

ALGAEROW

AUTONOMOUS NON-CONTACT SENSOR FOR WATER QUALITY MONITORING



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LASER
DIAGNOSTIC
INSTRUMENTS

ALGAEROW

IDEAL FOR DETECTION
OF **CHLOROPHYLL-A**
IN **GREEN ALGAE**

Early warning system for harmful **algal blooms**
by determination of chlorophyll-a concentration
changes

➤ WHAT ARE ALGAL BLOOMS AND WHY MONITOR THEM?

Algal blooms tend to form in presence of ideal condition of temperature, nutrients and light. Algal blooms become harmful when colonies of algae—simple plants that live in the sea and freshwater—grow out of control while producing **toxic** or **negative effects** on people, fish, shellfish, marine mammals, and birds.

The human illnesses caused by harmful algal blooms, though rare, can be debilitating or even fatal.

Harmful algal blooms' occurrence are on the rise and are becoming a **major environmental concern** in many states, not only because they affect the health of people and marine ecosystems, but also the prosperity of local economies.

In consequence, governments and environmental authorities request effective algal bloom monitoring tools.

➤ WHY CHLOROPHYLL-A DETECTION?

Chlorophyll-a concentration is the most commonly used parameter for measuring algal concentration or biomass, and assessing the occurrence of algal blooms.

All photosynthetic organisms contain chlorophyll. Among all forms of chlorophyll, only chlorophyll-a is common to all algae.

A few micrograms of chlorophyll-a per litre are considered to be normal. Concentrations beyond 10 or 20 µg/L are evaluated as algal bloom.

➤ WHY ARE ALGAL BLOOMS DEPLETING OXYGEN FROM THE WATER?

Only a small amount of the algal biomass is eaten by zooplankton, the remains sink to the bottom where they are decomposed by bacteria.

Oxygen at the bottom can fall to stress levels for most organisms or even to near zero - causing death of the ecosystem in the area.

Time

1. Nutrient load up

Excessive nutrients from fertilisers are flushed from the land into rivers and lakes by rainwater

nutrient material

sunlight

algae layer

decomposers

2. Plants flourish

These pollutants cause aquatic plants to grow.

3. Algae blooms, oxygen is depleted

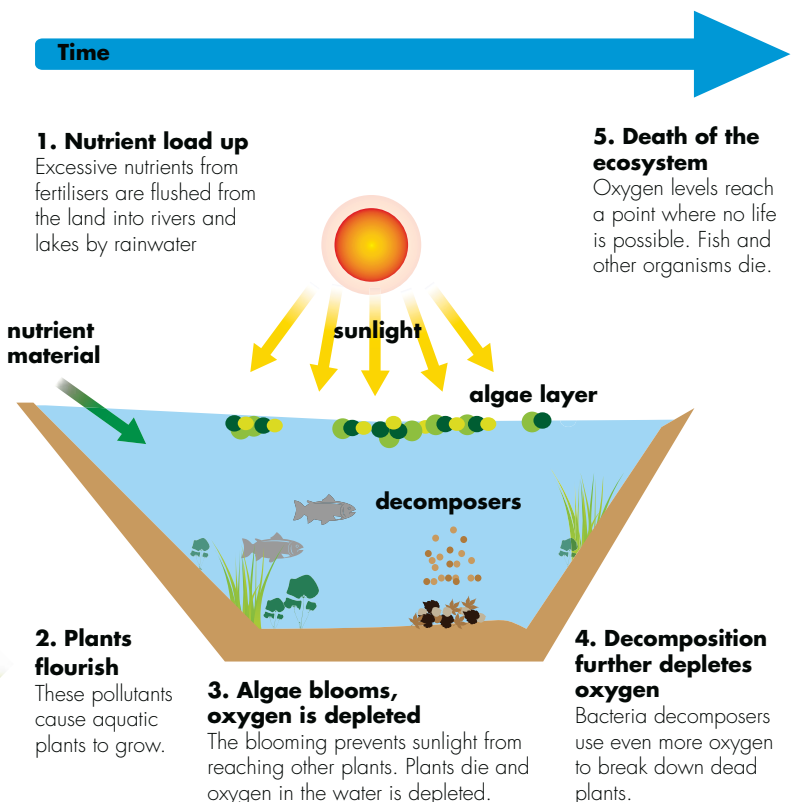
The blooming prevents sunlight from reaching other plants. Plants die and oxygen in the water is depleted.

5. Death of the ecosystem

Oxygen levels reach a point where no life is possible. Fish and other organisms die.

4. Decomposition further depletes oxygen

Bacteria decomposers use even more oxygen to break down dead plants.



> DETECTING HARMFUL ALGAL BLOOMS THROUGH TOXINS MONITORING

Chlorophyll-a concentrations are associated with microcystins levels, a toxin that has harmful effects on human health.

US Environmental Protection Agency (USEPA) and World Health Organisation (WHO) give recommendations for concentration limits of microcystins. It can be linked with the probability of chlorophyll-a exceeding these levels.

	USEPA Child (0.3 µg/L)	WHO Drink (1 µg/L)	USEPA Adult (1.6 µg/L)	WHO Recreational (2 µg/L)
Conditional probability of 50%	23	68	84	104

For instance, there is a 50% chance of exceeding the WHO drink limit of 1 µg/L of microcystins when the concentration of chlorophyll-a is 68 µg/L.

