<i>E. coli</i>
RDM-S2-A	+	-	+	+	-	-	<i>E. coli</i>
RDM-S3-A	+	-	+	+	-	-	<i>E. coli</i>
RMT-S1-A	+	-	+	+	-	-	<i>E. coli</i>
RMT-S1-B	+	-	+	+	-	-	<i>E. coli</i>
RMT-S2-A	+	-	-	-	-	-	Unknown
RMT-S2-B	+	+	-	-	-	-	Unknown
RSN-S1-A	+	-	+	+	-	-	<i>E. coli</i>
RSN-S2-A	+	-	+	+	-	-	<i>E. coli</i>
RWC-S1-A	+	-	+	+	-	-	<i>E. coli</i>
RWC-S3-A	+	-	+	+	-	-	<i>E. coli</i>
RWC-S3-B	+	-	+	+	-	-	<i>E. coli</i>
RWF-S1-A	+	-	+	+	-	-	<i>E. coli</i>
RWF-S2-A	+	-	+	+	-	-	<i>E. coli</i>

RWF-S3-A	+	-	+	+	-	-	<i>E. coli</i>
RWF-S3-B	+	-	+	+	-	-	<i>E. coli</i>
FAS-NS(S)	+	-	+	+	-	-	<i>E. coli</i>
FAS-SD1(S)	+	-	+	+	-	-	<i>E. coli</i>
FAS-RV1(S)	+	-	+	+	-	-	<i>E. coli</i>
FAS-R10(B)	+	-	+	+	-	-	<i>E. coli</i>
FAS-R10(S)	+	-	+	+	-	-	<i>E. coli</i>
FAS-8(S)	+	-	+	+	-	-	<i>E. coli</i>
FAS-16(S)	+	-	+	+	-	-	<i>E. coli</i>
FAS-16(B)	+	-	+	+	-	-	<i>E. coli</i>
FAS-42(S)	+	-	+	+	-	-	<i>E. coli</i>
FAS-62(S)	+	-	+	+	-	-	<i>E. coli</i>
FAS-62(B)	+	-	+	+	-	-	<i>E. coli</i>
FAS-SD2(B)	+	-	+	+	-	-	<i>E. coli</i>
FBKA-K4(S)	+	-	+	+	-	-	<i>E. coli</i>
FBK2-OLT(S)	+	-	+	+	-	-	<i>E. coli</i>
FBK2-OLT(B)	+	-	+	+	-	-	<i>E. coli</i>
FBK2-K2(B)	+	-	+	+	-	-	<i>E. coli</i>
RBK-RV2(S)	+	-	+	+	-	-	<i>E. coli</i>

IMViC test result that include test for positivity for Indole, Motility, H₂S production, Methyl Red, Voges-Proskauer, and citrate test; Positive control: *Escherichia coli* code (ATCC25922); Negative control, *Enterobacter aerogenes* (ATCC13048); +, positive result; -, negative result.

Table S2. Antibiotic susceptibility test on *Escherichia coli* isolated from aquaculture farm and rivers against amoxicillin, chloramphenicol, nialidixic acid, nitrofurantoin, and tetracycline using disk diffusion method

