



TINTEGRATED SYSTEM FOR THE DISPOSAL OF LIVESTOCK SEWAGE AND THE CONTROL OF THE ENVIRONMENTAL IMPACT

ROTA GUIDO Company got many appreciations for its constant research and development in the environmental-zootechnical sector. Worthwhile examples are the "FLOATING MODULAR STRUCTURES FOR THE BIOGAS RECYCLING AND THE REDUCTION OF THE SMELLS IN THE SEWAGE STORING TANKS" that was given the prize "Technological Innovation" at the Verona Exhibition and the "INTEGRATED SYSTEM FOR THE DISPOSAL OF LIVESTOCK SEWAGE AND THE CONTROL OF THE ENVIRONMENTAL IMPACT", unanimously voted by the technical-scientific committee, that was given the "Targa Beltrami" (first prize) at the International Exhibition of the Milch Cow in Cremona.

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This system provides for a combination of organized treatments forming the following integrated system:

1) Solid/liquid separation.

It consists in removing from the livestock sewage the solid particles having a granulometry over about 500-800 micron. The resulting fractions are therefore two: an essentially solid one that can be piled up on the platform and a liquid one for the anaerobic digestion;

2) Anaerobic digestion with biogas recycling.

Anaerobic digestion of the sewage from cattle and pig farmings in a special tank (digester) suitably covered and equipped where the biogas is produced by means of controlled biological reactions;

3) Use of the biogas for the production of thermal energy and electric power.

The biogas resulting from the anaerobic digestion can be profitably used to fuel a boiler for the production of heat energy, or cogenerators that produce electric power and heat energy at the same time;

4) Aerobic stabilization treatment with conditioning of the nitrogen content according to specific farming requirements.

The air and consequently the oxygen inlet helps the development of the facultative aerobe organisms, present in the sewage by nature, that carry out an oxidative degradation of the organic matter, thus stabilizing it and reducing considerably the production of smelly and phytotoxic compounds (nitrogenous and sulphurated compounds).

The aerobic treatment involves a modification of the chemical composition of the sewage: the ammonia nitrogen rate decreases by 20-25% (by volatilization) and the BOD and COD contents decrease by 25-75% and 30-60% respectively. The oxygenation can be more-or-

less forced according to the intended purpose. As to the oxygenation, generally speaking, the energy is required in proportion to the expected stabilization degree. This system assures the following main advantages:

- a) modulation of the nitrogen rate in the sewage waste to be distributed according to specific requirements. It'll be therefore possible to reduce the nitrogen content in the sewage waste so as to make it fit the farm land requirements and meet the specific environmental regulations;
- b) drastic reduction and, practically, elimination of the smells resulting from storage and distribution operations;
- c) reduction of the emissions of greenhouse gas and ammonia;
- d) possible spreading of the waste as covering, because of the elimination of any phytotoxicity problems;
- e) positive energy result, thanks to the recycling of the biogas produced and to its conversion into electric power and heat energy;
- f) great flowing of the sewage waste and easy pumping into underground lines without risks of clogging;
- g) easy and low-cost operation of sewage spreading;
- h) operators' better working conditions, thanks to the release control and the consequent improvement in the air quality;
- i) sewage waste hygienization resulting from the reduction of the overall microbic charge and from the control of any pathogen charge;
- j) possible total automation of the process and integration of control and safety systems, with considerable cutback of the operating costs;
- k) system flexibility allowing the disposal of sewage waste from either cattle farmings or pig farmings or mix.

Conclusions

To end off this short explanatory summary about the system it is necessary to point out that this system as a whole assures the environmental compatibility of the livestock activity (for both cattle and pig farmings) with a total recycling of resources from livestock waste without rises in costs, on the contrary there is often a positive balance of the energy costs. As a consequence, the livestock activity is improved as to work quality and operators' safety, the operating costs are cut back and the overall productivity increases while the environmental impact is sensibly reduced.

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