**Occurrence of Pharmaceutical Residues and Antibiotic-Resistant Bacteria in Water and Sediments from Major Reservoirs (Owabi and Barekese Dams) in Ghana**

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**Fig. S1**: HPLC chromatogram for analyte standards **A**: antibiotics at 215 nm; **B**: analgesics at 270 nm; **C**: analgesic at 220 nm. Peaks corresponding to specific analytes have been indicated.

**Table S1: HPLC flow program for the analyses of antibiotics and analgesics**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Analyte Type** | **Step** | **Step type** | **Step time (min)** | **Flow (mL/min)** | **% A** | **% B** |
| Antibiotics**\*** | 0 | Equilibration | 1.0 | 1.0 | 75.0 | 25.0 |
| 1 | Run | 4.0 | 1.0 | 75.0 | 25.0 |
| 2 | Run | 4.0 | 1.0 | 30.0 | 70.0 |
| 3 | Run | 8.0 | 1.0 | 30.0 | 70.0 |
| 4 | Run | 0.1 | 1.0 | 75.0 | 25.0 |
| 5 | Run | 5.0 | 1.0 | 75.0 | 25.0 |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| Analgesics**#** | 0 | Equilibration | 1.0 | 1.0 | 75.0 | 25.0 |
| 1 | Run | 4.0 | 1.0 | 75.0 | 25.0 |
| 2 | Run | 4.0 | 1.0 | 30.0 | 70.0 |
| 3 | Run | 8.0 | 1.0 | 30.0 | 70.0 |
| 4 | Run | 0.1 | 1.0 | 75.0 | 25.0 |
| 5 | Run | 5.0 | 1.0 | 75.0 | 25.0 |

**\***For antibiotics, solvent A is 0.05% TFA and solvent B is methanol

**#**For analgesics, solvent A is 0.1% acetic acid and solvent B is methanol

**Table S2: Quality parameters**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Analyte Class** | **Analyte** | **% Recovery** | **LOD****(µg/L)** | **LOQ****(µg/L)** | **R2** |
| Analgesics | Paracetamol | 97.02 | 0.058 | 0.193 | 0.998 |
| Caffeine | 93.19 | 0.041 | 0.137 | 0.999 |
| Diclofenac | 94.66 | 0.031 | 0.103 | 0.999 |
| Ibuprofen | 91.58 | 0.116 | 0.386 | 0.998 |
| Antibiotics | Amoxicillin | 94.26 | 0.084 | 0.280 | 0.982 |
| Doxycycline | 91.04 | 0.105 | 0.350 | 0.997 |
| Metronidazole | 85.51 | 0.061 | 0.203 | 0.998 |
| Ciprofloxacin | 89.12 | 0.092 | 0.306 | 0.997 |
| Chloramphenicol | 91.16 | 0.090 | 0.300 | 0.997 |

% R – percentage recovery LOD – limit of detection, LOQ – Limit of quantitation, R2 values were obtained from the calibration curves.

**Table S3: Frequency of disposal of prescription and non-prescription drugs**

|  |  |
| --- | --- |
| Type of medicine   |  %  |
| daily | weekly | monthly | yearly | when necessary | never |
| Orthodox medicines | 1.0 | 10.0 | 6.0 | 3.0 | *58.0* | 22.0 |
| Herbal medicines  | 5.0 | 4.0 | 4.0 | 3.0 | *49.0* | 35.0 |

**Table S4: Disposal methods and medication types often disposed**

|  |  |
| --- | --- |
| Item and options  | Number of mentions  |
| *Methods of disposal* (n = 100) Dustbin  | 67 |
| Incineration  | 19 |
| Flush down toilet/sink  | 12 |
| Return to pharmacy  | 2 |
|  *Prescription medicines disposed off* Pain medications  | 42 |
| Antimalarials  | 55 |
| Antibiotics | 64 |
| Antihypertensives  | 5 |
| Heart medications  | 7 |
|  |  |
| *Non-prescription medicines disposed of* Pain medications | 54 |
| Antimalarials  | 11 |
| Antibiotics | 24 |
| Herbal medicines  | 43 |
| Cough preparations  | 7 |

**Table S5: How important are health, transportation, education, environment, and jobs (n=100)**

|  |  |
| --- | --- |
|  | Frequencies |
| Extremely important | Very important | Moderately important | Slightly important | Not at all important |
| Health | 78 | 13 | 5 | 2 | 2 |
| Transportation | 1 | 15 | 14 | 23 | 47 |
| Education | 7 | 15 | 53 | 11 | 14 |
| Environment | 9 | 16 | 14 | 48 | 13 |
| Jobs | 11 | 43 | 10 | 14 | 22 |

**Table S6: Respondent's willingness to better improve the environment**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Statements** | **Strongly****agree** | **Agree****somewhat** | **Neither****Nor****disagree** | **Disagree****somewhat** | **Strongly****disagree** |
| *Taking my unused or expired medication to the pharmacy for disposal would be inconvenient?* | 60 | 12 | 5 | 9 | 14 |
| *We should only spend money on environmental problems that affect human health, not on problems that only affect other species or ecosystems* | 51 | 20 | 10 | 13 | 6 |
| *We should try to prevent all water pollution, even if we have no evidence that a pollutant will harm human or ecosystem health* | 66 | 23 | 9 | 2 | 0 |
| *Pharmaceuticals affect the environment* | 38 | 32 | 21 | 5 | 5 |
| *Return drugs to pharmacy* | 60 | 12 | 5 | 9 | 14 |
| *Spend on only Environment & Human health* | 51 | 20 | 10 | 13 | 6 |
| *Prevent all water pollution* | 66 | 23 | 9 | 2 | 0 |
| *Human health against environment* | 56 | 25 | 8 | 3 | 8 |
| *Pharmaceuticals affect the environment* | 38 | 32 | 21 | 4 | 5 |