	Antibiotic (Mean diameter of clear zone, mm)				
	Amoxicillin	Tetracycline	Nitrofurantoin	Chloramphenicol	Nialidixic acid
Control	26	22	20	25	23
RBK-S2-A	9 (R)	0 (R)	17	0 (R)	17
RDM-S1-A	9 (R)	0 (R)	18	0 (R)	23
RDM-S2-A	8 (R)	0 (R)	19	0 (R)	8.5 (R)
RDM-S3-A	9 (R)	0 (R)	18	0 (R)	22
RMT-S1-A	10 (R)	22	18	25	20
RMT-S1-B	11 (R)	25	21	27	30
RWC-S1-A	8 (R)	20	19	22	20
RWC-S3-A	10 (R)	17	18	23	21
RWC-S3-B	10 (R)	10	19	25	19
RWF-S1-A	0 (R)	0 (R)	18	0 (R)	20
RWF-S2-A	25	20	19	24	20
RWF-S3-A	25	22	18	21	23
RWF-S3-B	25	20	18	24	8 (R)
RBT-S1-A	26	19	18	21	23
RBT-S3-A	24	23	19	25	19
RSN-S1-A	10 (R)	6 (R)	19	0 (R)	17
RSN-S2-A	9 (R)	0 (R)	17	17 (I)	20
FAS-NS(S)	10 (R)	23	18	22	25
FAS-SD1(S)	9 (R)	21	16	22	22
FAS-RV1(S)	0 (R)	0 (R)	18	0 (R)	23
FAS-R10(B)	10 (R)	22	17	23	23
FAS-R10(S)	8.5 (R)	21	15 (I)	23	23
FAS-8(S)	10 (R)	21	17	22	22.5
FAS-16(S)	9 (R)	22	17	22	24

FAS-16(B)	9 (R)	0 (R)	16 (I)	23	22
FAS-42(S)	8.5 (R)	22	17	23	22
FAS-62(S)	9 (R)	19	15 (I)	22	23
FAS-62(B)	9 (R)	22	17	22	22
FAS-SD2(B)	8 (R)	20	17	21	21.5
FBK2-K4(S)	0 (R)	17	15	19	19
FBK2-OLT(S)	9 (R)	21	16 (I)	25	21
FBK2-OLT(B)	9 (R)	0 (R)	16 (I)	0 (R)	18.5
FBK2-K2(B)	0 (R)	9 (R)	17 (I)	10.5 (R)	17
RBK-RV2(S)	9 (R)	9 (R)	16.5	23	9 (R)

Performance Standards for Antimicrobial Disk Susceptibility Tests: Amoxicillin: ≤ 18 (Resistant), 19–23

(Intermediate), ≥ 24 (Susceptible); Tetracycline ≤ 11 (Resistant), 12–14 (Intermediate), ≥ 15 (Susceptible);

Nitrofurantoin ≤ 14 (Resistant), 15–16 (Intermediate), ≥ 17 (Susceptible); Chloramphenicol ≤ 12 (Resistant),

13–17 (Intermediate), ≥ 18 (Susceptible); Nalidixic acid ≤ 13 (Resistant), 14–18 (Intermediate), \geq

19 (Susceptible); Control: *Escherichia coli* ATCC 25922.

