OBERON ALPHA EU se
JOINT STOCK COMPANY

Resource-saving technology

Obtaining concentrated organic fertilizers (KOF) from livestock farm wastewater

How does the technology work?

OBERON ALPHA EU se
JOINT STOCK COMPANY

The KOFs have been developed and are being implemented in farms by processing liquid, semi-liquid and litter manure from livestock enterprises based on the accelerated composting method using a biologically active additive (BAA):

- allows to produce solid KOF based on liquid and semi-liquid manure during 7-15 days and liquid KOF during 4-8 hours

Advantages of technology

OBERON ALPHA EU se
JOINT STOCK COMPANY

1

Reduces the amount of space required for storing manure. Long-term effect, up to 4 years after application.

2

The application rate of liquid and solid KOF does not exceed 4 t/ha. KOF has 50 times the nutritional value of traditional organic fertilizers.

3

KOFs help replenish the reserves of nutrients in the soil and improve the water, thermal and air characteristics of the soil.

OBERON ALPHA EU se
JOINT STOCK COMPANY

1

Improve the ecology in places where manure accumulates

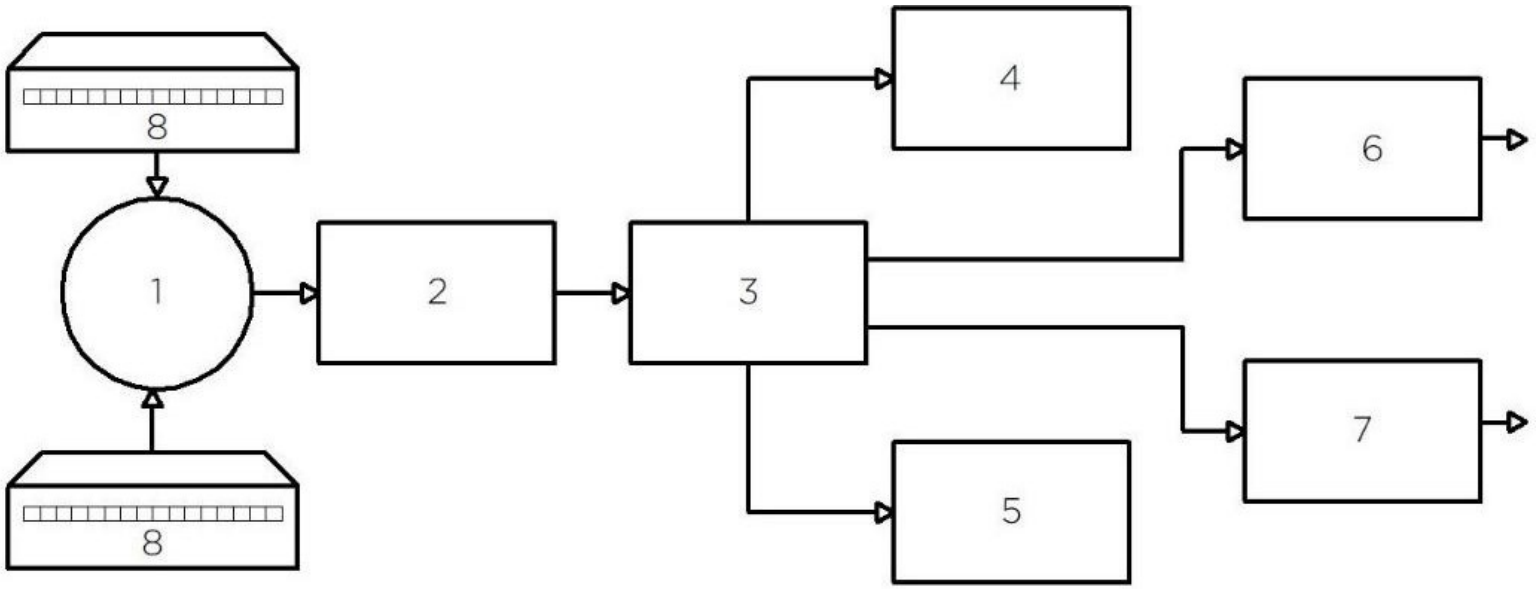
KOF **solve** major **problems**

2

Contribute to increasing soil fertility

Block-diagram of processing manure into organic fertilizers and KOF

OBERON ALPHA EU se
JOINT STOCK COMPANY



1. Initial capacity of liquid manure
2. Liquid manure disinfection line
3. Manure separation line
4. Liquid organic fertilizer preparation line
5. Solid organic fertilizer preparation line
6. Liquid organomineral fertilizer and KOF preparation line
7. Line for preparation of solid organomineral fertilizers and KOF
8. Livestock building

