**SUPPLEMENTAL INFORMATION**

For

# Determination of Three Classes of Antibiotics in a Natural River Basin: Association with Antibiotic-resistant *Escherichia coli*

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Figure 1

**Chemicals and materials**

**SAs and Trimethoprim.** Sulfaguanidine (SGD), sulfanilamide (SA), sulfathiazole (STZ), sulfisomidine (SIM), sulfamonomethoxine (SMM), sulfisoxazole (SIA), sulfachloropyridazine (SCP), sulfapyridine (SPD), sulfadiazine (SDZ), sulfamethazine (SMA), sulfamethoxazole (SMX), sulfamerazine (SMR), sulfaquinoxaline (SQX), sulfameter (SME), sulfamethizole (SMT), sulfamoxol (SMO), sulfadimethoxine (SDM), sulfamethoxypyridazine (SMP), sulfanitran (SNT), and trimethoprim (TMP) were all obtained from Sigma-Aldrich (MO, USA). $^{13}C_6$-sulfamethazine ($^{13}C_6$-SMA) was obtained from Cambridge Isotope Laboratories (MA, USA). *N*-acetylsulfapyridine (NAcSPD), *N*-acetylsulfadiazine (NAcSDZ), *N*-acetylsulfamethazine (NAcSMA), *N*-acetylsulfamethoxazole (NAcSMX), *N*-acetylsulfamerazine (NAcSMR), and *N*-acetylsulfamethoxazole-$d_5$ (NAcSMX-$d_5$) were purchased from Toronto Research Chemicals (North York, ON, Canada). TMP and SAs are usually used for animal growth promotion agents, together.

**Quinolone.** Cinoxacin (CINO), lomefloxacin (LOME), pipemidic acid (PIPE), ofloxacin (OFL), danofloxacin (DANO), enrofloxacin (ENRO), ciprofloxacin (CIP), sarafloxacin (SARA), difloxacin (DIF), sparfloxacin (SPAR), moxifloxacin (MOXI), and fleroxacin (FLER) were purchased from Sigma (St. Louis, MO, USA); norfloxacin (NOR), oxolinic acid (OXO), pefloxacin (PEFL), and flumequine (FLUM) were purchased from Dr. Ehrenstorfen (GmbH, Germany); nalidixic acid (NALI) was purchased from Acros Organics (Geel, Belgium); piromidic acid (PIRO) was purchased from Wako (Japan); gatifloxacin (GATI) was purchased from LKT Laboratories Inc. (Minnesota, USA), and norfloxacin-$d_5$ (NOR-$d_5$) was purchased from RdH Laborchemikalien GmbH (Germany).

**TCs.** Six target tetracyclines (purity, %), including tetracycline (TC, 95%), oxytetracycline (OTC, 95%), chlortetracycline (CTC, 80%), doxycycline (DXC, 98%), minocycline (MINO,

93%), and methacycline (MTC), as well as the internal standard demeclocycline (DMC, 98%), and ten products including 4-epitetracycline (ETC,97%), anhydrotetracycline (ATC, 97%), and 4-epianhydrotetracycline (EATC,97%), 4-epioxytetracycline (EOTC, 97%), α-apo-oxytetracycline (α-apo-OTC), β-apo-oxytetracycline (β-apo-OTC), isochlortetracycline (ICTC, 97%), 4-epichlortetracycline (ECTC,97%), anhydrochlortetracycline (ACTC), and 4-epianhydrochlortetracycline（EACTC） were analyzed in this study. These seven chemicals were obtained from Sigma-Aldrich (St. Louis, MO, USA), and the ten degradation products were purchased from Acros Organics (Geel, Belgium).

**Isolation Procedure of *E. coli.*** Water samples were 10×fold serial diluted and 0.1 mL of each dilution was filtered through nitrocellulose filters (0.45 μm pore-size, 47 mm diameter, 2 Millipore Corporation, America) with the goal of obtaining 30 to 50 colonies per filter. The filters placed onto E. coli chromogenic agar (Chromagar Microbiology, France) and incubated at 44°C for 24 h. After 24 h of incubation, colonies that turned blue on *E. coli* chromogenic agar were chosen and streaked onto LB agar (BD, America), and then incubated at 37°C for 24 6h. Approximately 40 isolates were collected with dilution method using 6-8 disks for each water sample, and their antibiotic susceptibilities were tested. To avoid the clones, all isolates were randomly chosen from independent colonies growing on the disks and the number of 9 selected isolates from each disk was less than 10. The pure cultures were then used to inoculate 1% tryptone water (Oxoid, UK) and EC broth containing 4-methylumbelliferyl-D-glucuronide (Oxoid, UK) and incubated for 24 h at 37 and 44°C, respectively. Isolates that produced indole from tryptophan and that were positive for gas production and fluorescence in EC broth containing 4-methylumbelliferyl-D-glucuronide

were designated as E. coli isolates and used for subsequent studies.

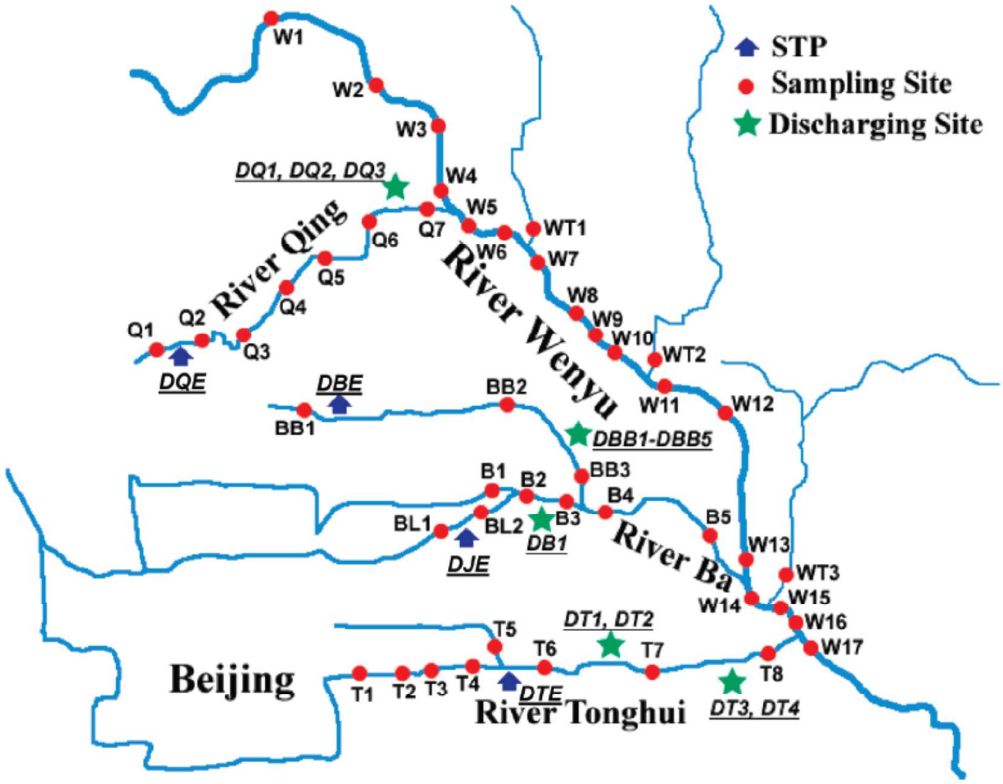


**Figure S1.** The Sampling Locations in Wenyu Basin of Beijing

**Table S1.** The Abbreviations of Discharging Sites and STP Effluents.

| Sampling site | Abbreviations |
|---|---|
| STP effluent (Qinghe) in River Qing | DQE |
| Discharging sites in River Qing | DQ1 |
| | DQ2 |
| | DQ3 |
| STP effluent (Beixiaohe) located River Ba | DBE |
| STP effluent (Jiuxianqiao) in River Ba | DJE |
| Discharging sites in River Ba | DB1 |
| | DBB1 |
| | DBB2 |
| | DBB3 |
| | DBB4 |
| | DBB5 |
| STP effluent (Gaobeidian) in River Tonghui | DTE |
| Discharging sites in River Tonghui | DT1 |
| | DT2 |
| | DT3 |
| | DT4 |

