



Typical Questions – Algae Growth and Control

What is filamentous algae?

Typically, filamentous algae, grows on the bottom of the shallow ponds and on rocks and aquatic plants. Sometimes filamentous algae float to the surface forming large mats. There are numerous species of filamentous algae and, in some ponds; several species can be present at the same time.

What stimulates algae growth?

Factors that directly affect algae growth include, Low oxygen levels in the water column, available forms of nitrogen and phosphorus, sunlight, and temperature.

What level of phosphorus does it take to stimulate algae growth?

Depending on geographical location, environmental conditions, water column characteristics, ect., surface water concentrations ranging from 4 – 20 ug/L can trigger an algae bloom.

How does algae affect DO (dissolved oxygen) levels in the water column?

Periodic Oxygen depletion, resulting from algae respiration and decomposition, can occur during algae blooms.

Example:

During the day algae take up carbon dioxide and release oxygen into the water column through photosynthesis. This can cause DO levels to increase. During the night, algae take up oxygen and release carbon dioxide into the water column. This can cause DO levels to decrease. Algae, suspended below the surface, cannot photosynthesize and, as a result, they decompose. The decomposition process consumes dissolved oxygen, and, as a result, DO levels in the water column can decrease.

Will ESAE – Algae Eliminator harm turf?

No. **ESAE** – Algae Eliminator also improves the water quality of irrigation ponds by breaking down ammonia salts, and other contaminants before they reach the turf. **ESAE** enhance turf health. The microbes used in **ESAE** are natural soil and water bacteria that are an essential part of the mechanism for the efficient transport of nutrients from the soil into the turf roots.

Is ESAE- Algae Eliminator safe for fish?

Yes! By removing ammonia and nitrite from the water, **ESAE** enhances the aquatic environment for fish and other wildlife.

What is thermal stratification?

Typically, when pond water is warm and in full sun, oxygen is consumed faster than is replenished. This can result in thermal stratification in the water column. That is to say, the warmer, oxygen rich upper layers of water are suspended on top of the cooler oxygen deficient lower layers. When this occurs, conditions within the pond environment change.

Example:

- a) Beneficial aerobic bacteria become inactive and anaerobic bacteria take over.
- b) The rate, at which the biodegradable component(s) in the bottom sludge layer is degraded is significantly reduced.
- c) Sludge accumulation increases.
- d) Nutrient levels, in the bottom sludge layer begin to climb resulting in algae bloom, excessive scum accumulations and plant growth and higher ammonia and hydrogen sulfide levels.
- e) Biological oxygen demand increases and dissolved oxygen levels decrease.

Will ESAE – Algae Eliminator work within the pond bottom and sludge layer?

Yes. **ESAE** provides the correct biomass for the entire pond, including the sludge layer. The sludge layer can be the largest contributor of nutrients to the pond for two reasons.

- (1) As organic matter, i.e. leaves, grass, clippings, fecal matter from fish, frogs, birds, ect. Degrades on the pond bottom, it releases nitrogen and phosphorus.
- (2) The bacteria population in the sludge layer can be damaged by herbicides, algaecides and pesticides flushed into the pond during rainstorms.

ESAE will repopulate the sludge layer and degrade nitrogen and phosphorous. This not only reduces the sludge layer volume but also reduces the nutrients that algae needs as an energy source.

How does ESAE-Algae Eliminator control odour?

The microbes in **ESAE** attack the cause of the pond odour, ammonia and slow decaying organic matter. By accelerating and stabilizing the natural nitrogen conversion reactions, **ESAE** accumulated organic matter eliminates foul odour.

How does ESAE clarify water?

ESAE reduces the algae population and digests floating and suspended organic matter that clouds the water column.

Will ESAE clear a pond of existing algae?

Yes, however, **ESAE – Algae Eliminator's** mode of action is to “starve” the algae by out-competing for a primary nutrient, nitrogen. Therefore, it is most effective when used as a preventive maintenance program, before algae commence blooming.

Is ESAE compatible with algaecides or pesticides?

No, algaecides kill biomass and, as a result, fewer nutrients are digested and the potential for long-term algae problems increases. It is important to note that the copper used in algaecides and herbicides accumulates in bottom sludge causing an ever-increasing toxicity problem for natural microbes.