Technological scheme

OBERON ALPHA EU se
JOINT STOCK COMPANY

1. The work on preparing organic and organomineral fertilizers begins with feeding from livestock buildings through sewer collectors into a storage tank. In this tank, the primary preparation of liquid manure is carried out, which includes homogenization and grinding of large inclusions existing in the manure.

2. The proposed hardware scheme for physical and chemical disinfection of liquid manure allows, in a flow mode, in one pass, to solve the problem of disinfecting manure with the receipt of a product of standard quality and the required sanitary and epidemiological safety standards. At the same time, the destruction and deprivation of germination of weed seeds and the neutralization of all pathogenic microflora and helminths found in the manure are ensured.

3. Then part of the disinfected liquid manure is sent to the line for separating liquid manure into two fractions, liquid and solid.

Technological scheme

OBERON ALPHA EU se
JOINT STOCK COMPANY

4 The resulting disinfected liquid fraction with a humidity of 98% - 98.5% is fed to the liquid organic fertilizer preparation line (pos. 4). In this process section, the liquid fraction is brought to parameters that meet the characteristics of liquid organic fertilizer. This line has a section for packaging and storing finished products.

5 The disinfected solid fraction obtained by mechanical dehydration with a humidity of 70%-75% is fed to the solid organic fertilizer preparation line. In this technological section, this fraction is brought to parameters that meet the characteristics of solid organic fertilizer. Then, solid organic fertilizers are sent to the places of their intended use. This section has places for packaging and storing finished products.

6-7 Part of the obtained disinfected liquid manure fraction is sent from the manure separation line (pos. 3) to areas for the preparation of liquid (pos. 6) and solid (pos. 7) organomineral or concentrated organic fertilizers, which are obtained by enriching organic materials with macro- and microelements.

Why can manure be used as fertilizer in agriculture only after preliminary preparation and disinfection?

OBERON ALPHA EU se
JOINT STOCK COMPANY

General view of the liquid manure disinfection line

According to the World Health Organization, manure can contain more than 100 types of various pathogens that cause animal and human diseases.

After 1.5 years of storage, 30-80% of helminth eggs, trichocephalus, trichostrongylids, etc., as well as 1-17% of weed seeds, which can dramatically reduce the yield of cultivated plants, remain viable.

The proposed method:

- ✓ allows to significantly reduce the area
- ✓ reduce transportation costs of agricultural enterprises

Setting up process activation

OBERON ALPHA EU se
JOINT STOCK COMPANY

This is a device that is used to intensify various types of physical and chemical processes.

The quality of the processes is ensured by their implementation in the vortex layer.