**Table S2.** Liquid Chromatography Conditions for Three Classes Antibiotics.

| **25 sulfonamides and their *N*-acetyl-metabolites** | | | |
|---|---|---|---|
| Time(min） | %A(Methanol） | %B (0.1% formic acid, v/v) | Gradient Curve |
| 0 | 10 | 90 | 1 |
| 4.5 | 48 | 52 | 6 |
| 5 | 70 | 30 | 6 |
| 6 | 100 | 0 | 6 |
| 7 | 100 | 0 | 1 |
| 10 | 10 | 90 | 1 |
| **20 FQs** | | | |
| 0 | 10 | 90 | 1 |
| 0.5 | 20 | 80 | 6 |
| 4 | 35 | 65 | 6 |
| 5 | 45 | 55 | 6 |
| 6.5 | 100 | 0 | 6 |
| 8 | 100 | 0 | 1 |
| 10.5 | 10 | 90 | 1 |
| **17 TCs and their degradation products** | | | |
| 0 | 10 | 90 | 1 |
| 0.5 | 20 | 80 | 6 |
| 3.5 | 30 | 70 | 6 |
| 4.5 | 75 | 35 | 6 |
| 6 | 85 | 15 | 6 |
| 7.5 | 100 | 0 | 1 |
| 10 | 10 | 90 | 1 |

**Table S3**. Multi-selected Reaction Monitoring (MRM) Conditions of the Target Analytes.

| Substance | SRM transition | Cone voltage (V) | Collision energy (eV) | Substance | SRM transition | Cone voltage (V) | Collision energy (eV) |
|---|---|---|---|---|---|---|---|
| SAs | | | | | | | |
| SGD | 173 > 92 | 13 | 16 | SMX | 254 > 92 | 31 | 31 |
| | 173 > 156 | | 10 | | 254 > 156 | | 16 |
| SA | 215 > 92 | 25 | 22 | SIA | 268 > 92 | 25 | 31 |
| | 215 > 156 | | 13 | | 268 > 156 | | 16 |
| SPD | 250 > 92 | 31 | 25 | SMP | 281 > 92 | 31 | 28 |
| | 250 > 156 | | 16 | | 281 > 156 | | 16 |
| SDZ | 251 > 92 | 28 | 25 | SMM | 281 > 92 | 31 | 28 |
| | 251 > 156 | | 16 | | 281 > 156 | | 16 |
| STZ | 256 > 92 | 25 | 25 | SCP | 285 > 92 | 25 | 31 |
| | 256 > 156 | | 16 | | 285 > 156 | | 13 |
| SMR | 265 > 92 | 31 | 28 | NAcSMR | 307 > 134 | 36 | 28 |
| | 265 > 110 | | 25 | | 307 > 172 | | 20 |
| SIM | 279 > 92 | 34 | 31 | NAcSMA | 321 > 134 | 40 | 25 |
| | 279 > 124 | | 19 | | 321 > 186 | | 20 |
| SMO | 268 > 92 | 25 | 28 | NAcSMX | 296 > 134 | 35 | 25 |
| | 268 > 156 | | 16 | | 296 > 198 | | 20 |
| SMT | 271 > 92 | 22 | 28 | NAcSDZ | 293 > 134 | 32 | 25 |
| | 271 > 156 | | 13 | | 293 > 198 | | 20 |
| SMA | 279 > 92 | 37 | 31 | SQX | 301 > 92 | 34 | 28 |
| | 279 > 186 | | 16 | | 301 > 156 | | 16 |
| SME | 281 > 92 | 31 | 28 | SDM | 311 > 92 | 31 | 31 |
| | 281 > 156 | | 16 | | 311 > 156 | | 22 |
| $^{13}C_6$-SMA | 285 > 98 | 28 | 31 | SNT | 336 > 64 | 25 | 43 |
| | 285 > 186 | | 16 | | 336 > | | 13 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| TMP | 291 > 110<br>291 > 123 | 40 | 34<br>22 | NAcSMX-$d_5$ | 156<br>301 > 139<br>301 > 203 | 35 | 25<br>18 |
| NAcSPD | 292 > 134<br>292 > 198 | 40 | 25<br>20 | | | | |
| TCs | | | | | | | |
| MINO | 458>352 | 31 | 30 | ETC | 445>410 | 28 | 19 |
| | 458>441 | | 19 | | 445>427 | | 15 |
| EOTC | 461>426 | 22 | 19 | OTC | 461>426 | 22 | 19 |
| | 461>444 | | 16 | | 461>444 | | 16 |
| α-apo-OTC | 443>408 | 31 | 25 | TC | 445>154 | 28 | 26 |
| | 443>426 | | 16 | | 445>410 | | 20 |
| DMC | 465>430 | 34 | 25 | ICTC | 479>462 | 34 | 15 |
| | 465>448 | | 19 | | 479>197 | | 40 |
| ECTC | 479>444 | 34 | 22 | EATC | 427>154 | 31 | 34 |
| | 479>462 | | 15 | | 427>410 | | 16 |
| ATC | 427>154 | 31 | 34 | MTC | 443>201 | 28 | 31 |
| | 427>410 | | 16 | | 443>426 | | 16 |
| β-apo-OTC | 443>408 | 31 | 25 | DXC | 445>154 | 28 | 34 |
| | 443>426 | | 16 | | 445>428 | | 16 |
| EACTC | 461>154 | 28 | 28 | ACTC | 461>154 | 28 | 28 |
| | 461>444 | | 16 | | 461>444 | | 16 |
| CTC | 479>444 | 34 | 22 | | | | |
| | 479>462 | | 15 | | | | |
| FQs | | | | | | | |
| PIPE | 304>217 | 31 | 22 | LOME | 352>265 | 34 | 22 |
| | 304>286 | | 16 | | 352>308 | | 16 |
| FLER | 370>269 | 37 | 25 | DIF | 400>299 | 45 | 28 |
| | 370>326 | | 19 | | 400>356 | | 20 |
| OFL | 362>261 | 34 | 25 | SARA | 386>299 | 45 | 28 |
| | 362>318 | | 19 | | 386>342 | | 18 |
| PEFL | 334>290 | 37 | 19 | GATI | 376>289 | 37 | 28 |
| | 334>316 | | 19 | | 376>332 | | 19 |
| NOR | 320>276 | 31 | 16 | SPAR | 393>292 | 40 | 24 |
| | 320>302 | | 19 | | 393>349 | | 20 |
| NOR-$d_5$ | 325>281 | 31 | 19 | MOXI | 402>358 | 34 | 19 |
| | 325>307 | | 22 | | 402>384 | | 22 |
| CIP | 332>231 | 37 | 36 | CINO | 263>189 | 30 | 28 |
| | 332>288 | | 18 | | 263>245 | | 15 |
| DANO | 358>283 | 40 | 25 | OXO | 262>216 | 32 | 25 |
| | 358>340 | | 25 | | 262>244 | | 18 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ENRO | 360>316 | 42 | 20 | NALI | 233>187 | 30 | 25 |
| | 360>342 | | 22 | | 233>215 | | 14 |
| ENO | 321>232 | 35 | 30 | FLUM | 262>202 | 28 | 34 |
| | 321>303 | | 35 | | 262>244 | | 22 |
| | | | | PIRO | 289>243 | 32 | 30 |
| | | | | | 289>271 | | 18 |

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**Table S4.** Recoveries (%), Instrument Detection Limits (IDLs, μg/L), Limits of Quantification (LOQs, ng/L) and Matrix Effects for Target Antibiotics in Various Water Matrices.