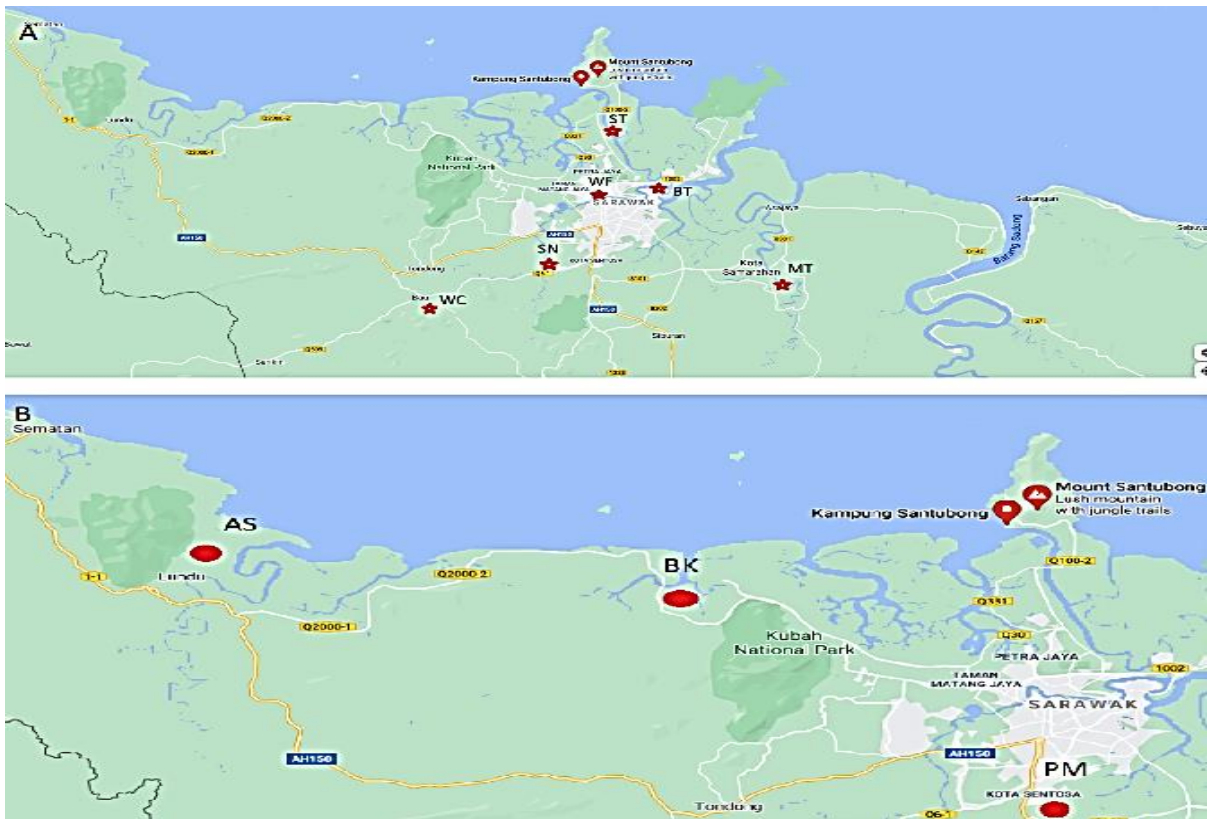


Fig. S1. Location of study areas in Kuching, Malaysia, Northwestern Borneo (Shown in red). A, Location of selected 6 sampling stations of rivers; B, Location of selected 3 aquaculture farms.

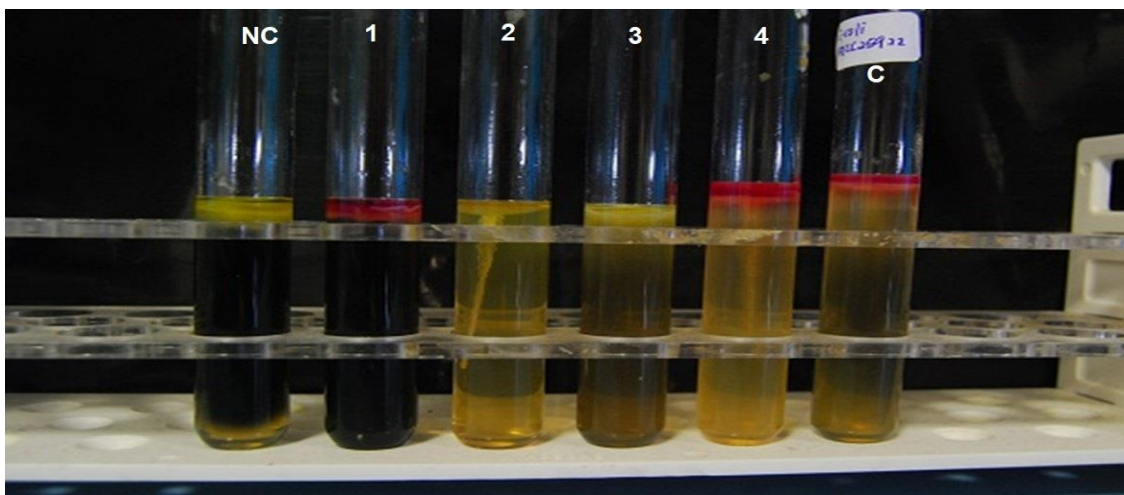


Fig. S2. Examples of the sulfide, indole, motility (S.I.M) test result of bacteria isolated from 3 aquaculture farms and 6 rivers in Northwest Coast of Borneo (from left to right). NC, Negative control (*Enterobacter aerogenes* ATCC13048); 1–4, Bacteria isolates (RWF-S1-A, RB-S2-A, RMT-S2-A, RBT-S2-A); C, Positive control (*Escherichia coli* ATCC25922).