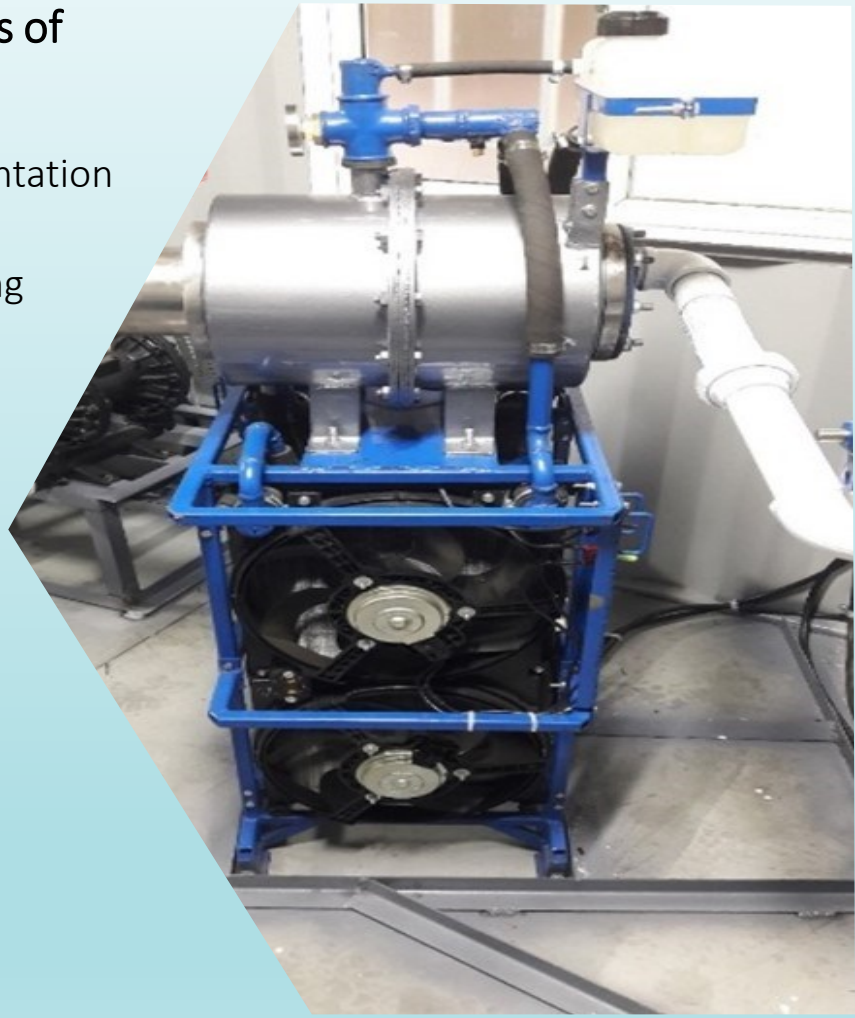
This is the chaotic movement of ferromagnets in a rotating magnetic field.

Ferromagnets are elements made of magnetic material, usually cylindrical in shape, **5-20 mm** long and **1.5-3 mm** in diameter.

In the vortex layer, a complex interaction with the processed product occurs due to a set of **various factors:**

- grinding of solids in liquid and dispersion media (due to the mechanical movement of ferromagnets);
- activation of the surface of solid particles (due to electric fields and the electrolysis process);
- changes in the physical and chemical properties of substances (due to electric and magnetic fields).

High electromagnetic field strength as a powerful disinfection factor.



UAP NVPO «Proinnotech «(laboratory installation)

