Water Quality Analysis

Water quality analysis is a complex and ever-evolving field. New technologies and methods are constantly being developed to improve the accuracy and precision of water quality testing.

One of the most important aspects of water quality analysis is sampling. The water sample must be representative of the water body being tested. This means that the sample must be collected from the correct location and at the correct time. The sample must also be handled and preserved properly to avoid contamination.

Once the water sample has been collected, it can be analyzed for a variety of physical, chemical, and biological parameters. The specific parameters that are tested will depend on the intended use of the water. For example, drinking water will be tested for a different set of parameters than wastewater.

RANGE	Max	Min
Conductivity (µs/cm	1040	480
pH	8.2	7.5
PV as $CaCo_3$	NT	NT
MV as CaCo3	170	80
Total hardness ppm	280	120
calcium hardness ppm	180	70
Magnesium hardness ppm	100	50
Carbonate hardness ppm	170	80
Non-Carbonate hardness ppm	110	40
Chloride as Cl ppm	147	56
Sulphate (SO_4) ppm	64	21
Silica as SiO_2	39	10

Physical parameters that are commonly tested include temperature, color, turbidity, odor, pH, and conductivity. Chemical parameters that are commonly tested include dissolved oxygen, nutrients, metals, pesticides, and herbicides. Biological parameters that are commonly tested include bacteria, algae, and protozoa.

Data were collected using a cross-sectional research design for a household survey, and water quality samples were collected from improved and unimproved alternative sources. Nine physicochemical and two bacteriological analyses were performed. The result shows that esthetic water quality parameters had a potential interpretation of water quality as of the laboratory analysis. The taste was the dominant and easily detectable indicator as compared to odor and color. This is associated with the higher correlation between iron and manganese that deter the taste of water.

Water quality analysis can be performed in the field or in a laboratory. Field tests are typically used for quick screening of water quality, while laboratory tests provide more accurate and detailed results.

Parameter	Vi	Si	Qi	Wi	QiWi
pH	5.1	8.5	126.7	0.118	14.95
Conductivity (uS/cm)	61.0	1000	6.1	0.001	0.0061
TDS (mg/l)	30.3	500	6.1	0.002	0.0122
TSS (Mg/l)	0.001	500	0.0002	0.002	0.0000004
Nitrate (mg/l)	17.6	50	35.2	0.02	0.704
Sulphate (mg/l)	8.5	150	5.67	0.007	0.04
Hardness (mg/l)	90.0	150	60	0.007	0.42
Chloride (mg/l)	9.6	250	3.84	0.04	0.00154
				ΣWi = 0.197	ΣQiWi = 16.13
					WQI = 81.9

Field tests are often used to monitor water quality in real time. For example, a field test can be used to measure the dissolved oxygen level in a river. This information can be used to assess the health of the aquatic ecosystem and to identify potential sources of pollution.

Laboratory tests are often used to test water samples for a wider range of parameters. For example, a laboratory test can be used to measure the concentration of specific metals or pesticides in a water sample. This information can be used to assess the suitability of water for drinking, irrigation, or industrial use.

Parameters	Unit	Number of Water Sample		
		TW A 2	TW A 3	TW A 5
Temperature	°C	25.9	27.6	27.3
EC	µS/cm	1497	552	1384
pH	-	2.90	4.66	2.87
Nitrate	mg/l	0.275	0.402	0.466
BOD	mg/l	0.37	0.39	-
COD	mg/l	1.46	0.74	6.67
Phosphate	mg/l	≤0.02	≤0.02	≤0.02
Coliform	MPN/100ml	7	11	7

Water quality analysis is an important tool for protecting public health, the environment, and the economy. By understanding the physical, chemical, and biological characteristics of water, we can develop strategies to manage and protect this precious resource.

Here are some specific examples of how water quality analysis is used to address current and emerging water quality challenges:

- Climate change: Climate change is impacting water quality in a number of ways, including increasing the frequency and intensity of extreme weather events, such as floods and droughts. These events can lead to increased pollution levels in water bodies. Water quality analysis is being used to monitor the impact of climate change on water quality and to develop strategies to mitigate the risks.
- Emerging contaminants: Emerging contaminants are new or understudied chemicals that are being found in water bodies. These contaminants can include pharmaceuticals, personal care products, and industrial chemicals. Water quality analysis is being used to identify and quantify emerging contaminants in water bodies and to assess their potential impact on human health and the environment.
- Microplastics: Microplastics are tiny pieces of plastic that are polluting water bodies around the world. Microplastics can be ingested by aquatic organisms

and can also leach harmful chemicals into the water. Water quality analysis is being used to quantify microplastic levels in water bodies and to assess their potential impact on human health and the environment.

Water quality analysis is a critical tool for addressing the water quality challenges of the 21st century. By understanding the physical, chemical, and biological characteristics of water, we can develop strategies to protect this precious resource for future generations.

Converting organic matter into CO2 than gram-negative bacteria. It is proposed that fish farmers should reduce the accumulation of dissolved and particulate organic material during the growing season, while maintaining high rates of probiotics in production ponds. What is more, this can support phytoplankton production. Nonetheless, this theory could not be tested using one or more Bacillus species, Nitrobacter, Pseudomonas, Enterobacter, Cellulomonas, and Rhodopseudomonas, during the cultivation of shrimp or channel catfish. Except for the nitrates, published evidence for improving the water quality is therefore limited. Use of the Bacillus sp. has been documented to result in improved water safety, longevity, and development rates, as well as improved juvenile Penaeus monodon health status and decreased pathogenic Vibrio species (Dalmin et al., 2001).

	Type of Water		
Parameter	De-ionized	Bore Hole	Salt Water
Colour	0.00	0.002	0.022
Odour	Unobj.	Unobj	Unobj
Taste	Insipid	ND	ND
pH	7.00	6.4	7.5
Temp. (°C)	28.00	28.00	28.00
Conductivity	0.00	0.24	410.00
Salinity (mg/L)	0.00	0.00	875.00
Total dissolved solid mg/l)	0.00	21	1300
Total suspended solid (mg/l)	0.00	0.04	59.00
Turbidity	0.00	0.08	46.70
DO (mg/l)	0.00	0.06	4.5
Total hardness $CaCO_3$ (mg/l)	0.00	5.20	20.90

Boyd acknowledged the positive impact of probiotics on organic matter decomposition and decreased phosphate and nitrogen compound amounts (Boyd & Massaut, 1999). Aerobic denitrifying bacteria are deemed ideal candidates in aquaculture waters to reduce nitrate or nitrite to N2. Many bacteria have been extracted in tanks for shrimp farming to that purpose. Some of the already known denitrifying bacteria are Acinetobacter, Arthrobacter, Bacillus, Cellulosimicrobium, Halomonas, Microbacterium, Paracoccus, Pseudomonas, Sphingobacterium, and Stenotrophomas.

Conclusion:

Evaluating drinking water quality using the water quality parameters and esthetic characteristics has a profound significance for human health. Esthetic parameters such as color, odor, and taste were evaluated using households' understanding of the water quality.