



BIOCIDAS BIODEGRADABLES ZIX

Aquazix[®]

ALGAS TABLETS

Are you aware of the dangers of Algae and Cyanobacteria?

What you see: obstruction

What you cannot see: poor quality of water:

Organic compounds

Bacteria and Viruses

Microcystins

What happens: toxicity in animals

Eliminates algae

It has always been thought that algae only cause problems by obstructing nipples and drinkers, but the problem goes way beyond what is easily visible.

Algae are a polyphyletic grouping, which means that its members are found in a large number of related groups. Those which are normally seen in pools of water are autotrophic organisms that produce oxygen through photosynthesis, although there are some that do not need light. These may be either prokaryotes or eukaryotes. The ones that concern us are prokaryotic cyanobacteria, commonly called blue-green algae or Cyanophyceae. Although these are always taken to be algae, they are really closer to being bacteria. They form part of the plant plankton. They produce oxygen by photosynthesising light energy into chemical energy by releasing the oxygen from breaking down water molecules (water photolysis). They produce blue-green pigments and toxins.

Algae are a physical base that protect and feed micro-organisms and Cyanobacteria. They are the main source of providing organic material to the food chain. Algae can convert inorganic material into organic.

They contaminate water systems and reduce the amount of dissolved oxygen, thus contributing to a more rapid deterioration of water. They develop en masse in rivers, canals, reservoirs, lakes, ponds and large water tanks. They generate toxic metabolites that are very powerful at low concentrations, called Cyanotoxins. The first record of Cyanotoxins produced by a blue-green algae, *Modularia spumigena*, was in 1878. Cyanobacteria can produce a wide variety of cyanotoxins. These are secondary metabolites, non-ribosomal peptides, polyketides, lipopolysaccharide alkaloids with a biological action whose function is unknown, in many cases. In Spain, 3 main types of cyanotoxins are found: microcystin, anatoxin-a (neurotoxic alkaloid) and cylindrospermopsin (cytotoxin: targeting the liver and kidneys). *Microcystis aeruginosa* is the main cyanobacteria producing microcystin hepatotoxin. Formed by a peptide ring of 7 amino-acids. It acts by inhibiting the type 1 and 2 A protein phosphatases in the eukaryotic cells, and producing a toxic effect in the liver by spreading hepatocytes on specific receptors of bile acids. Over 80 different varieties of microcystins have been identified, of which the most common is the LR. Reproducing and non-reproducing strains occur within the same species. Reproducing cyanobacteria: 5 genres and 14 species.

Toxicity of cyanotoxins in livestock

The toxins remain inside the cyanobacterial cell. They are released in young cultures or when the cells die, although not all the release mechanisms are fully known.

Acute toxicity occurs due to the inhibition of the protein phosphatases. Concentration levels higher than 1 microgram per litre cause toxicity in the stomach, lungs, kidneys, and may even kill. With pigs, 800 micrograms per kg by weight causes visible lesions on the liver.

Low dosage: 20 micrograms / kg live weight.

High dosage: 32 micrograms / kg live weight.

Chronic toxicity has an accumulative toxic effect, whereby the hepatocytes are affected, causing the cytoskeleton to collapse, causing blood to pool.

Concentrations lower than 1 microgram per litre cause tumours, allergies and a severely depressed immune system.

Concentrations of 0.1 micrograms per litre modify the immune system.

Environmental factor favouring the development of cyanobacteria and cyanotoxins

The growth of cyanobacteria and the production of microcystins is directly related to environmental conditions and the characteristics of the water. They do not demand much food, basically needing nitrogen and carbon. Currents and rough water prevent them from developing by making it more difficult to float and multiply.

An increase in the following parameters increases the production of cyanobacteria:

Light: cyanobacteria photosynthesise, and therefore the intensity of light determines how much it is able to multiply.

Depth of water: the deeper the water, the fewer algae are produced. Ideal conditions are 12 to 60 cm, although it can also easily colonise the bottoms of reservoirs. The ability to produce toxins is closely related to this parameter. Cyanobacteria can modify its own ability to float, which is controlled by the production of carbohydrates from photosynthesis.

Temperature: ideal between 15 to 30° C

Ph: ideal between 6 to 9

Conductivity

Oxygen: supersaturation of oxygen

Phosphorus: phosphates

Nitrogen: ammonia, nitrates, nitrites: increases the level of nutrients, promoting the increase of toxic strains as opposed to non-toxic (increases the transcription of the MC YD gene)

Organic compound: increases the level of nutrients

With cyanotoxins, it is important to remember:

Toxicogenic capacity is also affected by environmental conditions. The microcystin content in the mass of plant plankton in water storage may undergo large changes in size in less than a week.

Light: ideal light intensity: 40 microeinstein / square metre / second. Toxicity decreases with depth

Temperature: ideal for the water surface, 20 to 25° C

Iron: alters production and toxicity with regard to factors of virulence in certain pathogenic species

Detoxifies toxins

AQUAZIX ALGAS TABLETS

Eliminates algae

Eliminates cyanobacteria

Detoxifies toxins: microcystins

Improves the quality of water

Reduces organic compounds in water. Reduces the BOD

Prevents obstruction in water systems

Removes obstructions in less than half an hour

Does not react to other algicides

Easy dosage



Treatment

Reacts badly to dilution with chlorine. It is also very volatile in open water. Active carbon absorbs and retains the microcystins. Filtering and coagulation may exacerbate the problem due to stirring.

Some biocides may give rise to an increase in toxicity due to a capacity for eliminating algae, but releasing the toxins. Copper kills algae and causes putrefaction, reducing the dissolved oxygen, with the risk of anaerobic fermentation. Aquazix Algas Tablets do not putrefy the water but improve the BOD. Copper has no powers of detoxification, and may increase risk as, when it kills the cells, toxins are released into the water and may be ingested by animals. Aquazix kills cyanobacteria and at the same time, detoxifies by oxidising the toxins released by young cultures, and those released by dead cells.

Aquazix Algas Tablets eliminate algae, prevent putrefaction in the water, kill cyanobacteria, reduce organic compounds in water, eliminate the toxicity in microcystins (confirmed by an ELISA analysis).

Legislation

Royal Decree 140 / 2003 on Water for Public Consumption establishes a maximum of 1 microgram per litre of microcystin. The WHO establishes the same quantity.

AQUAZIX ALGAS TABLETS

Composition: combination of oxidising and surface-acting algicides

Use: Algicide. Water in reservoirs, lagoons, ponds, tanks. Not for use in swimming-pools

Dosage: Treatment: 10 to 12 tablets / 1000 cubic metres

Prevention: 2 to 3 tablets / 1000 cubic metres (80% less)

Containers: 200 gr tablets. 5 kg drum

Registration nº in accordance with

Royal Decree 140 / 2003 on Water for Public Consumption

Water Planning, 21 November 2005: Complies with UNE-EN standards

"Safe use of biocides. Always read the label and product information before use".

BBZIX is registered with: MISACO: Official Registry of Pesticide Establishment and Services 22 / 00043 / S



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