Recycling line

OBERON ALPHA EU se
JOINT STOCK COMPANY

Technological equipment of the manure disinfection line

Liquid Separation Line manure fractions

Solid fraction of liquid manure after separation

Production of solid KOF

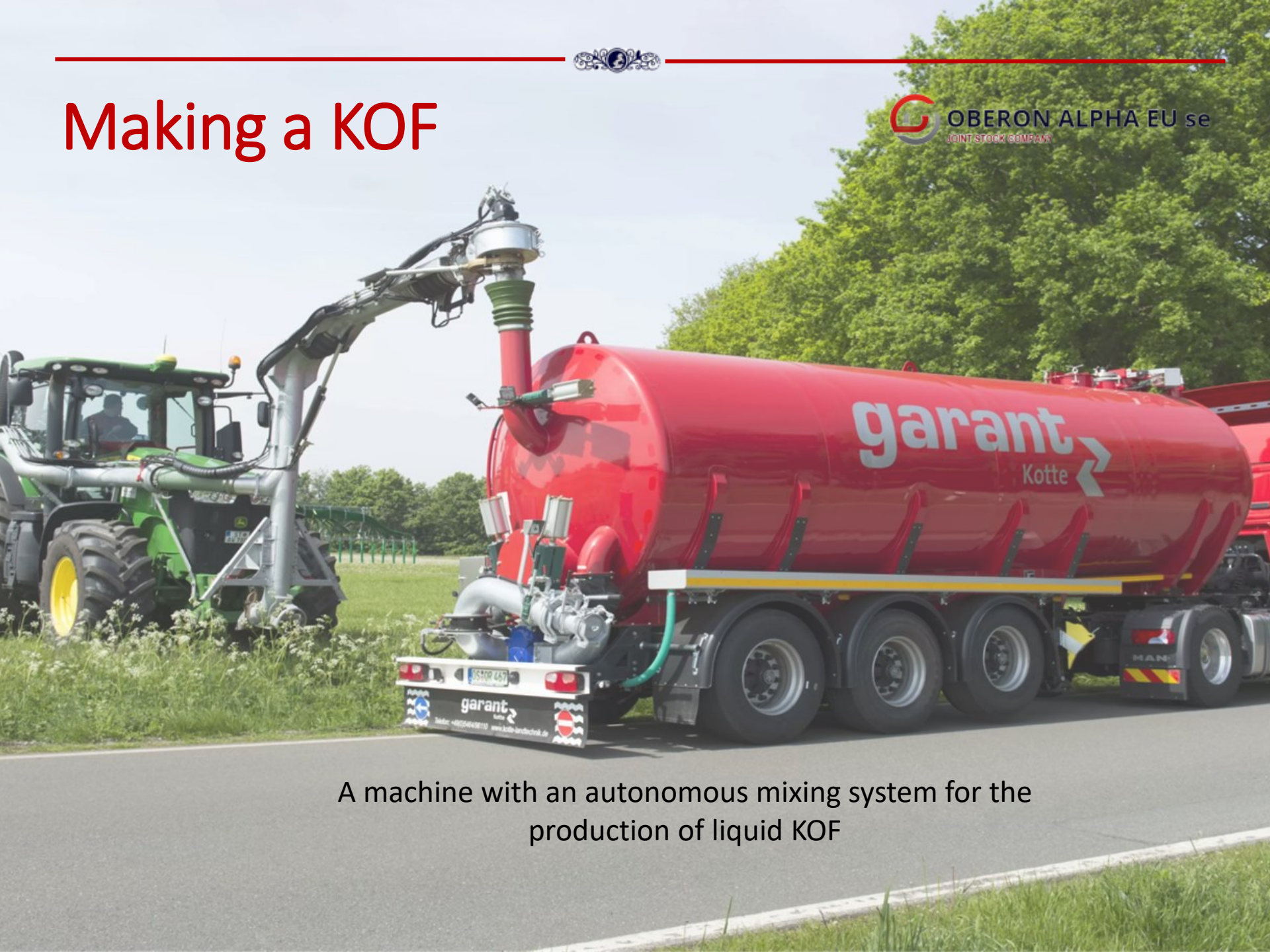
OBERON ALPHA EU se
JOINT STOCK COMPANY

in an open area and under a canopy

in the field, a general view of the collars

Making a KOF

OBERON ALPHA EU se
JOINT STOCK COMPANY



A machine with an autonomous mixing system for the production of liquid KOF

Making a KOF

OBERON ALPHA EU se
JOINT STOCK COMPANY

Introduction of solid KOF

A fragment of the loading of solid KOF

Economic efficiency of the technology

OBERON ALPHA EU se
JOINT STOCK COMPANY

profitability of winter wheat cultivation is increasing

%

using mineral fertilizers

на 43,5 - 67,1

sunflower seeds

на 38.6 - 66,2

corn for grain

на 30,5 - 68,2

Payback period for projects

От 1 до 1,5 лет

The indicators of productivity, labor, production costs, and cost of production are given below

