Solution 8. Environmental Intelligence – Sewage treatment water sample analysis for Alcohol and Drugs metabolites and other harmful substances detected in vessel's sewage system.

For comprehensive details regarding this Solution, please contact ARTION D&A at +30 210 260 1475 or via email at info@artiondna.com

View a brief overview here:

1.8.1 Description

As a complementary—not competitive—solution to conventional drug and alcohol (D&A) testing based on human samples, Artion D&A offers an innovative alternative: the detection of alcohol, drugs and other harmful substances (benzene, toluene, etc.) in the vessel's sewage system. This method enables the identification of substances' use that may fall outside the observation window of traditional testing protocols. This approach is particularly useful in detecting usage that may occur shortly after the last period of test of samples of the crew—at a time when crew members might feel assured that no further unannounced testing is imminent. It is important to clarify that this method detects metabolites (e.g., alcohol metabolites), not the parent substances themselves. This eliminates false positives caused by the presence of alcohol-based cleaning agents for example.

Sampling is conducted via wastewater sample collection from the vessel's Sewage Treatment Plant. Ideally, the sample collection can be performed by the operator's superintendent to ensure both impartiality and the element of the unannounced.

The collected samples are sent through ARTION to Green Biotech Laboratories for analysis, performed under the attached certification. The results are non-individualized; they reflect the status of the vessel, indicating the presence or absence of drugs and alcohol. **Moreover, in coordination with the operator, the method can be extended to detect environmental substances that may pose a risk to crew health.**

This solution is offered to existing customers and to operators who may not yet be utilizing any of the aforesaid D&A testing solutions.

1.8.2 Analysis methods, the Cut-offs, the targeted substances.

Category	Compound	Analytical Method	Sample Type	Indicative Cut-off
Illicit Drugs	Cocaine (benzoylecgonine)	LC-MS/MS, SPE	Wastewater	5–50 ng/L
Illicit Drugs	Methamphetamine	LC-MS/MS, SPE	Wastewater	5-50 ng/L
Illicit Drugs	MDMA (Ecstasy)	LC-MS/MS, SPE	Wastewater	1-20 ng/L
Illicit Drugs	Heroin (6-MAM) / Morphine / Codeine	LC-MS/MS	Wastewater	1-10 ng/L
Illicit Drugs	THC-COOH	LC-MS/MS, SPE	Wastewater	1-10 ng/L
Illicit Drugs	Synthetic cannabinoids / Cathinones	LC-MS/MS, SPE	Wastewater	1-10 ng/L
Illicit Drugs	Fentanyl	LC-MS/MS	Wastewater	1 ng/L
Prescription Drugs	Diazepam / Alprazolam / Lorazepam	LC-MS/MS, SPE	Wastewater	10-100 ng/L
Alcohol	Ethyl Glucuronide (EtS) / Ethyl Glucuronide (EtG)	LC-MS/MS	Wastewater	10-100 ng/L
Alcohol	Ethanol (residue)	GC-FID, Enzymatic	Wastewater	100-1000 µg/L
Toxic Compounds	Benzene / Toluene / Xylene	GC-MS, SPE	Wastewater	1-5 / 10 - 500 µg/L
Toxic Compounds	Hydrochloric acid / Sulfuric acid	MS, Ion Chrom / Color	Wastewater	pH based
Toxic Compounds	Acetone	GC-MS	Wastewater	50-500 µg/L
Heavy Metals	Lead (Pb)	ICP-MS	Wastewater	1-10 µg/L
Heavy Metals	Mercury (Hg)	ICP-MS	Wastewater	0.05–0.15 µg/L
Heavy Metals	Cadmium (Cd)	ICP-MS	Wastewater	0.5-5 µg/L
Heavy Metals	Arsenic (As)	ICP-MS	Wastewater	0,1 - 10 µg/L
Heavy Metals	Nickel (Ni)	ICP-MS	Wastewater	10 µg/L
Heavy Metals	Zinc (Zn)	ICP-MS	Wastewater	50 µg/L
Industrial Chemicals	PBDEs	GC-MS	Wastewater	0.01-0.5 µg/L
Industrial Chemicals	DEHP	GC-MS	Wastewater	1-10 µg/L
Industrial Chemicals	Nonylphenols	HPLC-UV	Wastewater	1-10 µg/L
Industrial Chemicals	PFOS	LC-MS/MS	Wastewater	0.01-0.1 µg/L
PAHs	Benzo[a]pyrene / Naphthalene	GC-MS, LC-MS/MS	Wastewater	0.1-1 µg/L
VOCs	Formaldehyde / Acetone / Ethylbenzene	GC-MS / HPLC	Surface Swab	1-10 µg/L