THE METHOD OF FORECASTING AND ESTIMATION OF RATIONAL USE OF THE GROWN YIELD OF FODDER CROPS BY THE COEFFICIENT OF EFFECTIVENESS OF FORAGES' PREPARATION'S TECHNOLOGIES (CET)

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It is possible to prepare various voluminous forages, for winter period, from the grown yield of fodder crops, as from new-mown mass, at usual (spontaneous) fermentation or with use of chemical or biological preservatives, and from sun-cured and dried up mass. Thus each basic technology of forages' preparation has set of variants, differing in technological operations. The choice of the most rational variant of resource-saving and energy-saving technology of voluminous forages' preparation with consideration of safety and using of nutritious substances' energy of the grown yield of fodder crops, needs and opportunities of farms, weather conditions and other working factors is essentially important.

Preparation and storage of forages, and further feeding, are parts of one circuit. At the same time their study is frequently carried out separately, it can result to one-sided and even to a biased assessment.

On the basis of facts, received in own researches we've developed an objective index for a complex estimation of methods of preparation, storage and use of voluminous forages, received mathematical expression in the formula of coefficient of effectiveness of forages' preparation's technologies ("Zootechnics", №9, 2000, Moscow).

The output of dry substance and energy on the stages of preparation and storage of forages, and also metabolism of gross energy in organism of ruminating animals are calculated in the coefficient, on a basis of previously calculated losses of dry substance (DS) and concentration of gross energy (GE) in fresh raw material, in raw material, prepared for a storage (forage-raw material), and ready voluminous forages.

Theoretically the coefficient of effectiveness of technology is based on the recognized systems of the estimation of forages: A.P. Dmitrochenko, 1982, N.G. Grigoryev, 1986 (definition of energy according to the equations of regress), the British system of K.L. Blekster, 1965 (metabolism of energy), the German system of definition of nutritiousness of forages on L. Hofmann and R. Shimann, 1975 (classification of losses of dry substance) and other basic theories of feeding production and feeding of agricultural animals.

The majority of the modern scientists consider the system of an estimation of forages by energy the most perspective, connected, on the one hand, with feeding production, and, on the other hand, - with feeding of animals. The offered coefficient of effectiveness of forages' preparation's technology (by energy) expresses the named connection mathematically and can make a basis of a method of a complex estimation and forecasting of successfulness of voluminous forages' preparation from identity of vegetative mass at a choice of optimum technology with the least loss of energy of

the grown yield of fodder crops. The coefficient of effectiveness of technology (CET) is calculated under the formula:

$$CET = \frac{O_2 * C_2}{O_1 * C_1} * \frac{O_3 * C_3}{O_2 * C_2} * \frac{C_{ME}}{C_3} * 100$$

(Ist stage) (IInd stage) (IIId stage)

CET by energy - the coefficient of effectiveness of technology, %;

O_1 - crop of green mass, kg of dry substance (DS) with 1 ga;

O_2 - output of "forage - raw material" with 1 ga, kg DS *;

O_3 - output of a ready forage with 1 ga, kg DS;

C_1- concentration of gross energy (GE) in green mass, MDj in 1 kg DS;

C_2 - concentration GE in "forage - raw material", MDj in 1 kg DS;

C_3 - concentration GE in ready forage, MDj in 1 kg DS;

C_{ME} - concentration of metabolic energy (ME), MDj in 1 kg DS.

* - the formulation "forage - raw-material" means the weight, ricked into the storehouse or put away for warehousing and suitable, on the contents DS to the given way of preservation.

The closer factor is to 100 %, the greater efficiency of investigated (used, forecasted) technology is. As the same forage has various power nutritiousness for various kinds of animals, it is automatically distributed to the offered coefficient.

The formula changes depending on researched methods of forages' preparation. So, if at the drying of grass the indices O_1 and O_2 differ considerably, at the filling of a silo from corn and other crops by a straight combine, they are almost the same.

The offered way allows to determine *preservation* of GE of the grown yield of fodder crops separately in voluminous forages from the identical green mass, from mowing to filling into the storehouse (stage I), at keeping, taking out and use (stage II), and *efficiency* of assimilation GE by animals, on the basis of calculation of its metabolism (stage III). All kinds of the corresponding losses of DS by starting green mass are counted up on the stages I and II: field, from fermentation, with juice; regional, at taking out - use of forage.

All calculations are carried out according to the international system of units (ISU). The basic indices of the offered method are GE and ME in MDj/kg DS, which meets the standards of the countries of European Economic Community of quality's estimation of silage with employment of standard methods of the analysis, tested and introduced by the international standard organization (ISO).