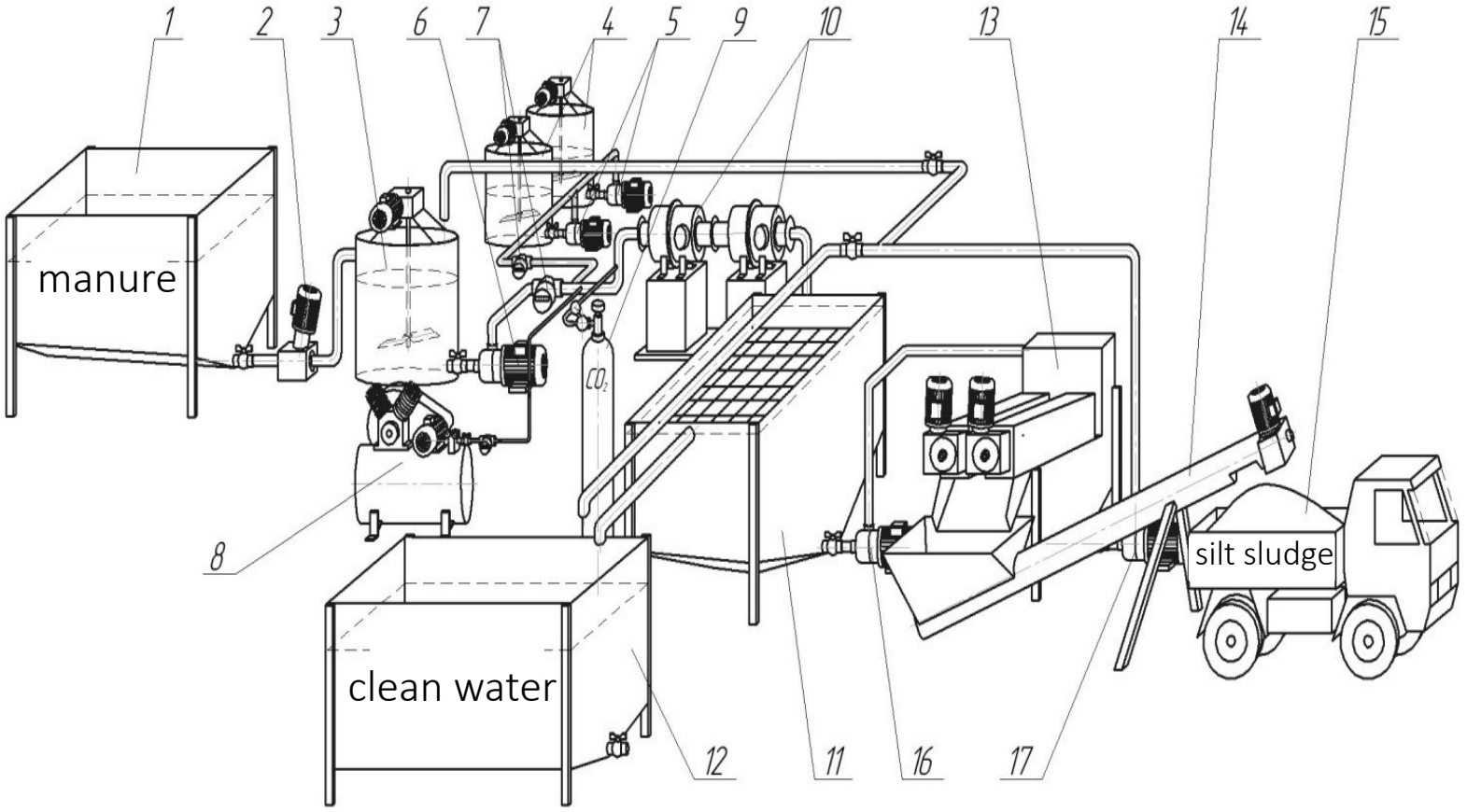
Economic efficiency of cultivating agricultural crops using organic farming using KOF