| compounds | IDLs (μg/L) | Recovery ± RSD (%) | | | LOQs (ng/L) | | | Matrix effects （%） |
|---|---|---|---|---|---|---|---|---|
| | | discharging sites | STP effluents | river water | discharging sites | STP effluents | river | |
| TCs | | | | | | | | |
| MINO | 0.5 | 95±15.7 | 81±5.2 | 91±3.9 | 19.1 | 30.6 | 32.6 | 32.7 |
| ETC | 0.03 | 101±19.6 | 98±6.7 | 87±3.4 | 4.7 | 1.6 | 1.4 | 8 |
| EOTC | 0.05 | 94±6.4 | 103±7.7 | 90±5.3 | 6.8 | 6.5 | 6.0 | 11.7 |
| OTC | 0.05 | 90±8.1 | 93±6.7 | 88±2.7 | 3.0 | 3.3 | 2.3 | 5.3 |
| α-apo-OTC | 0.1 | 120±10.1 | 73±10.1 | 68±9.4 | 11.7 | 4.4 | 6.3 | 20.3 |
| TC | 0.03 | 86±4.5 | 97±10.2 | 89±1.1 | 4.9 | 1.4 | 1.4 | 8.3 |
| DMC | 0.1 | 85±9.7 | 82±8.5 | 95±2.9 | | | | - |
| ICTC | 0.05 | 108±2.4 | 95±7.8 | 113±1.3 | 11.7 | 8.8 | 2.5 | 20.1 |
| ECTC | 0.1 | 80±2.0 | 87±3.9 | 85±7.5 | 16.3 | 7.5 | 6.5 | 27.9 |
| EATC | 0.05 | 83±9.7 | 61±2.4 | 64±11.5 | 7.5 | 3.7 | 4.2 | 12.8 |
| ATC | 0.05 | 75±14.2 | 76±6.8 | 71±12.2 | 7.9 | 4.4 | 2.8 | 13.6 |
| MTC | 0.05 | 79±8.4 | 84±5.0 | 67±6.1 | 7.5 | 4.0 | 4.4 | 12.9 |
| β-apo-OTC | 0.1 | 78±1.0 | 73±12.7 | 68±1.2 | 14.0 | 12.8 | 5.1 | 24.1 |
| DXC | 0.1 | 113±5.6 | 80±1.7 | 91±7.1 | 9.5 | 7.2 | 4.0 | 16.4 |
| EACTC | 0.1 | 57±6.9 | 54±6.2 | 54±2.5 | 16.6 | 8.6 | 8.9 | 28.5 |
| ACTC | 0.05 | 50±16.4 | 55±8.3 | 48±6.0 | 15.1 | 9.1 | 8.2 | 25.9 |
| CTC | 0.1 | 82±10.7 | 77±5.2 | 86±1.5 | 11.7 | 5.8 | 4.6 | 20.2 |
| SAs | | | | | | | | |
| SGD | 1 | 76±14.4 | 86±10.4 | 93±9.1 | 2 | 1.75 | 1.45 | 9 |
| SA | 0.5 | 79±18.5 | 87±20.0 | 95±20.0 | 1.75 | 1.25 | 0.6 | (+)27.4 |
| SPD | 0.08 | 84±8.8 | 91±2.9 | 102±11.9 | 1 | 0.75 | 0.5 | 5 |
| SDZ | 0.2 | 78±10.1 | 89±7.6 | 93±10.0 | 1.5 | 1 | 1 | 12.2 |
| STZ | 0.15 | 82±10.6 | 92±5.2 | 89±16.4 | 2.5 | 1.3 | 1.3 | 15.2 |
| SMR | 0.07 | 80±9.0 | 86±1.7 | 105±10.9 | 1.5 | 1.3 | 1.1 | 6.5 |
| SIM | 0.06 | 81±10.8 | 88±3.7 | 102±12.3 | 0.8 | 0.5 | 0.5 | 13.3 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SMO | 0.07 | 75±11.8 | 85±6.6 | 96±12.1 | 0.8 | 0.5 | 0.5 | 17 |
| SMT | 0.03 | 75±10.0 | 84±9.0 | 75±19.2 | 2.5 | 1.5 | 1.5 | 1.7 |
| SMA | 0.08 | 82±9.8 | 90±4.6 | 113±12.0 | 1.3 | 0.8 | 0.8 | 8.9 |
| SME | 0.01 | 82±8.2 | 88±2.8 | 97±11.4 | 1.5 | 0.8 | 1.3 | 6.8 |
| TMP | 0.05 | 84±9.0 | 92±11.0 | 110±7.3 | 2.3 | 1.5 | 1.3 | 21 |
| SMX | 0.15 | 82±9.1 | 89±4.2 | 86±9.4 | 2.5 | 1.5 | 1.3 | 3.8 |
| SIA | 0.12 | 67±18.6 | 90±9.7 | 71±10.6 | 2.8 | 1.0 | 1.5 | 24.6 |
| SMP | 0.2 | 83±7.1 | 88±10.0 | 120±15.4 | 2.0 | 1.5 | 1.5 | 11 |
| SMM | 0.2 | 84±9.4 | 83±12.3 | 103±11.8 | 2.3 | 1.3 | 1.5 | 5.5 |
| SCP | 0.35 | 80±8.4 | 88±7.9 | 81±16.4 | 3.8 | 2.3 | 2.0 | 9.8 |
| SQX | 0.04 | 80±10.0 | 87±11.2 | 102±6.0 | 3.3 | 2.3 | 1.5 | 8.6 |
| SDM | 0.11 | 83±7.7 | 89±10.5 | 107±3.9 | 3.3 | 3.0 | 1.3 | 11.6 |
| SNT | 0.19 | 82±10.7 | 73±5.8 | 62±0.3 | 17.5 | 6.8 | 7.5 | 2.8 |
| NAcSPD | 0.11 | 81±4.2 | 116±7.2 | 110±3.2 | 5.0 | 2.5 | 2.5 | 5.7 |
| NAcSDZ | 0.12 | 75±1.2 | 91±12.4 | 92±9.8 | 6.3 | 4.0 | 2.5 | (+)9.6 |
| NAcSMA | 0.06 | 85±2.9 | 117±8.6 | 115±2.8 | 2.5 | 1.8 | 1.3 | 14.1 |
| NAcSMX | 0.5 | 91±5.0 | 98±7.9 | 120±8.9 | 5.0 | 4.3 | 3.3 | 12.3 |
| NAcSMR | 0.5 | 77±3.3 | 91±6.0 | 110±0.1 | 7.5 | 7.5 | 3.5 | 11.7 |
| $^{13}C_6$-SMA | 0.05 | 82±4.9 | 89±0.4 | 110±10.8 | - | - | - | 3.6 |
| NAcSMX-$d_5$ | 0.5 | 89±11.1 | 92±6.9 | 109±8.4 | - | - | - | 15.8 |
| FQs | | | | | | | | |
| PIPE | 0.15 | 57±2 | 53±11 | 63±8 | 4.4 | 11.0 | 2.3 | (+)4.0 |
| FLER | 0.06 | 80±7 | 81±3 | 94±5 | 0.6 | 1.5 | 0.5 | 4.3 |
| OFL | 0.1 | 61±21 | 61±6 | 71±7 | 6.0 | 15.0 | 7.5 | (+)15.7 |
| PEFL | 0.1 | 94±4 | 80±11 | 112±6 | 3.5 | 8.8 | 2.3 | (+)19.6 |
| ENO | 0.2 | 58±2 | 59±9 | 61±17 | 1.2 | 3.0 | 1.5 | (+)17.0 |
| NOR | 0.15 | 76±2 | 64±13 | 88±9 | 10.4 | 26.0 | 6.5 | (+)1.4 |
| NOR-$d_5$ | 1.2 | 72±1 | 91±13 | 86±10 | - | | | (+)14.4 |
| CIPRO | 0.25 | 59±3 | 75±18 | 63±9 | 1.3 | 3.3 | 1.0 | (+)18.4 |
| DANO | 0.1 | 84±4 | 107±10 | 98±11 | 1.7 | 4.3 | 1.5 | (+)26.3 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ENRO | 0.05 | 92±2 | 83±6 | 111±4 | 1.1 | 2.8 | 1.0 | (+)23.9 |
| LOME | 0.3 | 63±5 | 62±11 | 72±14 | 0.4 | 1.0 | 0.5 | 15.5 |
| DIF | 0.15 | 68±3 | 81±5 | 80±9 | 2.7 | 6.8 | 3.3 | 3.1 |
| SARA | 0.1 | 58±3 | 66±17 | 62±17 | 9.0 | 22.5 | 5.5 | 13.4 |
| GATI | 0.15 | 56±4 | 46±2 | 59±20 | 1.5 | 3.8 | 0.8 | 5.2 |
| SPAR | 0.03 | 67±2 | 60±18 | 77±18 | 2.6 | 6.5 | 1.5 | 25.1 |
| MOXI | 0.1 | 91±4 | 99±14 | 106±3 | 9.6 | 24.0 | 4.8 | (+)19.5 |
| CINO | 0.15 | 62±5 | 67±19 | 66±11 | 3.8 | 9.5 | 3.3 | (+)1.3 |
| OXO | 0.55 | 61±3 | 54±13 | 64±16 | 1.8 | 4.5 | 1.3 | 22.9 |
| NALI | 0.05 | 66±3 | 71±18 | 68±2 | 3.3 | 8.3 | 2.0 | 21.8 |
| FLUM | 0.05 | 66±4 | 68±12 | 78±4 | 1.5 | 3.8 | 2.0 | 6.1 |
| PIRO | 0.05 | 57±3 | 55±14 | 58±14 | 3.9 | 9.8 | 3.3 | 20.8 |