Therefore, **continuous monitoring of chlorophyll-a variations** could be used as a trigger for possible actions in case of important risk of exceeding health advisory levels.

> FEATURES

- Fast and convenient in-situ monitoring
- No sampling or preparation required
- Non-contact technique for maintenance-free operations
- Fewer false alarms through advanced algorithmics

BEST DETECTION FEATURES



REAL-TIME ALERT OVER SMS & EMAIL



FEWER FALSE ALARMS ADVANCED ALGORITHMICS



MAINTENANCE-FREE OPERATIONS



> SCIENTIFIC PRINCIPLE: DETECTION OF ALGAE VIA FLUORESCENCE

To detect chlorophyll-a concentration variations starting at few microns from **up to 2 m above the water**, AlgaeROW pulses a UV beam at the surface and excites any algae cells in the target area. Using native fluorescence of algae pigments, ROW monitors chlorophyll-a concentration levels and alerts the site operator.

Advanced software algorithms are calibrated to detect as low as 2 µg/L concentration of chlorophyll-a and minimize false alarms. It can be preset according to customer's expectations.

> FULL AUTONOMY FOR CONTINUOUS OPERATION

AlgaeROW is easy and efficient to use, enabling **continuous monitoring** even in remote areas. Optional solar panels and wireless setups are available.

> APPLICATIONS

- Water intakes and marine waterways
- Water reservoirs and drinking water sources
- Management of dams
- Beaches, bathing and water leisure areas
- Fishing areas
- Water quality research
- Fauna and wildlife
- Human health



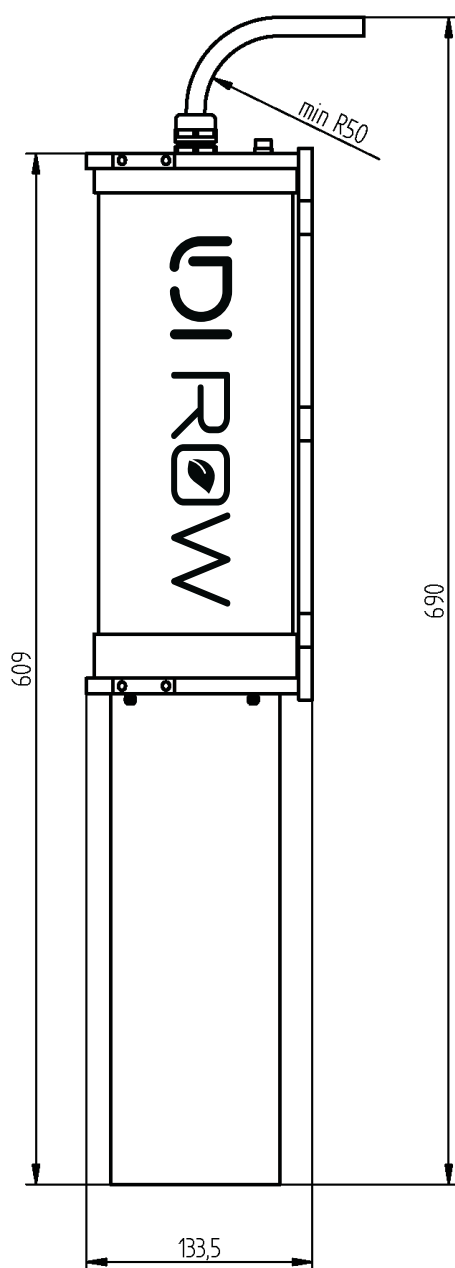
Based in Estonia, **LASER DIAGNOSTIC INSTRUMENTS** develops and manufactures sensing systems that analyze substances in real time. Combining photonics with software analysis, our products excel at detecting specific molecules in complex solutions.



TECHNICAL SPECIFICATIONS

OPTICAL NON-CONTACT AND AUTONOMOUS SENSOR
FOR REAL-TIME DETECTION OF ALGAE BLOOM
BY UV FLUORESCENCE METHOD.

ALGAE ROW



MODEL	ALGAE ROW A-2300A
SENSITIVITY	> 2 µg/L chlorophyll-a in vivo
RANGE	from 0.3 m to 2 m above water surface
OPERATION TEMPERATURE	- 25°C to 60°C [-13°F to 140°F]
ENCLOSURE	IP68, pressurised (1.3atm, Ar) hermetically sealed, weather proof, powder painted, anodised aluminum
DIMENSIONS	609 x 133.5 x 133.5 mm [23.9 x 5.2 x 5.2 in]
WEIGHT	3 kg [6.61 lbs]
POWER OPTIONS	12 VDC (10V - 30V) as standard other options: 110/220 VAC 60/50 Hz
POWER CONSUMPTION	< 2 Watt (DC)
LIGHT SOURCE	pulsed UV LED
OUTPUT	relay, RS-485, 4-20 mA
EXTERNAL COMMUNICATION OPTIONS	ethernet/LAN radio Wi-Fi GSM/GPRS/3G/4G
USER INTERFACE	ROW Configurator for setup & adjustment ROW Manager for network visualization
CERTIFICATION	CE : EN 61000-6-2, 61000-6-3 EN 61326-1, 61000-4-2, 61000-4-5, 61000-4-6, 61000-4-8, EN 61010-1 IP68: EN 60529
WARRANTY	2 year factory warranty as standard, supported worldwide



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