OBERON ALPHA EU se
JOINT STOCK COMPANY

Indicators	winter wheat		spring barley		sunflower seeds		corn for grain	
	basic technology	with the introduction of a solid code	basic technology	with the introduction of a solid code	basic technology	with the introduction of a solid code	basic technology	with the introduction of a solid code
yield g/ha	41,7	52	29,5	39	24,6	32	49,7	62
labor costs. people h/ha	6,42	6,09	5,07	4,86	2,94	2,87	3,39	3,78
the cost of petroleum products kg/ha	0,79	0,93	0,71	0,85	0,79	0,92	0,8	0,93
grain yield c based on - 1 person-h	6,49	8,53	5,82	8,03	8,38	11.14	11,64	16,4
- 1 kg of petroleum products	52,92	55,91	41,43	46,15	31,22	34,74	61,97	66,95
production costs RUB/ha	24807,37	26912,36	13270,27	16369,96	11591,99	14366,41	14755,31	15649,70
the cost of agricultural crops in rubles/ton	5949,01	5175,45	4498,40	4197,19	4712,19	4489.50	2968,88	2524,15
the cost of production RUB/ha	5949,01	41600,00	20650,00	27300,00	29520,00	38400,00	37275,00	46500,00
net income -RUB/ha	8552,63	14687,64	7379,73	10930,04	17928,01	24033,59	22519,69	30850,30
- RUB/ton	2050,99	2824,55	2501.60	2802,57	7287,81	7510,50	4531,12	4975,85
profitability level, %	34,48	54,58	55,61	66,77	154,66	167,29	152,62	197,13

A complex for cleaning household and agricultural wastewater with electromagnetic fields

OBERON ALPHA EU se
JOINT STOCK COMPANY



Pig manure processing complex

OBERON ALPHA EU se
JOINT STOCK COMPANY

An innovative complex designed for the neutralization of pig manure to produce, for reuse, technically clean water and sludge with a moisture content of 15%, which is the basis for obtaining a highly effective fertilizer.

Receiving **hopper 1** is designed for receiving and accumulating initial pig manure from farms.

Drainage pump – **shredder (macerator) 2** has a cutting tool in the design, which simultaneously with pumping manure crushes the large parts trapped in the manure.

The **collector-averager 3** is a container with a stirring device that receives the prepared manure and ensures its homogeneous composition by volume.

The device for automatic preparation and dosing of reagents (lime milk) **4** with two containers, this device includes a silo for storing lime with an intake screw and a preparation and dosing tank. This device prepares the reagents and maintains their average composition before serving to carry out the manure neutralization process. The tanks of the device are connected in a parallel circuit, which ensures an uninterrupted supply of reagents. **Pumps 5** provide a metered supply of reagents to carry out the manure neutralization process.

Flowmeters 7 monitor the flow of manure and reagents to ensure their exact ratio during the process.

Compressor 8 provides a metered supply of air, which is supplied to the manure mixed with reagents. Air is also necessary for the process. The CO2 supply **system 9** provides the supply of CO2 carbon dioxide to the manure mixed with reagents, carbon dioxide ensures the formation of coalescing elements, which further separates water from sludge.

The unit of devices with intersecting magnetic fields 10 is an electromagnetic activator of chemical processes installed in series. These activators ensure the rapid chemical processes of manure neutralization.

The settling **tank 11** with thin-layer blocks is an apparatus for high-speed deposition of suspended particles, which separates into clean industrial water and sludge. The **tank 12** is designed to collect clean water, which is obtained during the operation of the pig manure processing complex. The screw **conveyor 13** extracts the sludge obtained in the **sump 11**. The moisture content of the sludge after pressing is 15%. The screw conveyor **14** removes the squeezed sludge and transports it **16** for further use.

A complex for cleaning

OBERON ALPHA EU se
JOINT STOCK COMPANY

A complex for cleaning domestic and agricultural wastewater with a capacity of up to 10 m 3/hour is an innovative facility that provides highly efficient processing (purification) of liquid biological waste with high-intensity electromagnetic fields to produce clean water and fertilizers with minimal energy costs.

Scope of application

- dynamic cleaning of household and agricultural biological effluents;
- cleaning of sludge maps of sewage treatment plants;

The use of container (mobile) complexes for cleaning and neutralization of accumulators of household and agricultural facilities that do not have sewage treatment plants.

The use of container (mobile) complexes for emergency and emergency situations.

OBERON ALPHA EU se
JOINT STOCK COMPANY

Environmental challenges to be solved:

• purification of urban domestic and industrial wastewater and sewage sludge with minimal energy consumption;

• neutralization of bird droppings, manure, products of technical processing of birds and animals;

• obtaining high-quality organic or organomineral fertilizers, compound feeds and purified water.