**Table S5.** Number of *E. coli* Resistant to FQs, TCs, and SAs in Sampling Sites, and the Level of All Target Chemicals.

| | Sampling sites | Q1 | DQE | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | DQ2 | DQ3 | W1 | W2 | W3 | W4 | W5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FQs | FLER | | 9.5 | | | | | | | | | | | | | |
| | OFL | 71.9 | 854.0 | 54.9 | 116.7 | 81.3 | 39.5 | 30.0 | 251.3 | 18.5 | 2.1 | 73.4 | 39.7 | 25.1 | 42.4 | 208.2 |
| | DANO | | | | | | | | | | | | | | | |
| | PEFL | | 5.9 | | | | | | | | | | | | | |
| | CIP | | 15.0 | 12.7 | | | 6.7 | 4.5 | | | | | | | | |
| | NOR | 28.8 | 140.3 | 160.0 | 199.4 | 81.8 | 95.9 | 41.5 | 33.2 | | 11.1 | | | | | 60.7 |
| | PIPE | 15.3 | 10.2 | 1.3 | 19.5 | 12.7 | 9.1 | 4.9 | 10.2 | | | | | | | 4.3 |
| | DIF | | | | | | | | | | | | | | | |
| | LOME | 2.4 | 27.2 | | | | | 1.2 | 1.8 | | | | | | 1.5 | |
| | GATI | 8.8 | 56.5 | 8.8 | 14.7 | 11.3 | 8.1 | 5.2 | 27.5 | 2.6 | | 3.1 | 3.2 | 1.6 | 4.6 | 16.5 |
| | MOXI | | | | | | | | | | | | | | | |
| | OXO | 9.4 | 4.5 | 7.3 | 12.0 | 11.9 | 11.1 | 4.9 | 6.9 | 3.7 | | 5.3 | | | | 7.3 |
| | PIRO | 129.1 | | 11.0 | 16.4 | | 12.3 | | | | | | | | 12.0 | 8.9 |
| | FLUM | 48.4 | 131.8 | 74.3 | 104.4 | 96.3 | 54.6 | 41.4 | 109.6 | 52.9 | | 54.6 | 25.4 | 29.8 | 45.1 | 88.1 |
| | NALI | 78.1 | 5.2 | 6.1 | | | | | | | | | | | | |
| TCs | MINO | 0.0 | 0.0 | 1.4 | 0.0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | ETC | 4.8 | 7.7 | 4.8 | 3.7 | 4.5 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| | OTC | 30.9 | 41.1 | 37.2 | 34.9 | 30.2 | 32.1 | 31.4 | 11.5 | 9.8 | 0.0 | 39.1 | 0.0 | 0.0 | 0.0 | 8.5 |
| | TC | 7.1 | 12.6 | 7.9 | 5.9 | 7.2 | 3.4 | 5.2 | 3.0 | 2.2 | 0.0 | 2.1 | 0.0 | 0.0 | 1.4 | 1.4 |
| | ICTC | 29.1 | 3.7 | 6.2 | 6.1 | 4.4 | 13.0 | 12.3 | 5.5 | 14.1 | 0.0 | 3.4 | 1.9 | 0.0 | 0.0 | 2.3 |
| | DXC | | | | | | | | | | | | | | | |
| | ATC | | | | | | | | | | | | | | | |
| | EACTC | 0.0 | | | | | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SAs | SGD | | | 0.7 | | | | | 0.9 | 1.6 | | 1.2 | 0.9 | 1.0 | 1.0 | 1.3 |
| | SA | | | | | | | | 0.5 | 1.3 | | 0.9 | 1.6 | 0.7 | 1.1 | 1.0 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SPD | 28.6 | 91.1 | 51.9 | 35.1 | 29.3 | 31.1 | 40.4 | 49.4 | 13.2 | 0.2 | 6.8 | 3.7 | 1.3 | 4.8 | 21.5 |
| | SDZ | 176.5 | 245.4 | 216.9 | 106.3 | 121.6 | 192.6 | 221.1 | 216.3 | 142.9 | 0.8 | 46.9 | 136.4 | 107.7 | 131.5 | 151.5 |
| | STZ | | | | 0.8 | | 0.3 | | 0.5 | 2.0 | | 0.2 | 0.7 | | 0.5 | 0.5 |
| | SMA | 0.9 | 2.0 | 1.4 | 4.6 | 1.4 | 1.4 | 2.2 | 4.2 | 8.8 | 0.9 | 37.2 | 37.0 | 29.6 | 39.4 | 19.1 |
| | SME | | 0.0 | | 1.2 | 0.5 | 0.6 | 1.0 | 0.5 | 1.7 | | 4.4 | 9.5 | 5.4 | 6.0 | 2.9 |
| | TMP | 77.1 | 138.7 | 67.3 | 81.3 | 77.0 | 50.7 | 71.5 | 58.6 | 44.2 | 27.7 | 16.1 | 34.1 | 22.8 | 23.8 | 54.8 |
| | SMX | 138.2 | 443.5 | 272.0 | 221.0 | 246.9 | 234.1 | 293.0 | 284.2 | 136.0 | | 71.3 | 97.5 | 83.6 | 95.3 | 164.6 |
| | SMM | 1.4 | 0.7 | 1.1 | 1.4 | 0.8 | 1.2 | 0.8 | 1.3 | 3.7 | | 5.5 | 11.6 | 9.3 | 10.8 | 6.4 |
| | SCP | | 0.0 | | 0.5 | 1.5 | 1.1 | 1.8 | 3.9 | 1.9 | | 1.4 | 3.1 | 2.8 | 2.3 | 7.4 |
| | SQX | | 1.1 | | 0.7 | 1.4 | 0.6 | | | | | 0.8 | 1.0 | 2.1 | 1.0 | 1.0 |
| | NAcSPD | 37.9 | 119.0 | 107.3 | 70.4 | 76.8 | 65.2 | 116.6 | 87.9 | 13.2 | | 8.7 | 7.8 | 4.5 | 7.5 | 48.9 |
| | NAcSDZ | 175.1 | 218.2 | 213.6 | 106.4 | 152.2 | 220.9 | 317.7 | 207.9 | 77.3 | 0.8 | 33.2 | 61.5 | 51.1 | 63.5 | 146.8 |
| | NAcSMA | 3.4 | 4.1 | 3.8 | 4.0 | 2.9 | 3.8 | 8.0 | 3.7 | 2.7 | | 21.7 | 35.6 | 25.1 | 31.3 | 20.3 |
| | NAcSMX | 434.5 | 313.5 | 459.3 | 352.4 | 461.4 | 595.0 | 753.2 | 520.7 | 241.3 | 1.1 | 218.6 | 229.5 | 205.8 | 201.6 | 319.3 |
| | Numbers of *E. coli* resistant to three antibiotics (E.coli/ml) | 57000 | 1700 | 41000 | 15000 | 13000 | 17000 | 2000 | 1000 | 300 | 6 | 2800 | 17 | 10 | 4 | 13 |
| | Numbers of *E. coli* resistant to SXT(SAs, E. coli/ml) | 13100 | 290 | 6400 | 4500 | 1700 | 2800 | 300 | 180 | 170 | 1 | 860 | 4 | 1 | 2 | 2 |
| | Numbers of *E. coli* resistant to TC(TCs, E.coli/ml) | 6400 | 440 | 3600 | 600 | 600 | 200 | 400 | 130 | 200 | 2 | 290 | 1 | 0 | 0 | 3 |
| | Numbers of *E. coli* resistant to LEV(FQs, E.coli/ml) | 4100 | 100 | 2000 | 1600 | 800 | 1200 | 100 | 60 | 50 | 1 | 130 | 2 | 0 | 0 | 5 |
| | sampling sites | **W6** | **WT1** | **W7** | **W8** | **W10** | **WT2** | **W11** | **W12** | **W13** | **B5** | **W14** | **WT3** | **W16** | **T8** | **W17** |
| FQs | FLER | | | | | | | 1.1 | | | | 0.6 | | 1.0 | | 3.3 |
| | OFL | 225.9 | 27.0 | 28.7 | 62.2 | 45.2 | 110.0 | 53.5 | 116.7 | 116.3 | 345.6 | 296.7 | 77.6 | 185.7 | 202.4 | 1092.4 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DANO | | | | | | | | | | | | | | 3.4 | |
| | PEFL | | | | | | | | | | | | | | | 6.4 |
| | CIP | | | 6.9 | | | | 5.5 | | | | | | | 18.1 | 7.0 |
| | NOR | | | 41.0 | 34.5 | | | 51.4 | | | 79.7 | 46.6 | | 23.4 | 144.9 | 1.8 |
| | PIPE | | 4.0 | | | | 10.0 | | | | | | | 3.1 | 19.4 | 7.0 |
| | DIF | | | | | | | | | | | | | | 2.6 | |
| | LOME | | | | 2.9 | | 4.5 | 6.9 | 3.6 | | | | | 2.9 | 4.9 | 7.0 |
| | GATI | 19.7 | 2.0 | 4.8 | 9.1 | 5.1 | 3.6 | 6.4 | 19.5 | 19.7 | 66.4 | 31.5 | 13.1 | 16.8 | 34.6 | 90.5 |
| | MOXI | | | | | | | | | | | | | | | 7.4 |
| | OXO | 8.5 | 12.2 | 5.9 | 8.6 | 3.7 | | 1.7 | 5.6 | 4.0 | 20.8 | 2.1 | | 3.7 | 14.0 | 3.1 |
| | PIRO | | | | | 4.1 | | 4.1 | | | | | 5.7 | 2.1 | 72.7 | |
| | FLUM | 113.9 | 28.4 | 95.2 | 67.1 | 40.5 | 50.3 | 51.4 | 127.9 | 106.0 | 113.7 | 87.3 | 41.9 | 48.7 | 114.1 | 56.0 |
| | NALI | | | | | | | | | | | | | | 69.7 | |
| | MINO | | | | | | | | | | | | | | | 2.0 |
| | ETC | 1.4 | | 1.7 | | | | | 0.8 | 0.0 | 2.2 | | | 1.3 | 26.3 | 7.6 |
