



HOW TO KNOCK OUT ODORS AND REMEDiate THE WATER IN YOUR HOG FARM LAGOON

Regulators and environmentalists are applying tremendous pressure on hog farmers regarding pollution issues connected to their waste lagoons. On top of this, a distraught public continues to demand that hog farmers control the stench which emanates from these ponds.

Hog farmers are not alone. These same demands are being placed upon all confined animal feedlot operators as well as upon municipal wastewater treatment operators.

Municipal wastewater engineers have long known that aeration is one of the keys to the treatment of black water. The challenge has been that most aerators on the market consume huge amounts of high cost electrical energy. Other shortcomings include high maintenance costs and inefficient oxygen transfer.

There is a new self-aspirating aerator on the market provided by VaraCorp LLC which overcomes most of the shortcomings of mainstream aerators. Rather than use modified propellers, as is common in other self-aspirating aerators, this new aerator uses a turbine. This state-of-the-art aerator operates on the physics principles of centrifugal force and precession as applied to rotating fluids. The result is a highly efficient, low maintenance aerator which has low power costs.

VaraCorp's aerator operates by injecting air into water and not water into air. Since air is a lot easier to move than water, the horsepower requirements can be as much as five times less than competing aerators. Thus, it is not unusual for a 5-horsepower turbine aerator to outperform a 15-horsepower paddlewheel aerator or a fountain (splash) aerator. This lower horsepower equates to significantly lower electrical costs.

Hog farm owner/operators use one of two methods to process animal waste. These methods are anaerobic digestion and aerobic digestion. Byproducts of anaerobic digestion include high odor, formaldehyde, mercaptans, aldehydes, and other compounds that can harm crops or soil. In contrast, aerobic digestion results in a liquid compost that can be highly beneficial to crops and soils.



The main function of an anaerobic lagoon is to remove, destroy, and stabilize organic matter, but not to “purify” the water. The advantage of this system is in its ability to concentrate solid wastes. High levels of gas and odor are evident near these types of lagoons. These systems are characterized by a relatively solids-free liquid zone located above a layer of bottom sediment.

The end products of aerobic digestion are mainly carbon dioxide and water. Virtually any degree of processing can be obtained in an aerobic lagoon since digestion is a function of time, oxygen availability, and carbon content.

Aerobic lagoons can be in the form of oxidation ponds or mechanically aerated ponds. Oxidation ponds depend upon naturally occurring dissolved oxygen from the air or from algae in the water. Because the oxygen demand is so high in a manure lagoon, the surface area of an oxidation pond must be large to enhance the air exchange at the water surface.

Mechanical aeration seems to be the more practical mode of treatment in a hog waste lagoon. The advantage of aerobic digestion is a reduction in volatile organic compounds, a reduction or elimination of odors, and a reduction of solids which are turned into carbon dioxide gas. Furthermore, oxygen is known to kill harmful pathogens. Aerobic digestion is said to turn the wastewater into a form of compost tea making it not only fit, but highly beneficial for spraying onto crop fields.

The level of aeration needed to turn a lagoon from anaerobic to aerobic will vary greatly from farm to farm. A pond is considered to be aerobic when the level of dissolved oxygen equals at least two milligrams per liter. It takes this level of oxygen to adequately support aerobic bacteria. Because of the size of many lagoons, and the huge burden of waste, it can take a multitude of aerators to reach this level of dissolved oxygen.

The VaraCorp turbine aerator is a self-cleaning aerator that is not affected by wire-like hog hair. Other aerators such as venturi (air injector) aerators can fail when hog hair blocks the injector throat or clogs the pump impellers. It is virtually impossible to screen out hog hair.



VaraCorp's Self-Aspirating Turbine Aerator

With an adequate number of turbine aerators in the lagoon, the hog farmer can expect the severe odor to abate in a matter of days, not weeks or months. This benefit alone can appease the nearby public. In fact, odor abatement will be the result of dissolved oxygen ramping up the

populations of aerobic bacteria which will be processing the solids and oxidizing the other contaminants in the lagoon. Since the turbine aerator injects dissolved oxygen below the surface, as opposed to throwing water up into the air, it does not stir up the source of the odor.

The efficiency of the turbine aerator is partly due to the small size of the dissolved oxygen bubbles it injects into the water. Smaller bubbles have a longer retention time in the lagoon compared to macro-sized bubbles that might be produced by paddlewheel aerators, for example. Retention time is critical to the efficient operation of any aerator.

Following is a summary of the benefits of the VaraCorp turbine aerator to the hog farmer:

- Improves the relationship with environmentalists and regulators.
- Reduces foul waste odor, thus reducing complaints from neighbors.
- Designed to run 24/7 with little or no attention from the farmer.
- Provides quiet, trouble-free operation.
- Dissolves sludge on the bottom of the lagoon.
- Can outperform aerators which have five or more times the horsepower.
- Will not clog with hog hair.
- Forces air into water and not water into air, thus, requires less horsepower.
- Boasts a high retention time of dissolved oxygen in the water.
- Reduces ecological damage to soil and nearby streams.
- Helps the farmer stay within regulatory compliance.
- Reduces electrical costs.

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