Under the formula CET, it is possible to analyze the preservation of energy of the grown crop of green mass on the stages of preparation and use of forages. For example, at the mowing of clover-timothy grass mixture, the preservation of energy has made 89% at the first stage, from harvesting to filling into a trench, 86% on the II stage - in the storehouse before use by animals, and the preservation (metabolism) of energy at the

transformation of GE and ME has been 53 % on the III stage. The corresponding quantity has made 68 %, 84 % and 50 %, on the stages of preparation, storage and use of hay, and 98 %, 74 % and 51 % at the silage.

The coefficients of effectiveness of technology are settled down in the following descending order, in a complex, on three stages of preparation, storage and use of forages from clover-timothy grass-mixture: haying - 40,57 ±1,15 %, silage - 36,26 ± 1,97 % and preparation of loose hay - 30,87 ± 1,22 %. The received coefficients are reliable P < 0,001. The difference between CET of separate forages is also reliable at standard P < 0, 05 - 0,001.

It is possible to use the reduced variant of the formula for quick determination of CET:

$$CET = \frac{O_3 * C_{ME}}{O_1 * C_1} * 100$$

The tables of CET have been prepared for six investigated fodder crops, phases of vegetation, methods of preservation to use the offered method of estimation and forecasting of rational use of fodder crops in feed production and for scientific purposes.

The researches which have been lead in controlled experience in collective farm "Tver" of the Tver area of the Russian Federation on lactational cows of black-motley breed at feed to forages from clover-timothy grass mix have shown, that between sizes CET and an output of milk counting (upon 1 ga) to the fodder area, there is the positive communication, which is coming nearer to high (r = + 0,673; p = 0,01).

Application of regressional analysis has allowed to reveal the following rectilinear dependence: at increase in effectiveness ratio of technologies of preparations of forages on 1% and feed forages to cows, the output of milk counting (upon 1 ga) the fodder area increases on the average for 98 kg. If to apply this regressional dependence to variants of mowing (CET 40,57 %) and preparations of hay (CET 30,87%) on a difference in factors (9,7%) are possible for predicting that the output of milk counting upon 1 ga at mowing will be higher on 9,5 c., that proves to be true the data of the lead scientific-economic experience in collective farm " Tver ", in which actually use of the oblique grass as mowe in comparison with hay was more effective on 9,2 c. some milk, counting upon 1 ga. The difference between actual and predicted sizes made 3,26% (p <0,01). The given results are checked up in facilities Torzhokskiy, Kaliniskiy and Kimrskiy of the Tver area of the Russian Federation.

Transformation of the base formula of CET by energy makes it possible to determine efficiency of use of separate nutritious components of starting vegetative mass.

It is desirable the help of leading scientific centers with the problems of technology of preparation of forages and feeding of agricultural animals for expansion of CET's data bank and possible recommendation of its definition in feed-production.

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INTRODUCTION INTO THE NEW METHODS OF NATURAL STONE BREAKING

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Nowadays the demand for the natural stone construction materials is very high and continues its increase in most countries. In connection with that the output of its kinds, from which various wares are produced, is being carried out. The production of natural stone is conducted in the most countries with certain differences in output volume and its nomenclature, as well as the purpose of the initial and repeated production. In the meanwhile new means of its destruction, aimed for the efficiency increase and preservation of the natural quality of output resources are have been invented, approved and launched into the production line within the last ten years. According to a new trend, all means of the natural stone destruction, including wedge-operated that are typical for the solid stone production pits, are used and improved. One of the ways of this improvement is the introduction of the plastic substances into the breaking process and the supply of the proper technical facilities and mining technologies.

The typical attribute of all natural stone production facilities is the technical complication and high value of their inner reorganization in order to use new technologies. In most cases cardinal alterations are needed within the going opening methods and the resources taking out preparation system. Because of that mining operations within the most natural stone production facilities are being carried out regardless to the possibilities that are linked to the appearance of new effective ways of rock destruction. Some of those mining technologies that are highly adapted to the existing mining-geological and mining-technical conditions of minerals production are the technologies of natural stone breaking using the plastic substances. With the right characteristic calculation the can be used for the natural stone production of any solidity, are effective with the system of natural and artificial fissure and do not need any unique and expensive equipment for their application. They can be easily adapted to negative external environment conditions and also have high safety and harmlessness index.

The nature stone breaking technologies that are linked with ousting the plastic substances from blast holes is based on the direct rock destruction method that has its basis from the new principles of fissure advance in fragile environment. Its static are dynamic type of forming demands the application of specific technological set, devices and materials that are need for its practical