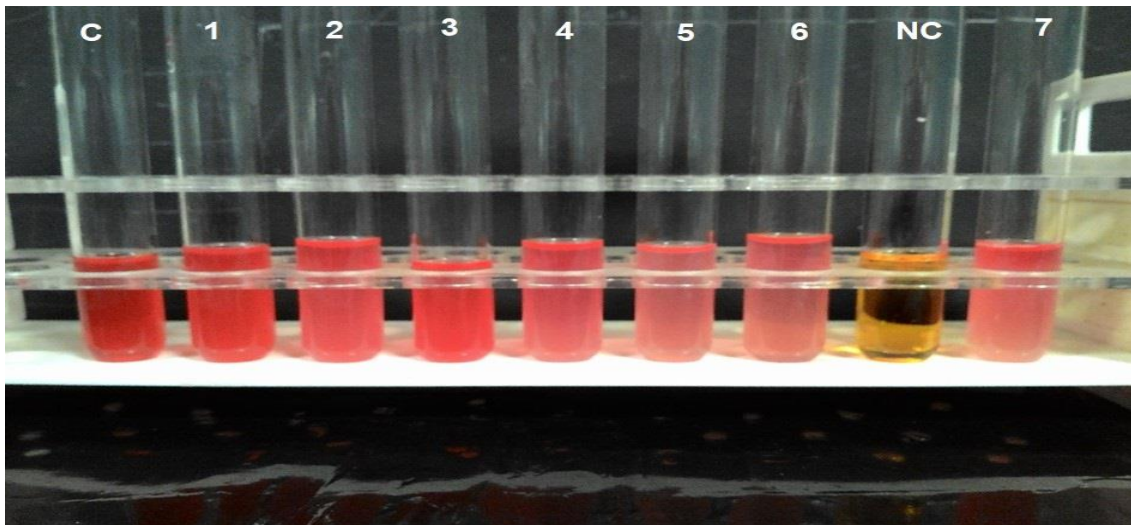


Fig. S3. Examples of the methyl red (MR) test result of bacteria isolated from 3 aquaculture farms and 6 rivers in Northwest Coast of Borneo (from left to right). C, Positive control (*Escherichia coli* ATCC25922); 1–7, Bacteria isolates (RB-S2-A, RBT-S1-A, RBT-S3-A, RDM-S1-A, RDM-S2-A, RDM-S3-A, RMT-S1-B); NC, Negative control (*Enterobacter aerogenes* ATCC13048).

