

**Please read carefully! Highly effective product!**

**JBL  
BioNitrat EX**

### **Product Information**

**Controlling algae growth and improving the conditions of aquarium life by nitrate breakdown – made easy.**

#### **1. How does nitrate get into the aquarium?**

The breakdown or mineralising process of all organic matter in the aquarium (feed and plant residues, fish excrements) happens through the stages protein > ammonium > nitrite > nitrate. Certain bacteria, which prefer to settle in the filter and on the aquarium floor, are responsible for this process. Nitrate in relatively high concentrations is not harmful to fish. The bacterial conversion of the waste matter in the aquarium into nitrate is, as it were, the life insurance for the fish because toxic intermediate products cannot enrich in well tuned filters.

But since a high content of nitrate promotes the growth of unwanted algae, the nitrate content in the aquarium water should not be allowed to exceed about 50 mg per litre. Regular partial changes of the aquarium water used to be the most common method for reducing the nitrate content. Ion exchanger resins and biological nitrate filters are also widely used.

#### **2. What is biological denitrification?**

Biological denitrification is the reduction of nitrate into gaseous nitrogen through bacteria. This is a phenomenon which has been well-known in agriculture for a long time and which results in an undesirable nitrogen depletion in the soil. Certain bacteria are capable of using the oxygen bound in the nitrate molecules for breathing, and in the process reducing the nitrate into gaseous nitrogen which eventually escapes into the air. This process is known as denitrification. It can also be used to remove nitrate from the aquarium.

But since these bacteria will move into action only under very special conditions, successful denitrification used to require an array of more or less complicated filter equipment. Among these conditions are an environment very low in oxygen approaching 0 mg, and the supply of organic food in the form of sugar, alcohol, organic acids and similar substances. These conditions can be created by extremely slow-running filters used as bypass to the main filter and the controlled supply of nutrients. Supplying the food requires reliable controls to prevent the food from being flushed into the aquarium, with undesirable consequences.

### 3. What is JBL BioNitrat EX?

#### **JBL BioNitrat EX is the simplest method for reliable biological denitrification:**

JBL BioNitrat EX consists of small beads containing nutrients for bacteria and so encourages the settlement of denitrifying bacteria which are present in large numbers in **any** aquarium. The net bag around the material restricts the water flow and so ensures the correct flow velocity inside the bag. The outcome is the desired environment low in oxygen. The net bag must therefore never be opened.

The bacteria colonies now use the oxygen bound in the nitrate molecules for breathing and, in the process, convert the nitrate into gaseous nitrogen which ultimately escapes into the atmosphere. Their source of energy are the nutrients embedded in the beads. This method ensures that nitrate is eliminated from the aquarium **without trace!** Chloride enrichment, which is often found in conventional ion exchangers and which can have a detrimental effect on plant growth, can be safely ruled out!

#### **4. Use in freshwater:**

Simply place the net bag as the last filter stage into the aquarium filter. If several bags are required, **use a single bag first**, followed by the next bag a week later, etc.. In aquariums with normal fish stock (max. 1 cm fish per litre of water), one bag for 50 litres of water is normally sufficient; in aquariums with higher stock density, one bag for 30 litres is adequate. One package is therefore sufficient for 120 to 200 litres of water. After an activation phase of about 2 to 3 weeks, the material has reached its ultimate bacterial colonisation and begins to develop its full effect (Fig.). Some gas may occasionally collect inside the net bag. In this case allow the gas to escape by slightly squeezing the bag. Foul smell which might develop is perfectly harmless and does not endanger aquarium life. Do not rinse the bag.

In rare cases, water clouding may be occur during the activation phase. This can be removed by briefly filtering with JBL Carbomec *activ*. Excessive nitrate levels (50 mg/l and more) should be reduced by changing the water or by using an ion exchanger (JBL NitratEx 36000).

#### **5. Use in saltwater**

JBL BioNitratEx is also suitable for use in saltwater. Use as described above for freshwater, but **add one layer of activated carbon** (JBL Carmomec ultra) to the BioNitratEx in the filter to avoid nutrients being washed out and clouding the water during the activation phase. Excessive nitrate levels (50 mg/l and more) should be reduced by suitable means (water change).

**6. Duration of effect:** Up to 12 months in aquariums with normal stock density (1 cm fish per litre of water).

**7. Control:** Use JBL Nitrate Test Set NO<sub>3</sub>

**8. Note:**

Removing nitrate from the aquarium water can never fully substitute the regular partial change of the water. It can only prolong the interval between water changes. When using JBL BioNitrat EX we therefore recommend changing about 20 percent of the aquarium water every month. This is required to prevent the enrichment of inhibitors and other agents .

**Contents:** 4 net bags for 30-50 litres of water depending on stock density.

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