| | OTC | 11.9 | 20.1 | 12.7 | 13.3 | 7.4 | | 4.9 | 5.6 | 9.0 | 12.3 | 8.6 | 20.2 | 8.8 | 110.2 | 46.8 |
| TCs | TC | 2.4 | 1.9 | 2.4 | 1.7 | 1.6 | | 2.7 | 1.7 | 1.7 | 3.6 | 2.6 | 1.3 | 2.9 | 44.6 | 11.4 |
| | ICTC | 3.8 | 3.8 | 3.5 | 4.9 | 2.7 | | 3.5 | 2.7 | 3.7 | 5.4 | 1.8 | 1.8 | 1.8 | 8.0 | 1.6 |
| | DXC | | | | | | | | | | | | | | 13.4 | |
| | ATC | | | | | | | | | | | | | | 0.0 | |
| | EACTC | | | | | | | | | | | | | | 2.9 | |
| | SGD | 1.1 | 0.7 | 1.2 | 1.1 | 0.9 | 1.3 | 1.4 | 2.8 | 1.3 | 1.4 | 1.2 | 2.0 | 2.2 | 1.4 | 4.4 |
| | SA | 0.5 | 0.7 | 0.8 | 0.8 | | 1.7 | 0.7 | 1.7 | 1.1 | 0.8 | 0.5 | 2.5 | 2.0 | 1.0 | 4.4 |
| | SPD | 25.4 | 18.9 | 23.6 | 14.1 | 18.1 | 2.6 | 22.3 | 51.7 | 20.8 | 17.3 | 19.7 | 4.9 | 32.0 | 129.3 | 48.1 |
| | SDZ | 174.5 | 177.9 | 146.1 | 121.4 | 141.8 | 54.4 | 175.9 | 342.0 | 188.0 | 123.1 | 97.5 | 215.6 | 185.1 | 739.2 | 460.1 |
| SAs | STZ | 0.4 | | 0.4 | 2.6 | | | 0.4 | 0.9 | 0.4 | 0.3 | 0.3 | | 0.4 | 0.8 | 0.5 |
| | SMA | 18.6 | 3.2 | 12.1 | 25.6 | 13.4 | 43.5 | 14.9 | 18.4 | 10.5 | 2.4 | 9.8 | 16.2 | 9.7 | 17.4 | 22.4 |
| | SME | 3.0 | 1.9 | 1.7 | 2.0 | 2.2 | | 2.9 | 2.9 | 1.8 | 0.4 | 1.4 | 2.8 | 1.7 | | 0.7 |
| | TMP | 63.9 | 46.7 | 47.2 | 39.0 | 49.8 | 12.8 | 39.4 | 119.7 | 61.4 | 30.4 | 48.3 | 14.5 | 48.2 | 79.2 | 82.6 |
| | SMX | 220.0 | 130.1 | 166.1 | 113.4 | 153.8 | 33.2 | 183.1 | 359.8 | 201.1 | 106.3 | 200.6 | 144.8 | 188.0 | 528.1 | 370.5 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SMM | 5.4 | 3.3 | 0.3 | 4.9 | 4.1 | 0.9 | 5.3 | 5.1 | 3.8 | 1.3 | 2.7 | 17.8 | 4.0 | 1.6 | 1.4 |
| | SCP | 10.4 | 0.3 | 3.7 | 2.4 | 2.0 | 0.9 | 4.7 | 9.5 | 5.9 | | 4.8 | 0.3 | 3.5 | 1.8 | 1.3 |
| | SQX | 1.6 | 0.7 | 0.6 | 1.1 | 0.7 | | 1.0 | 1.1 | | | | 0.5 | 0.7 | 1.0 | 1.0 |
| | NAcSPD | 48.7 | 22.5 | 66.7 | 21.7 | 44.6 | 6.0 | 38.8 | 54.0 | 39.1 | 37.1 | 45.9 | 6.9 | 29.3 | 192.6 | 89.9 |
| | NAcSDZ | 131.5 | 114.0 | 191.4 | 64.4 | 153.9 | 83.5 | 110.0 | 180.1 | 162.1 | 101.3 | 154.2 | 135.6 | 130.0 | 638.9 | 407.0 |
| | NAcSMA | 12.4 | 1.3 | 13.9 | 7.3 | 16.9 | 2.7 | 12.4 | 8.7 | 5.6 | 1.3 | 8.3 | 6.5 | 4.6 | 5.9 | 5.5 |
| | NAcSMX | 322.5 | 285.3 | 446.7 | 165.6 | 391.6 | 239.4 | 245.7 | 358.0 | 340.5 | 207.5 | 438.9 | 282.2 | 262.3 | 826.0 | 670.0 |
| | Numbers of *E. coli* resistant to three antibiotics（E.coli/ml） | 2100 | 20000 | 1300 | 8 | 50 | 31 | 68 | 22 | 8 | 1050 | 40 | 11 | 315 | 55000 | 17000 |
| | Numbers of *E. coli* resistant to SXT（SAs, E.coli/ml） | 340 | 2600 | 430 | 1 | 9 | 3 | 16 | 1 | 0 | 340 | 6 | 1 | 83 | 11400 | 4000 |
| | Numbers of *E. coli* resistant to TC（TCs, E.coli/ml） | 110 | 700 | 150 | 0 | 7 | 5 | 11 | 0 | 2 | 90 | 5 | 2 | 37 | 3800 | 650 |
| | Numbers of *E. coli* resistant to LEV（FQs, E.coli/ml） | 50 | 600 | 110 | 0 | 3 | 0 | 6 | 1 | 0 | 44 | 3 | 0 | 22 | 5950 | 900 |
| | sampling sites | **T1** | **T3** | **T5** | **T4** | **DTE** | **T6** | **T7** | **BB1** | **DBE** | **BB2** | **BB3** | **DBB4** | **BL1** | **DJE** | |
| FQs | FLER | | 2.2 | | | 5.0 | | 1.3 | | 52.2 | | | | | 2.4 | |
| | OFL | 375.9 | 543.9 | 598.3 | 436.3 | 1308.6 | 1213.6 | 163.3 | 38.8 | 1110.1 | 33.5 | 88.1 | 11.3 | 34.1 | 159.3 | |
| | DANO | | | | | | | | | | 1.0 | | | | | |
| | PEFL | | | | | 9.1 | | | | 21.7 | | | | | | |
| | CIP | | | | | 14.2 | 3.7 | 10.0 | | 13.1 | 23.4 | 6.0 | | 9.9 | 66.3 | |
| | NOR | | 22.2 | 30.8 | | 102.2 | 32.2 | 132.0 | 141.4 | 49.3 | 146.4 | 23.6 | | 115.2 | 512.5 | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PIPE | | 4.9 | | | 8.9 | 1.8 | 18.4 | 15.8 | | | 2.9 | | 13.6 | 19.5 |
| | DIF | | | | | | | | | | 2.7 | | | | |
| | LOME | | 4.6 | | | 7.3 | 6.2 | 12.8 | 3.4 | 37.7 | 0.9 | 2.5 | | 3.9 | 15.2 |
| | GATI | 44.2 | 46.9 | 38.6 | 39.8 | 72.5 | 91.9 | 26.3 | 6.9 | 28.2 | 14.3 | 19.5 | | 5.2 | 28.4 |
| | MOXI | | | | | | 10.6 | | | | | | | | |
| | OXO | 5.3 | | 1.5 | | | 1.6 | 7.1 | 8.7 | 2.6 | 12.7 | 5.0 | | 7.1 | 6.6 |
| | PIRO | 16.8 | | | | | 4.8 | 22.7 | | 7.1 | 12.6 | | | 17.1 | 57.4 |
| | FLUM | 24.2 | 56.2 | 69.8 | 79.8 | 93.8 | 64.0 | 90.4 | 39.4 | 139.2 | 50.0 | 30.5 | 28.0 | 33.2 | 154.6 |
| | NALI | | | | | | | | | | | | | | 112.7 |
| | MINO | | | | | | | | | 2.7 | | | | | 5.8 |
| | ETC | 3.2 | 3.1 | 4.0 | 3.6 | 10.5 | 5.5 | 5.9 | 46.5 | 16.1 | 5.6 | 4.1 | 3.5 | 4.5 | 21.0 |
| | OTC | 14.3 | 5.1 | 7.9 | 7.8 | 74.0 | 37.7 | 53.5 | 101.6 | 92.3 | 52.2 | 27.6 | 4.3 | 36.8 | 214.3 |
| TCs | TC | 4.2 | 5.8 | 5.8 | 4.9 | 15.8 | 9.8 | 9.7 | 90.7 | 31.0 | 12.3 | 5.6 | 6.7 | 5.9 | 32.5 |
| | ICTC | 3.0 | 2.1 | 1.3 | 1.7 | 2.6 | 3.5 | 3.4 | 6.4 | 4.0 | 7.3 | 4.9 | 35.7 | 5.0 | 22.0 |
| | DXC | | | 8.4 | | | | | | 8.1 | | | | | 1.5 |
| | ATC | | | | | | | | | | | | | | |
| | EACTC | | | | | | | | | | | | 50.1 | | |
| | SGD | | 1.6 | 1.5 | 0.9 | 2.0 | 2.5 | 2.9 | 0.7 | | 1.2 | 0.7 | 1.1 | 0.6 | 2.6 |
| | SA | | 0.6 | 0.7 | | 0.6 | 0.8 | 2.7 | | | | | 1.7 | 0.5 | 1.0 |
| | SPD | 5.9 | 31.2 | 25.8 | 24.1 | 52.7 | 51.2 | 95.1 | 8.9 | 46.6 | 54.7 | 15.9 | | 2.0 | 60.9 |
| | SDZ | 67.9 | 201.1 | 194.6 | 197.3 | 304.5 | 292.7 | 180.7 | 115.0 | 187.7 | 238.6 | 108.2 | 6.3 | 76.6 | 321.0 |
| | STZ | | 0.5 | 0.5 | 0.5 | 0.3 | 0.3 | 1.6 | | | | | | 0.2 | |
| | SMA | | 4.0 | 3.7 | 3.7 | 9.1 | 9.8 | 267.3 | 0.8 | 0.8 | 1.1 | 1.7 | | 1.6 | 1.5 |
| SAs | SME | | 0.7 | | | | 0.6 | | | 0.0 | 1.6 | 1.1 | | 0.7 | 0.3 |
| | TMP | 38.1 | 23.8 | 28.3 | 17.5 | 6.1 | 19.8 | 57.1 | 67.6 | 165.5 | 59.7 | 25.4 | 1.3 | 37.1 | 39.1 |
| | SMX | 58.4 | 228.1 | 214.6 | 180.6 | 355.0 | 341.4 | 395.4 | 115.5 | 282.5 | 164.6 | 74.5 | 5.0 | 78.1 | 202.4 |
| | SMM | | 0.9 | 1.1 | 0.9 | 1.1 | 1.1 | 1.1 | 0.5 | 0.0 | 0.8 | 0.8 | | | 1.2 |
