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GOVERNMENT OF BULGARIA

Workshop:"Biogas – an way to enhance the use value of animal dejections"
13th-14th of September 2012

ANIMAL MANURE COMPOSITION DEPENDING ON SPECIES

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ROMANIA - BULGARIA Cross Border Cooperation Programme

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The excrements of various types and groups of animals contain large amounts of organic matter and organogenic elements. Moreover, they are rich in micronutrients, microorganisms and biologically active substances. Finding themselves in the water at higher concentration, these substances can cause eutrophication and have a significant impact on hydrobiological processes. To obtain a more accurate expression of contamination of livestock, it is necessary to determine the quantities of excrements and urine that are derived from different species and groups of animals and give their chemical characteristics. On this basis, for each farm the total amount of organic pollutants and organogenic will be calculate.

It is estimated that:

- one cow is released on average per day 10 times more excrement and urine, rather than people,
- pig average weight 100 kg average effect is 2.5 polluter pee
- one hen - 0, 12, etc.

If we calculate pollution from livestock in our country will get polluter effect equivalent to 24 million inhabitants, is kvivalent. This means that pollution from livestock is almost 3 times greater than that of the population. A pig farm of 30,000 pigs, situated along the Danube, will pollute the river with organic matter and organogenic elements equal to the pollution that can cause a city with 75 000 inhabitants.

To better clarify the problems of pollution livestock farms we will consider some general features, that give an idea of the quantity of pollutants from livestock and their chemical characteristics.

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In many studies held in ISS "N. Pushkarov "is establish that in:

- **cattle (cows, calves and buffalo**) the quantity of excrements and urine are 8% of the weight of animals and the ratio of solid excrements and urine is 1.66: 1. The substantial part of the nitrogen in fresh manure (50-60%) is in soluble form. At an average weight of a cow 500-600 kg per day, it is received 40 - 48 kg manure (solid faeces and in grub) without bedding. Whit calves this amount is approximately half as the average weight of calves and heifers for fattening is about 250-300 kg.

-**in pigs the wastes**, representing 7% of the weight of the animal and the ratio of solid faeces and urine is 0.62: 1. From average 1 pig with weight 100 kg/per day are received 7 kg excrements.

-in laying hens dung are about 6% of the weight. Average 1 hen with weight 2 kg/per day are received about 120 gr.

The above data refer to fresh manure, without bedding and without spilled feed, which in some cases, a significant percentage. When animals are raised bed, the amount of strawis added to the amount of dung and urine.

Based on above shown coefficients, can be calculated daily of fresh manure, which is obtained from various species and groups of animals (in case of the stable year-round growing) / Table. 1/.

TABLE 1. DAILY QUANTITY OF DUNG AND URINE OF DIFFERENT AND GROUPS OF ANIMALS FOR 1 ANIMAL

	Cows with average weight 500 kg	*Heifers with an average weight of 350 kg*	*Calves with an average weight of 250 kg*	*Pigs with an average weight of 100 kg*	*Laying in the average weight of 2 kg*
Day (kg)	40.00	24.00	20.00	7.00	0,1 2

As pollutant, these values are real, but the total amount of manure that will be used in agriculture, is considerably less .

Depending on the cleaning of the premises is obtained hard manure from farms dry cleaning and liquid manure on farms water cleaning.

Qquantitative and chemical characteristics of manure from Farm dry cleaning

To estimate the amount of quantity of manure, which is obtained from an animal for one year, must be taken into account that about 20% of the time the animals are outside the room and manure can not be collected. Part of the urine goes for wetting the bed, but about 30% of it is wasted and evaporated. Moreover, during conservation, which usually lasts 6-8 monthsp as a result of mineralization processesp the percentage of moisture. Step on loss of organic matter and quantity, the manure during conservation is decreased by about 30%.

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Taking into account losses during collection and Conservation of manure, practically from one animal for 1 year may receive the following amounts of manure:

- cows - 6.7 tons/per year
- heifers - 4.4 tons/per year
- calves for fattening- 3.3 tons/per year.
- pig - 0.64 tons/per year
- sheep - 0.6 tons/per year.
- hens- 0.022 tons/per year

Contamination of manure depends largely on its chemical characteristics, especially the content of basic organogenic elements.