Is ESAE an algaecide?

No, **ESAE** is not an algaecide. **ESAE** is designed to digest the algae's primary growth nutrient, nitrogen. It will not kill living biomass. **ESAE** will help to re-establish a healthy, balanced aquatic ecosystem. **ESAE** is non-toxic, non-corrosive, and all natural and will not harm animals, plants, birds, fish or humans.

What about aeration?

ESAE bacteria utilize dissolved oxygen in their digestive processes. Typically, this does not affect the dissolved oxygen concentration in a well-aerated pond. Aeration will reduce or prevent thermal stratification and enhance the effectiveness of **ESAE**, as well as benefit all aquatic life present in the pond. It is recommended that all ponds, with inadequate dissolved oxygen levels, be aerated.

Are permits or applicator's licenses necessary?

Typically, no. **ESAE** is not regulated and a permit or applicator's license is not required.

How is ESAE used?

ESAE is a pond management program, not a one time, quick-fix chemical addition. As such, it requires initial preparation and continued attention in order to provide optimum results. An initial heavy dose is required to rapidly populate the pond with the necessary cultures. Seasonal golf courses require only one initiation dose, while year round courses should be done twice. The initial dose is applied at a rate of 3 lb. /acre-foot of water.

What is the purpose of the maintenance dose?

ESAE is a preventative maintenance product. Accordingly, an application every two to three weeks will ensure that biomass levels remain sufficient to handle nutrient inflows. Water outflow, irrigation, leaching and inter-species competition, with less desirable microbes, can reduce biomass. Typically, each treatment environment has a unique set of characteristics that impact microbial activity and, as a result, the time window to achieve the desired results will vary from pond to pond.

What time of the year should I be using ESAE?

This depends on where you live. **ESAE** should be used as long as there is no ice cover on your pond and particularly as long as you are feeding your fishes.

Can ESAE harm fish or other life in the pond?

Absolutely not. **ESAE** is beneficial to the fish; it improves the aquatic environment for the fish and wildlife.

I've added the ESAE but the ammonia is not coming down or the water stays green – why?

There are several conditions to verify:

- Are you overfeeding the fish or is there fertilizer runoff into the pond? Overfeeding is the most common cause of problems. You are not trying to produce tonnage but rather just keep your fish healthy. Daily feeding is not necessary; three times a week in small amounts is usually more than enough.
- Check pH; the ideal pH is 7.0 – 8.5 but is acceptable as low as 6.5 or up to 8.8. Outside of these limits the activity of nitrifying bacteria is reduced.

- Check carbonate/bicarbonate alkalinity; it should be above 100mg/L.
- Is the biological filter working properly? Check the flow rate through the system and make sure that the filter media is not in need of cleaning.
- Are you using **ESAE** as indicated? Beneficial bacteria require trace elements, just as people do.

Will ESAE clear green water?

Yes. **ESAE** contains neither algaecide nor other poison; **ESAE** does not kill algae. The scientific literature shows appropriate bacteria can capture nutrients faster than algae reducing nutrient availability. This is a natural process not a chemical one, natural processes are slower but safer and may take up to about a week.

How do I know ESAE is working?

There will be greater visibility in the pond, and there will be improved water quality, which can be monitored, with test kits, in terms ammonia, nitrite and nitrate. Sludge accumulation will also decrease.

Will ESAE help reduce diseases of fishes?

ESAE is not medication, but regular use of **ESAE** help maintain good water quality and reduces stress on the fishes (ammonia and nitrite cause stress), thereby making them more resistant to infection. In addition regular use of **ESAE** protects the fish by the probiotic effect of assuring the presence of vastly greater numbers of beneficial microorganisms which outnumber the pathogens. Keep the environment saturated with beneficial strains. Just as some people eat active yogurt culture to assure their intestinal flora.

Is it possible to over-dose with ESAE – Algae Eliminator?

Yes, One should always follow the instructions.

Is it possible to under-dose with ESAE – Algae Eliminator?

Yes. One should always follow the instructions.

How does ESAE work?

