Recycling of wastes of agricultural production and rural settlements to produce biogas and organic matter

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Abstract.
In most regions of the Russian Federation today has a highly developed agriculture and processing enterprises, respectively with a high concentration of resources for production of biogas. On the Volga and southern districts account for a total of about 58% of the biogas potential. In the processing of all waste of agriculture and processing enterprises can fully supply gas to rural areas.

Every year, up to 14-15 billion tons of biomass are produced in the production of agricultural products on the territory of the Russian Federation. The energy of chemical bonds in the decomposition of this amount of biomass is equivalent to 8.1 billion tons of conventional fuel.

According to the research results Of the Institute of energy strategy of Russia, the total amount of organic waste of the agro-industrial complex of the Russian Federation in 2015 amounted to 225 million tons, including:
- livestock-58.3 million tons;
- crop production-147 million tons;
- processing industry APK 14 million tons (the sugar and canning factories, meat processing plants, alcohol Breweries, etc.).

The above data show that the greatest mass among organic wastes of agricultural production is occupied by wastes of plant growing (straw, stems, husk, tops, floors, etc.). Processing into biogas at the same time with the waste of livestock and poultry requires the development of a universal biogas technology and related equipment.

The analysis of national and world literature in the field of biogas technologies should begin with the coverage of the work carried out in the early 60s of the last century At the Institute of biochemistry. A. N. Bach of the USSR. It is these studies and their commercial incarnation was the starting point in creating a domestic industrial bio-energy and active fundamental research of the processes of biosynthesis of methane and biogasification [1,2,3,4,5].

The idea was developed and calculated in 1972-1973 and embodied in the project in 1979 This project was supported by the leadership of the Union of SSR and in 1980 included in the program of the USSR State Committee on science and technology.

Under this program, three large biogas plants were built between 1980 and 1990.

Development of market economy and emergence of new forms of ownership in agricultural production demanded development of the highly profitable technologies and the equipment working in any climatic zone and in any Russian remote place from the centralized power supply.
Agricultural producers face the problem of manure utilization every year. Go a lot of money that is required for the organization of its export and warehousing.

It is known that manure is a very valuable fertilizer, and if there are several cows on the farm, then there are no problems with its use. Another thing when it comes to large farms with large livestock, where thousands of tons of biological material are formed per year. To make manure turned into high-quality fertilizer, we need equipped platforms, which are unnecessary costs. Therefore, many agricultural producers store it without observing the storage conditions, and then take it out and close up in the soil.

Biogas is a volatile substance without color and any smell, which contains up to 70% methane. According to its qualitative indicators, it approaches the traditional type of fuel – natural gas. Has a good calorific value of 1m3 biogas emit as much heat as is obtained by burning half a kilogram of coal. The formation of biogas we owe to anaerobic bacteria, which are actively working on the decomposition of organic matter, which is used as the manure of farm animals, poultry manure, waste processing plants, straw, etc. [9,10]. Table 1: Quantity and composition of combustible gas produced during processing of different types of biomass

| Species biomass            | Proportions of components, | the Specific biogas yield, m3/kg | methane,% |
|----------------------------|-----------------------------|---------------------------------|-----------|
| Chicken manure             | 100                         | 0,311                           | 59,8      |
| Chicken manure and organic(straw, tops) | 50/50          | 0,368                           | 66,1      |
| The cattle manure and straw | 50/50                      | 0,268                           | 51,0      |
| Pig manure and straw       | 50/50                      | 0,473                           | 65,0      |

Participate in the process of mesophilic bacteria. Their activity takes place at a temperature +30 – +40 degrees. Therefore, to activate the process it is necessary to create the most favorable conditions for their life. They should be similar to those in which microorganisms develop naturally, in the stomach of animals, where heat and anaerobic conditions are created. This is the two main conditions that contribute to the natural transformation of rotting manure mass into environmentally friendly fuel and valuable organic fertilizers [6].

To obtain biogas, you need a sealed reactor without air access, where the process of fermentation of manure and its decomposition into components will occur: methane (up to 70%); carbon dioxide (about 30%) and 1-2% - other gaseous substances (figure 1).
Figure 1. Scheme of biogas production from agricultural waste and household waste of rural settlements
The resulting gases rise to the upper part of the container, where they pumped then settles down and is calling Organic Dori, preserved in the result of processing CEN all the elements available in the nose of macro and micronutrients, dead pathogen, but also lost seeds son the life of the plant [7,8].

Calculations of the effectiveness of biogas and to enjoy the benefits of the use of biofuels an alternative, will help NS calculations. One bark weighing 500 kg produces about 35-40 kg of news per day. This amount will be enough to produce about 1.5 m³ biogas, from which in turn it is possible to develop 3 kW/h of electricity.

If the farm contains 100 goals of cors is not difficult to calculate how many m³ of biogas can be obtained at the output.

Sly Important is that for biofuel production it is necessary to use both one type of organic raw material and from a mixture of several components having a moisture content of 85-90%. Before the salad Breaker, it is necessary to remove from the mass to postpone the chemical simple, negatively affecting the process of the action of microorganisms.

Thus recycling of agro-industrial waste and sells pole sells will support the economy, will provide new jobs, the rational use of local waste and ensures maize landscapes of the environment.

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