| | SCP | | 0.9 | 0.7 | 0.7 | 1.1 | 1.3 | 2.3 | | 0.5 | | | | | |
| | SQX | | | | | | 0.6 | 0.8 | | 0.0 | | | | | |
| | NAcSPD | 11.7 | 47.0 | 37.7 | 41.1 | 107.2 | 84.1 | 107.5 | 24.5 | 93.7 | 139.5 | 40.2 | | 5.9 | 87.0 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NAcSDZ | 70.3 | 93.6 | 92.2 | 113.3 | 110.8 | 198.5 | 205.4 | 96.1 | 109.4 | 268.5 | 105.1 | 1.7 | 78.7 | 225.4 |
| | NAcSMA | 0.9 | 1.4 | 1.4 | 1.4 | 2.3 | 2.9 | 4.2 | 0.6 | 1.8 | 1.5 | 1.5 | | 3.4 | 1.8 |
| | NAcSMX | 214.6 | 285.7 | 256.9 | 286.9 | 213.9 | 87.4 | 623.4 | 640.6 | 162.7 | 571.2 | 239.2 | 7.7 | 562.0 | 329.2 |
| | Numbers of *E. coli* resistant to three antibiotics（E.coli/ml） | 1650 | 560 | 700 | 560 | 410 | 750 | 27000 | 1300 | 300 | 900 | 540 | 28 | 180 | 360000 |
| | Numbers of *E. coli* resistant to SXT（SAs, E.coli/ml） | 435 | 150 | 205 | 86 | 101 | 235 | 5150 | 1040 | 108 | 340 | 143 | | 52 | 34000 |
| | Numbers of *E. coli* resistant to TC（TCs, E.coli/ml） | 65 | 130 | 45 | 76 | 102 | 35 | 1000 | 260 | 39 | 300 | 54 | 17 | 10 | 11000 |
| | Numbers of *E. coli* resistant to LEV（FQs, E.coli/ml） | 165 | 54 | 60 | 25 | 31 | 70 | 1500 | 170 | 19 | 80 | 33 | 1 | 8 | 12300 |
| | sampling sites | **BL2** | **B1** | **B2** | **B3** | **B4** | **DQ1** | **DBB1** | **DBB2** | **DBB3** | **DBB5** | **DT1** | **DT2** | **DT3** | **DT4** |
| FQs | FLER | 7.3 | | | | | | | | | | | 16.05 | 60.01 | 11.08 |
| | OFL | 685.9 | 195.5 | 972.4 | 89.5 | 105.0 | 61.17 | 368.09 | 0.78 | 35.30 | | 966.34 | 758.90 | 1717.34 | 176.23 |
| | DANO | | | | | | | | | | | | | | |
| | PEFL | | | | | | | | | | | 7.08 | | | |
| | CIP | 24.1 | | 9.6 | 14.3 | | | 24.98 | | 13.29 | | 6.35 | 404.72 | 304.55 | 46.52 |
| | NOR | 142.3 | | 74.2 | 41.4 | 19.5 | 68.02 | 1182.42 | 4.73 | 386.39 | | 58.86 | 1710.70 | 1773.23 | 412.48 |
| | PIPE | 15.3 | 5.7 | | | 7.3 | 6.18 | | | 3.37 | | 9.50 | | 16.42 | 24.15 |
| | DIF | 2.1 | | | | | | | | | | | | | |
| | LOME | 15.7 | | 8.7 | | 1.6 | 1.65 | | | 2.13 | | 1.79 | 60.51 | 1735.39 | 195.19 |
| | GATI | 76.9 | 36.6 | 116.4 | 12.1 | 21.7 | 8.53 | | | 2.42 | | 101.03 | 24.84 | 259.35 | 17.25 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MOXI | 14.9 | | | | | | | | | | 8.18 | | | |
| | OXO | 3.3 | 7.7 | 6.7 | 6.9 | 9.1 | 8.65 | 5.58 | | 1.69 | | 0.36 | 9.86 | 36.04 | 27.62 |
| | PIRO | 20.2 | | 6.4 | 13.6 | 8.1 | | 79.72 | | 11.34 | | 8.08 | 127.85 | 395.58 | 203.89 |
| | FLUM | 65.4 | 27.1 | 62.1 | 109.7 | 93.5 | 88.72 | 114.52 | 2.98 | 39.25 | 11.51 | 62.64 | 106.34 | 66.69 | 78.11 |
| | NALI | 37.5 | 7.3 | | | | | 499.50 | | 36.39 | | | 153.45 | 224.83 | 206.59 |
| TCs | MINO | 3.4 | | | | | | | | | 0.86 | | | | |
| | ETC | 8.7 | 0.0 | 5.2 | 3.0 | 2.6 | 3.38 | 9.41 | 11.00 | 1.01 | 0.79 | 4.52 | 3.71 | 53.94 | 44.39 |
| | OTC | 60.8 | 13.6 | 41.7 | 30.0 | 19.7 | 26.15 | 704.93 | 47.19 | 26.06 | 9.38 | 30.67 | 33.28 | 153.47 | 42.49 |
| | TC | 13.7 | 1.8 | 8.0 | 5.0 | 5.6 | 5.31 | 15.76 | 16.06 | 1.60 | 0.95 | 7.55 | 6.11 | 89.36 | 67.24 |
| | ICTC | 7.2 | 5.7 | 5.7 | 6.0 | 4.6 | 2.90 | 10.51 | 0.92 | 3.58 | 1.49 | 3.06 | 43.21 | 70.74 | 9.41 |
| | DXC | | | | | | | 4.02 | | | | 6.88 | | | 5.37 |
| | ATC | | 0.4 | | | | | | | | | 4.13 | 5.35 | | |
| | EACTC | | | | | | | | | | | | | | |
| SAs | SGD | 2.8 | 1.0 | 1.5 | 0.8 | 1.2 | 1.1 | 0.9 | | 1.5 | | 3.4 | 3.0 | 2.6 | 9.6 |
| | SA | 2.0 | 0.8 | 1.1 | 0.6 | 0.6 | | 0.5 | | 1.0 | | 1.6 | 3.6 | 0.6 | 2.1 |
| | SPD | 47.8 | 6.2 | 23.0 | 19.9 | 18.1 | 32.7 | | 1.5 | 3.6 | 1.1 | 46.7 | 4.5 | 1970.7 | 47.6 |
| | SDZ | 260.8 | 129.1 | 193.4 | 189.3 | 163.9 | 173.6 | 311.6 | 40.7 | 1500.2 | 41.4 | 330.0 | 965.9 | 2544.3 | 2931.2 |
| | STZ | | | 0.3 | 0.3 | | | | | 1.3 | | 1.3 | 0.6 | | 2.3 |
| | SMA | 1.4 | 1.5 | 2.3 | 1.6 | 2.2 | 2.4 | 0.6 | | 1.4 | 1.0 | 143.3 | 213.7 | 2.0 | 484.1 |
| | SME | | 0.3 | 0.4 | 0.7 | 0.7 | 0.5 | | | | | | | 0.7 | |
| | TMP | 61.6 | 58.3 | 40.0 | 37.8 | 27.7 | 54.4 | 49.1 | 22.5 | 74.7 | 9.4 | 20.9 | 48.3 | 53.5 | 461.4 |
| | SMX | 162.9 | 90.4 | 118.9 | 229.1 | 128.6 | 208.0 | 183.4 | 27.2 | 174.1 | 25.8 | 346.1 | 827.8 | 486.5 | 1294.3 |
| | SMM | 1.1 | 1.9 | 2.6 | 1.5 | 0.9 | 1.0 | 0.4 | | 0.3 | | 1.0 | 0.6 | 0.9 | |
| | SCP | | | | | | 9.8 | | | | | 1.7 | 1.6 | | |
| | SQX | | | | 0.6 | | | | | | | 0.8 | | | |
| | NAcSPD | 62.9 | 7.5 | 39.4 | 18.6 | 32.8 | 50.5 | 3.7 | 1.4 | 0.8 | 2.2 | 73.5 | 6.5 | 1011.7 | 92.6 |
| | NAcSDZ | 124.2 | 80.2 | 134.8 | 76.0 | 103.5 | 171.8 | 398.5 | 36.2 | 165.5 | 13.5 | 178.3 | 2442.3 | 1228.5 | 378.8 |
| | NAcSMA | 0.8 | 0.6 | 1.2 | 0.9 | 4.6 | 2.7 | 0.6 | | 2.6 | | 3.0 | 8.3 | 3.5 | 2.0 |
| | NAcSMX | 289.3 | 310.0 | 345.8 | 231.5 | 198.2 | 384.6 | 824.2 | 67.5 | 373.6 | 69.6 | 335.2 | 7800.1 | 2053.1 | 606.7 |
| | Numbers of *E.* | 298000 | 4800 | 300000 | 7100 | 1400 | | | | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | *coli* resistant to three antibiotics（E.coli/ml） | | | | | |
| | Numbers of *E. coli* resistant to SXT（SAs, E.coli/ml） | 11500 | 980 | 8600 | 2200 | 470 |
| | Numbers of *E. coli* resistant to TC（TCs, E.coli/ml） | 3100 | 260 | 2000 | 1000 | 170 |
| | Numbers of *E. coli* resistant to LEV（FQs, E.coli/ml） | 3800 | 220 | 1800 | 320 | 50 |
| | sampling sites | **T2** | **W9** | **W15** | **DB1** | |
| FQs | FLER | 0.8 | | | | |
| | OFL | 421.5 | 100.9 | 226.4 | 61.14 | |
| | DANO | | | | | |
| | PEFL | | | | | |
| | CIP | 10.2 | | 2.7 | 11.14 | |
| | NOR | 24.3 | | | 182.91 | |
| | PIPE | 3.5 | | 2.1 | 25.20 | |
| | DIF | | | | | |
| | LOME | 3.4 | | | 1.29 | |
| | GATI | 39.3 | 14.5 | 16.7 | 3.33 | |
| | MOXI | | | | | |
| | OXO | 1.2 | 12.3 | 2.9 | 3.26 | |
| | PIRO | | | 3.7 | 30.41 | |
| | FLUM | 42.3 | 137.0 | 54.4 | 11.75 | |