ESAE natural pond cleaner is formulated for use in controlling pond scum, algae and odour that commonly plague lakes and ponds. **ESAE** works in the entire water column, as well as bottom sludge layers to degrade organic waste and other nutrients that promote algae growth. When **ESAE** is applied to the water, algae blooms are prevented through competition. **ESAE** will remove nitrogen compounds from the water column faster than the algae and, as a result, the algae are starved out of existence or bloom is inhibited. In addition, **ESAE** degrades accumulated organic waste, top scum and bottom sludge for use as carbon sources. The overall result is clean, clear water, free from algae, odours and sludge. **ESAE** is designed to treat the cause, not the effect.

Can I mix ESAE with chemicals in the pond?

Some chemicals are harmful to bacteria. Read the instructions for the chemicals to find out. Never mix two products together, even if you use them at the same time.

What time of the day should ESAE be added?

ESAE can be added at any time of the day, but to help clarify green water, additions should be made at the end of the day,

How long before ESAE begins to work?

ESAE starts immediately to solubilise sludge and other processes start over the next hours as the beneficial bacteria come out of formancy. Biological processes are slower than chemical poisons; positive results will be seen within a few days to a week, depending on conditions such as temperature, pH or aeration.

Some users of ESAE have noted a rapid decrease in nitrite. How is this possible?

ESAE contains bacteria capable of converting and removing nitrite by not just one but two pathways: nitrite can be converted to nitrate by the nitrifiers and to nitrogen gas by the denitrifiers.

Does ESAE contain bacteria capable of nitrification and denitrification? If so, how does one avoid partial denitrification?

ESAE contains bacteria, which are capable of nitrification and complete denitrification, which is the conversion of nitrate or nitrite into nitrogen gas. Partial denitrification is the conversion of nitrate into toxic nitrite. Not all bacteria are capable of complete denitrification, in fact, strains capable of incomplete denitrification are naturally more abundant than the desirable ones, which perform complete denitrification. Regular use of **ESAE** assures the presence and dominance of strains capable of complete denitrification.

How does ESAE solubilise protein?

ESAE solubilise sludge and protein by splitting the long chain molecules into smaller fractions such as amino acids, which are water soluble. **ESAE** also solubilise fats by converting them into fatty acids, which are also soluble in water. The solubilised sludge, protein and fats will then be converted, by the beneficial community in **ESAE**, into bacterial biomass, carbon dioxide and water. The bacteria biomass is natural food for your fish and invertebrates. Converting pollutants into beneficial food is the natural way of maintaining pond health by converting pollutants into something useful to your pond community. Gold fish and koi suck gravel into their mouth to remove the bacteria floc, which is food and then they spit out the cleaned gravel. Use of **ESAE** converts waste into natural and beneficial food; this is what the food web is all about.

What is the relationship between algae and bacteria? Why in some situations are there diatoms, filamentous algae or blue-green algae?

Nitrogen is considered the limiting factor for algal growth in salt water, while phosphorus is the limiting factor, in fresh water. Under optimal conditions heterotrophic bacteria can double their population within 20 minutes; algae take about 24 hours. The bacteria also have a much greater surface area to volume ratio than algae. Greater surface area facilitates the uptake of nutrients. It is largely for these reasons that appropriate bacteria can remove soluble nutrients, which are needed by algae.

The beneficial community in **ESAE** is particularly efficient at removing soluble phosphorus. Bacteria are rapidly preyed upon; this results in the nutrients being biotransformed into natural and beneficial food for the invertebrates and fishes in your pond. Regular additions of **ESAE** are essential for optimal benefits and water clarity. The nutrients taken into bacteria are unavailable to the algae.

Diatoms have the special requirement of silica for their growth. Filamentous algae are favored in moving water. The attached filaments remain in position, where as plank tonic forms move down stream with the current. Blue-green algae can fix nitrogen from the air and also form air pockets, which is turbid. Their ability to float provides them with light in otherwise dark waters.

What is the relation between light and bacteria?

Light is not only unnecessary for the growth of the beneficial bacteria, which improve water quality, but light can inhibit the growth of nitrifiers, particularly Nitrobacteria. Biological filters should be kept in the dark. Ultra violet light is a function of the wave length, intensity and duration of the exposure.