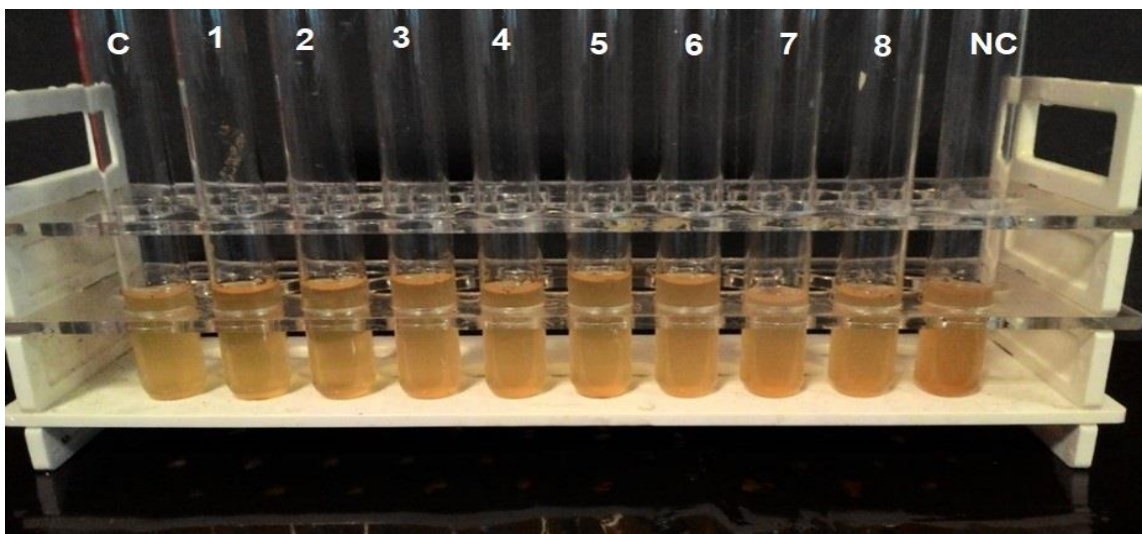


Fig. S4. Examples of the Voges-Proskauer (VP) test result of bacteria isolated from 3 aquaculture farms and 6 rivers in Northwest Coast of Borneo (from left to right). C, Positive control (*Escherichia coli* ATCC25922); 1–8, Bacteria isolates (RB-S2-A, RBT-S1-A, RBT-S3-A, RDM-S1-A, RDM-S2-A, RDM-S3-A, RMT-S1-B, RSN-S1-A); NC, Negative control (*Enterobacter aerogenes* ATCC13048).

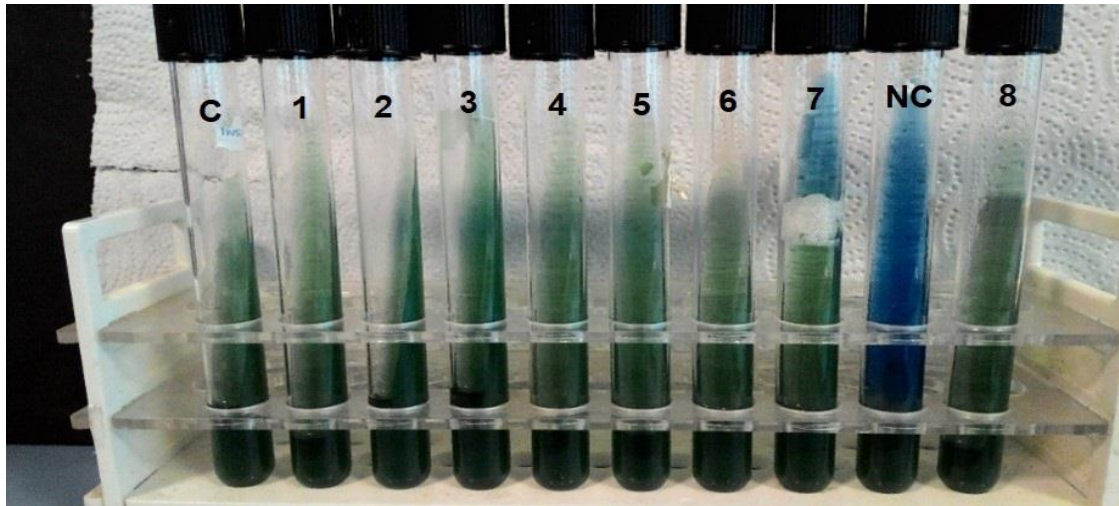


Fig. S5. Examples of the citrate test result of bacteria isolated from 3 aquaculture farms and 6 rivers in Northwest Coast of Borneo (from left to right). C, Positive control (*Escherichia coli* ATCC25922); 1–8, Bacteria isolates (RB-S2-A, RBT-S1-A, RBT-S3-A, RDM-S1-A, RDM-S2-A, RDM-S3-A, RMT-S1-B, RSN-S1-A); NC, Negative control (*Enterobacter aerogenes* ATCC13048).