INCREASE OF WATER QUALITY IN WATER RESERVOIRS

Controlled dosing of substances for the coagulation of cyanobacteria

USING AN APPLICATION VESSEL

With this vessel, we provide the service of controlled dosing of applied substance under the surface of water.

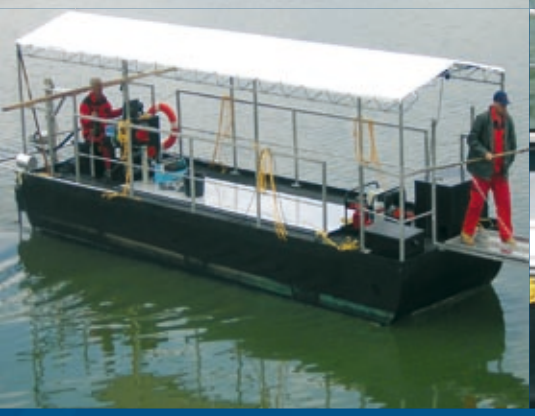
METHOD

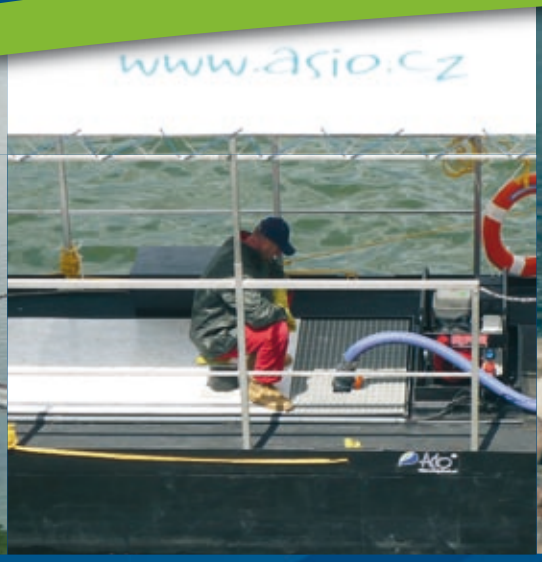
This technology uses a physico-chemical principle of suppressing the development of CYANOBACTERIA, specifically by applying doses of a coagulant into the surface layer of water. The vessel can be used for controlled and exact dosing of any liquid substance into water reservoirs with a similar application reporting.

PRINCIP

The procedure of removing cyanobacteria from the water column in the reservoir using a coagulant is as follows:
The basic nutritive (alimentary) element for cyanobacteria is phosphorus. Therefore we try to remove it from the water, eliminate its supply, or transform it into a form that is not usable by the cyanobacteria. Coagulant (anorganic substance which neutralizes the surface charge of particles in the water, and makes their clustering into bigger bodies possible) – e.g. polyaluminium chloride, that is applied in an optimum amount into the water. The polyaluminium chloride causes floccules of aluminum hydroxide to build up while creating indissoluble complex compounds with phosphorus.
These compounds cannot be the source of nutrients anymore. The floccules of aluminum hydroxide settle while removing dispersed substances, algae and cyanobacteria from the water column. Floccules of aluminum hydroxide settled on the bottom act as a barrier preventing the phosphorus to be released from the deposit into the water. The advantage of coagulation over the application of algaecides consists in leaving the cells of the cyanobacteria intact, thus preventing the contamination of water by toxins that would otherwise flow out of the cells. The aim of the application is the settling of cyanobacteria to the bottom of the reservoir, i.e. to a space where they cannot continue performing the photosynthesis, and where their gradual decomposition takes place.

program SINICE





Water transparency prior to application: 20 cm (measured with Secchi disk)

Transparency after application: 3,0 m (measured with Secchi disk)

DESCRIPTION

The vessel contains a tank for about 6 tons of coagulant. The coagulant (or other liquid substance) is pumped from a cistern-truck into tanks located on the lakeside, and from there, the coagulant is pumped over into the tank within the vessel.

Everything takes place under strict safety conditions ensuring that „not a single drop of the coagulant gets spilled".

The dose to be applied is determined for each day of the application based on a coagulation experiment. The period of time necessary for the application is generally several days depending upon the square area and the volume of the water reservoir in question. The dosage of the applied substance further depends on the velocity of the vessel, and on the depth of water under it. The operator controls the exact and effective dosage amount of the coagulant for the specific profile based on these parameters. Another advantage is the possibility to use naval GPS navigation that not only records the current position in terms of geographic coordinates, but it also draws the trajectory of the already passed route where the coagulant has already been applied, so the pilot is able to find out in what the areas the dosing has already been completed, and where it has not.

Considering the use of the above mentioned technology, it is obvious that we are able to ensure dosing of an ECOLOGICAL as well as ECONOMICAL amount of coagulant for the given profile and specific concentration of cyanobacteria.

ADVANTAGE

An advantage of this solution is that the effect is visible immediately. The transparency of the water can be increased even several times (e.g. by the factor of 15).

Recorded trajectory of the vessel during operation

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