

Liquid Manure Treatment

Sarkeresztesi Agricultural Plc, Sarkeresztes, Hungary



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Operation

1 liquid manure basin
with 9.000 m³ with
two OLOID Type 400

Period

06-08/2015

Success

Organic matter content reduced by
42%

Reliable reduction of odours

Reduced bacteria count

Process

The liquid manure of 450 cattle has been mixed with Effective Microorganisms (EM) in a 1:1000 dilution. Two OLOID Type 400 were responsible for the homogenisation of the EM in the liquid manure lake and for the circulation. The OLOIDS were set for maximum agitation without air intake. The reason for that was that the anoxic features were meant to be exploited: the cow manure is anaerobe, liquid manure is anaerobe, while EM also include many anaerobe and facultative anaerobe species of microbes. We found it more rational to keep it anaerobe than to put energy into turning it to aerobic conditions. The two OLOIDS were running at max. rotation 24 hours a day.

Target

Treatment of the separated cattle liquid manure with two OLOID Type 400 units and inoculated EM microbial to achieve solutions for the following problems:

1. Cleaning water:

Problem: Liquid manure is used as cleaning water of the stalls of the animals and is heavily infected with pathogenic germs causing illnesses for animals

Solution: Biologically high quality liquid manure, i.e. reduce the total amount of pathogenic germs in the liquid manure lake.

Result: E-coli and total coliforms reduced from 180 000 to 80 000 individuals.

2. Soil fertility:

Problem1: Liquid manure is rich in unprocessed raw organic matter. When sprayed to the lands, this organic matter takes time for soil microbial life to digest and transform to plant soluble matter, which consumes the energy reserves of the soil.

Problem2: The high nitrogen (N) content of the liquid causes an N-shock for the plants when spraying, which can even stop plant growth for weeks. Plus, most of the N is washed out from lands by rain.

Solution: EM microbes do the pre-digestion of the organic matter already in the lake before land application and save energy of the soil microbes. Plus, microbes intake N in the protein during the cell-body formation, and when they go to the land they stick to the soil particles and are not washed out. They release N gradually as they die.

Result: Organic matter content reduced by 42%, while stagnation of the COD with increasing BOD: increase shall mean that the organic matter's transformation of plant consumable food improved.

3. Methane and odour:

Problem: Liquid manure is a highly anoxic liquid and methane, a very aggressive greenhouse gas, is released into the nitrogen cycle. Moreover, simultaneously released gaseous hydrogen sulphides cause a bad smell.

Solution: Increase the biological activity in the liquid to interfere in the N-cycle. The microbes intake N in the protein during the cell-body formation, which reduces methane amount and reduces odour.

Result: Both aerobe and anaerobe microbial forms, as well as lacto-bacillus (one of the main components of EM) have been increased fixing N in their bodies. Odour increased in the first period and then substantially decreased (due to the formation of a new microbial balance in the lake).

4. Nitrate and nitrite infection of the land waters

Problem: The high nitrate and nitrite content of the liquid is intensively washed out from the lands into the land-waters in case of heavy rains. Furthermore, nitrite is toxic for the plants. Nitrate is dangerous for humans and animals as well.

Solution: Increase the biological activity in the liquid to interfere in the N-cycle. The microbes intake N in the protein during the cell-body formation, which reduces Nitrate and Nitrite as well.

Result: The so-called Kjeldahl-Nitrogen (all forms of organic N) increased, while Nitrite and Nitrate decreased.

5. Soil microbial life

Problem: The fertility of the soil is basically up to the healthy, divergent and rich microbial life (the Soil Food Web). The conventional, chemical based agriculture dramatically reduced the Soil Food Web, thus decreasing soil fertility.

Solution: EM to be propagated in the liquid. EM are able to join and cooperate with the existing soil microbial community and balance out the wrecked Soil Food Web.

Result: Lacto-bacillus total count increased by 25%, which proves the propagation of EM.

6. Capacity of the lagoons

Problem: Although there is a separation process of the liquid and solid phase of the manure, there is dry matter (undigested organic compounds, sand, soil, etc.) descending to the bottom. This settling can consume 30- 50% of the lagoon (in case of pig manure, it can be 90%!), which means lost capacity for the farmers resulting in more often emptying or failure or wrecked pumps.

Solution: Reduce organic matter and keep the other settling floating.

Result: Organic matter reduced by 42%, while the liquid became much more dense.

The project was carried out by our partner Agrofutura Ltd., Budapest, Hungary

Contact person: Gabor Szollosi GM; Web: www.agrofutura.hu/Oloid

Cell: +36 70 4343 601; E-mail: gabor.szollosi@glmatrix.com