| | | | | | |
|---|---|---|---|---|---|
| | NALI | 11.3 | | | 22.99 |
| TCs | MINO | 1.2 | 0.0 | 0.0 | |
| | ETC | 4.0 | 0.0 | 1.9 | |
| | OTC | 14.5 | 12.2 | 12.5 | |
| | TC | 5.6 | 2.7 | 2.2 | |
| | ICTC | | 3.3 | 1.1 | |
| | DXC | | | | |
| | ATC | | | | |
| | EACTC | | | | |
| SAs | SGD | 0.8 | 1.2 | 1.3 | 1.2 |
| | SA | 0.4 | 1.3 | 0.8 | 0.6 |
| | SPD | 21.2 | 17.6 | 19.5 | 37.3 |
| | SDZ | 159.4 | 148.1 | 239.5 | 172.7 |
| | STZ | | 0.2 | | 0.6 |
| | SMA | 3.7 | 14.3 | 12.2 | 2.1 |
| | SME | | 1.8 | 2.5 | 3.0 |
| | TMP | 17.1 | 44.5 | 56.7 | 78.0 |
| | SMX | 168.6 | 105.9 | 233.0 | 239.8 |
| | SMM | 0.7 | 3.9 | 9.0 | 1.7 |
| | SCP | 0.7 | 2.4 | 2.7 | |
| | SQX | | 0.6 | | |
| | NAcSPD | 43.7 | 80.9 | 20.6 | 64.1 |
| | NAcSDZ | 127.8 | 227.1 | 100.0 | 84.6 |
| | NAcSMA | 1.8 | 23.3 | 4.8 | 3.5 |
| | NAcSMX | 345.8 | 447.1 | 296.6 | 682.0 |
| | Numbers of *E. coli* resistant to three antibiotics （E.coli/ml） | | | | |
| | Numbers of *E.* | | | | |