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Tab. 2. CHEMICAL CHARACTERISTICS OF MANURE FROM DIFFERENT TYPES AND GROUPS OF ANIMALS

(In fresh state)

Chemical elements	*cows*	*calves*	*swine*	*Hens*
Abs. dry matter %	11.97	13.53	11.29	20.55
Total N%	0.57	0.73	0.64	1.18
Amon. N%	0.12	0.04	0.05	0.62
Total $P_2O_{5\%}$	0.55	0.46	0.59	1.36
Total $K_2O\%$	0.57	0.66	0.45	0.54
Na%	0.16	0.11	0.18	-
Mg%	0.08	0.09	0.09	0.14
Ca%	0.17	0,3 2	0.08	0.96
Zn mg/kg	-	27.8	30	356
Cu mg/kg	6	19	7	55
Mn mg/kg	27	6	-	-
Fe mg/kg	163	140	27	388

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Tab.3. CONTENTS NITROGEN, PHOSPHORUS AND POTASSIUM IN 1 TON OF MANURE, CORRECTLY STORAGE OF DIFFERENT TYPES AND GROUPS OF ANIMALS

Elements	*Cows* *kg/tonne*	*Calves* *kg/tonne*	*Swine* *kg/tonne*	*Laying* *kg/tonne*
Total N	6.0	6.5	6.5	12.0
Total P_2O_5	3.5	4.5	5.9	14.0
Total K_2O	5.7	6.6	4.5	5.4

According to these data, the pollutant effects of cattle is estimated 10 value people equivalents of an animal with an average weight of 500-600 kg. For weight loss, shall be reduced proportionately and the equivalent of contamination.

It was found that from 1 pig with an average weight 100 kg, polluter has an effect equivalent to 2.5 people. One sheep or goat - 1.2 and etc..

Using these equivalents for each farm can be estimated pollution effect. In pasture seeding a significant proportion of hard wastes and urine remain in the field. This requires in each case to the conditions of cultivation.

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-Qquantitative and chemical characteristics of liquid manure from the farms with clean water

In large industrial farms excrements and urine are removed with water. Hard excrements and water used for technology, sanitary and veterinary requirements are collected under floor spaces and **produces liquid manure. Characteristic of liquid manure - quantitative and chemical varies from farms and depend on how storage and quantity of water used.**

In many cases the amount of technological, veterinary and sanitary water repeatedly exceeded excrements and urine. This leads to increased volumes of liquid manure and to difficulties in its storage, disposal and utilization.

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- **In the industrial breeding of pigs** for a conditional-pig (100 kg) per day are recommended to 28 liters of sanitary and technology water. In this water dilution of liquid manure in the ratio 1:2 or 1:1.

Based on the above values for each farm can calculate the amount of liquid manure, that will be obtained in one day. Subject to project quantities of process and sanitation water, chemical characteristics of liquid manure from different species and groups of animals and will meet the data table. 4.

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Table 4: CHEMICAL CHARACTERISTICS OF LIQUID MANURE FROM DIFFERENT GROUPS ANIMALS

Indicators	Cows when authorized.water 1:2	Calves when authorized.water 1:1.5	Swine when authorized.water 1: 2	Laying hens when authorized.water 1:2
Abs.dry matter %	3.99	4.55	3.76	6.85
Total N%	0.19	0.24	0.213	0.360
Ammonia N%	0.04	0.01	0.017	0.207
Total P%	0.11	0.15	0.197	0.447
Total K%	0.12	0.22	0.150	0.268
Na%	0.05	0.03	0.060	-
Mg%	-	0.03	0.030	0.047
Ca%	0.05	0.10	0.026	0.320
Mn mg/kg	9.2	2.1	-	-
Cu mg/kg	2.2	6.6	2.62	18.59
Fe mg/kg	54.6	47.0	9.02	129.5
Zn mg/kg	-	9.3	10.21	118.9

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In practice there is no ideal decisions for treatment and utilization of liquid manure, resulting in near most industrial farms occurred pollution.

The most rational of agrochemical and sanitary point is the use of waste to maintain and increase soil fertility. Based on this in our country adopted the use of manure in the scheme "farm-field". In this direction was carried out considerable research on the characterization of liquid and hard manure and animal health and agrochemical changes that occur during storage and utilization. Results of laboratory and field experiments show a significant effect, when tested on manure as a means of fertilization. Increases crop yields, soil accumulate significant amounts of organic matter which improves water-physical propertis of soil and increase soil fertility.

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Thank you very much for your attention!

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The Romania-Bulgaria Cross Border Cooperation Programme 2007-2013 is co-financed by the European Union through the European Regional Development Fund