Innovative qualities of the complex:

• mechanical (intensive dispersion of components and particles and their mixing and impacts of working bodies);
• destructive flows that weaken intermolecular and interatomic bonds as a result of the action of the electromagnetic lens of the inductor
• hydrodynamic, expressed in large shear stresses in the liquid, developed turbulence, pressure pulsations and flow velocity;
• hydroacoustic in liquid media due to small-scale pressure pulsations, intense cavitation, shock waves and secondary nonlinear acoustic effects;
• microarcs and electromagnetic eddy current field;
• hydrolysis and ionization of water with release of H+ and hydroxyl group OH– ;
• thermal effects;
• destruction of pathogenic microflora and microorganisms.

OBERON ALPHA EU se
JOINT STOCK COMPANY

The main technical characteristics of the technological module for wastewater treatment

Parameters	Values
Types of wastewater to be treated	Wastewater generated by municipal household facilities , as well as
Cleaning capacity, m3/hour:	5-10 m3/hour
Supply network, V / Hz	3-phase: 380/50
Input power, kVA	5-15
The main parameters of the APMP device:	3-phase: 380V ± 10% / 45...66 Hz
Power supply voltage / frequency	
The current in the supply network, A	8-20
Power consumption (active), kW	4-9
Diameter of the working area, mm	100
Magnetic field induction in the working area, T	0,09 – 0,18
Operating frequency range, Hz	40-100
Operating voltage range, In	280-400
Cooling liquid	Immersion liquid
Dimensions of the inductor (diameter, length), m	0,3/0,8
Weight (without cooling system), kg	up to 80 (per unit)
Total power consumption of the process module, kW	8 - 35

OBERON ALPHA EU se
JOINT STOCK COMPANY

Variability of the manure processing complex

When designing a production complex for the preparation of organic, organomineral fertilizers and COE from liquid manure, the composition, quantity, technical characteristics of the technological equipment used, as well as the size of the used areas and production facilities largely depend on the chemical composition, quantitative and qualitative characteristics of the incoming liquid manure.

All these parameters, as well as the procedure for the preparation of organic, organomineral fertilizers and COE, are specified in the organization of production processes at each specific agricultural enterprise.

Commercial scheme of bio-waste (manure) processing

OBERON ALPHA EU se
JOINT STOCK COMPANY

Bio-waste (pig manure, etc.) enters a processing complex consisting of units for producing environmentally friendly water and a unit for producing environmentally friendly solid fuels (briquettes) with a caloric content of more than 4,300 kcal/kg for thermal energy complexes.

Purified, environmentally friendly water (approximately 9 tons out of 10 tons of manure) can be used as recycled water for the technical needs of biological production, or for irrigation (as fertilizer) of the surrounding ecosystem in an area close to the processing complex under a commercial agreement with Government authorities.

Solid environmentally friendly fuel (this is approximately 1 ton out of 10 tons of manure) can be used for its own thermal power plants to generate heat and electricity, or for sale on the foreign market.

Using a fine-grained fraction in combination with peat, highly effective biofertilizer can be obtained. The consumption of biofertilizer Concentrate is 1 liter per 1 hectare of sown area.

Commercial scheme of bio-waste (manure) processing

OBERON ALPHA EU se
JOINT STOCK COMPANY

With a processing plant capacity of **10 tons** per hour, we receive approximately **220 tons** of environmentally friendly water per day and 24 tons of solid environmentally friendly fuel per day. This corresponds to the production of approximately **120,000 kWh** of thermal energy per day.

$$Q=c*m*\Delta t$$

Q - the amount of heat, J
c - specific heat capacity of the substance that makes up the body (J/kg*S)
m - body weight, kg
▲t - body temperature measurement, C

The complex IS USED TO neutralize BIOLOGICAL WASTE (for example, pig manure) to produce technically clean water that can be reused.

The complex makes it possible to obtain sludge with a moisture content of 15%, which, with proper further processing, can be used as fertilizer.

OBERON ALPHA EU se
JOINT STOCK COMPANY

The following scheme is proposed for the distribution of shares

24% - farmer,

24% - Developer (techies)

24% - the investor

24% - the implementing party,

4% - protection