| | | |
|---|---|---|
| | *coli* resistant to SA（SAs, E.coli/ml） | |
| | Numbers of *E. coli* resistant to TC（TCs, E.coli/ml） | |
| | Numbers of *E. coli* resistant to levofloxacin（FQs, E.coli/ml） | |

Sampling sites in red: No data on *E. coli* Isolation, including 3 river samples (T2, W9, W15), 10 discharging sites samples (DQ1, DB1, DBB1, DBB2, DBB3, DBB5, DT1, DT2, DT3, DT4). Sampling sites in blue: data reported in our previous papers.[1, 2] Sampling sites in black: data were collected in the present study.

**Table S6.** Concentrations and Detection Frequencies of Target Antibiotics in Wenyu Rivers.

| Compound[a] | n[b] | Frequency (%) | Median (ng/L) | Range (ng/L) |
|---|---|---|---|---|
| **FQs** | | | | |
| OFL | 45 | 100 | 110 | 25.1-1213.6 |
| GATI | 45 | 100 | 16.5 | 1.6-116.4 |
| FLUM | 45 | 100 | 56.2 | 24.2-137.0 |
| OXO | 38 | 84.4 | 6.9 | ND-20.8 |
| NOR | 29 | 64.4 | 46.6 | ND-199.4 |
| PIPE | 24 | 53.3 | 7.2 | ND -19.5 |
| LOME | 22 | 48.9 | 3.5 | ND -15.7 |
| PIRO | 21 | 46.7 | 12 | ND-129.1 |
| CIP | 17 | 37.8 | 9.6 | ND-24.1 |
| FLER | 8 | 17.8 | 1.2 | ND-7.3 |
| DIF | 3 | 6.7 | 2.6 | ND-2.7 |
| MOXI | 3 | 6.7 | 10.6 | ND-14.9 |
| DANO | 2 | 4.4 | 2.2 | ND-3.4 |
| PEFL | 1 | 2.2 | 6.4 | ND-6.4 |
| NALI | 6 | 13.3 | 24.4 | ND-78.1 |
| Total | 45 | 100 | 287.5 | 56.5-1430.3 |
| **TCs** | | | | |
| TC | 42 | 93 | 3.6 | ND-90.7 |
| OTC | 41 | 91 | 14.3 | ND-110.2 |
| ICTC | 41 | 91 | 3.5 | ND-29.1 |
| ETC | 29 | 64 | 2.2 | ND-46.5 |
| DXC | 2 | 7 | | ND-13.4 |
| MINO | 5 | 11 | | ND-3.4 |
| EACTC | 1 | 2 | | ND-2.9 |
| ATC | 1 | 2 | | ND-0.4 |
| Total | 45 | 100 | 23.6 | ND-296.6 |
| **SAs** | | | | |
| SPD | 45 | 100 | 21.5 | 1.3-129.3 |
| SDZ | 45 | 100 | 175.9 | 46.9-739.2 |
| TMP | 45 | 100 | 47.2 | 12.8-119.7 |
| SMX | 45 | 100 | 166.1 | 33.2-528.1 |
| NAcSPD | 45 | 100 | 40.2 | 4.5-192.6 |
| NAcSDZ | 45 | 100 | 127.8 | 33.2-638.9 |

| | | | | |
|---|---|---|---|---|
| NAcSMA | 45 | 100 | 4.0 | 0.6-35.6 |
| NAcSMX | 45 | 100 | 319.3 | 87.4-826.0 |
| SMA | 44 | 98 | 7.2 | ND-267.3 |
| SMM | 43 | 96 | 1.4 | ND-17.8 |
| SGD | 39 | 87 | 1.2 | ND-4.4 |
| SME | 34 | 76 | 1.6 | ND-9.5 |
| SA | 33 | 73 | 0.8 | ND-4.4 |
| SCP | 32 | 71 | 2.1 | ND-10.4 |
| STZ | 27 | 60 | 0.4 | ND-2.6 |
| SQX | 23 | 51 | 0.8 | ND-2.1 |
| Total | 45 | 100 | 967 | 468-3164 |

[a]Full names and structures of chemicals are listed in Table 1. [b]Number detected.
ND=Not detected.

## References

(1) Hu, J.; Shi, J.; Chang, H.; Li, D.; Yang, M.; Kamagata, Y. Phenotyping and Genotyping of Antibiotic-Resistant Escherichia coli Isolated from a Natural River Basin. *Environ. Sci. Technol.* **2008**, *42*, 3415-3420.

(2) Shi, J.C.; Hu, J.Y.; Chang, H.; Wan, Y.; Zhang, Z.B.; Xiang, Y. Investigation on the antibiotic-resistance E.coli in Wenyu river in Beijing. *China Environmental Science*, **2008**, 28, 39~42