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Wet Maize to be Studied in the Diet of Domestic Animals

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Abstract: Wet maize used for diet of domestic animals was studied in two stages. The first one included two basic experiments.

The first experiment implied comparison of the wet maize silage nutritive value while mize was used as the primary energetic portion for milking cows.

Wet maize silages, dry maize and a complex concentrate fodder, were used in the first experiment.

The other one included the use of maize kernel and wet maize ear silages.

Both experiments implied addition of of soya rape seed, with basic part of a meal containing hay added according to needs.

In the first experiment, the diet with wet corn silage led to a significantly decreased fodder consumption, and particularly that of hay as well as to a mild drop in the milk fat percentage in the milk, while milk production proved to be significantly higher.

In another basic experiment, the diet with wet corn and corn ear silages caused the same effects.

These experiments have shown that silage of the wet corn is a good fodder for milk production, especially during the first maximal stage of lactation.

The trials have also shown that the meals of the corn silage as the only energetic meal portion with addition of soya rape seed, had a positive effect on the milk production just as multistructural palletted roughage did.

The results have shown that good cattle performances can be objectively expected provided that maize wetness be below 30% and be grits and not finely ground.

Keywords: maize silage, moisture content, silage nutritive value

Introduction

Wet corn may be defined as the one containing so much moisture that it cannot be stored in the usual manner, hence, it's being kept in the silos. Just as being in the ensilage process, fermentation processes and organic acid forming take place in the wet corn, too.

Wet grain of maize counts when making silage in rainy autumns with 40% accounting for moisture in the grain. The ear or even the whole maize plant can be ensilaged.

Wet corn silage can be obtained only from the wet grain or from that with ear. If the silage from the wet corn is made only from the grain, the grain is ground and squeezed, compressed and, after fermentation taken out from the silo and finally given to the animals. If silaged by ear, then the grain is silaged before ensilage, which goes with grain grits when silaged in the conventional silo towers or silo trenches.

Material and Method

Two basic trials were set up in order to compare nutritional values of the wet corn silage when the corn is used as a primary concentrate-energetic part for milking cows over the first stage of lactation.

The first basic trial included silage of the wet corn, dry corn and a complex concentrate fodder.

The other one included the silage of the wet maize grain and that of the wet corn ear. In both trials, the soya rape seed was added to the ration, with hay given to the basic meal according to the needs.

At the beginning of the trial, the first trial implied DDM (digestible dry matter) and dry matter rationed, as follows: 89,8; 83,5 and 78,6 and the second one had these them rationed, as 86,4 and 84,0.

The other stage of the trial included three new experiments for revealing moisture content effects on the wet corn silage quality.

Results and Discussion

In the first basic trial, the diet with wet corn silage caused a significant reduction in the bulky roughages consumption, particularly of hay and a slight decrease of milk fat percentage and that in dry matter consumption, as well, whereas milk production was significantly higher. the diet with wet corn silage did not affect dry matter content in milk.

In another basic trial, the diet with wet corn silage caused a lower consumption of bulky roughages in a meal, at which, a total milk production increased.

These trials have shown that the silage of the wet corn proved to be a good roughage for the upkeep of milk production in the early stage of the lactation, especially in comparison with a conventional silages diet. The trials also indicated that the rations of the wet corn silage as the only energetic meal

portion with addition of soya rape seed, had an identically positive effect on the milk production just as the multistructural peletted fodder did. The silages of wet corn and wet corn ear have been shown as an excellent energy source in the diet of milking cows over the maximal stage of lactation.

In order to achieve the optimal quality of wet corn silage with different moisture content (silages A, B and C had 24.1, 30.5 and 32% moisture, respectively).

Table 1. The Analysis of Wet Corn Silages

Content %	Types of silages		
	A	B	C
Moisture	24,1	30,5	32,0
Raw proteins, %DM	8,9	9,6	9,7
Soluble proteins, %DM	2,3	6,0	6,3
Soluble proteins, % raw protein	25,8	62,5	64,9
Milk acid, %DM	0,59	0,72	2,1

Standard feed rates for bullocks and milking cows worked out and published by Gutic, 1987. 1998., and Jovanovic, 1993. and 2001.

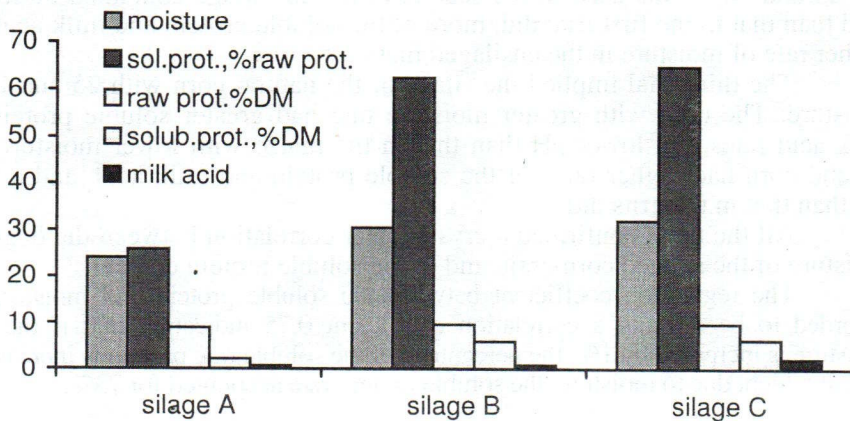


Fig.1. Graphic Outlook of the Analyses of A,B an C silages

From the Tab.1 and graph 1., one can see that production performances of the cattle reared with wet corn silage, type A, were maximal, and those of the cattle reared with silage type B and C, were markedly weaker. On the basis of the first stomach content analysis, this appeared to be the consequence of an increased ammonium production in the first stomach, resulting from soluble

protein, which appeared in a much higher rate in the first stomach of the animals bred by type B, and particularly by type C ration.

As far as health is concerned, the results show that the lowest contamination due to silage took place when the maize or its ear was silaged with 25-35% moisture. Nutritional value of dry matter was, in this case, equal to that of dry matter in dry corn.

However, when the cows were fed with the wet corn silage that had a lower moisture than the presented one, a lower milkiness was achieved.

Since the moisture content seemed to be a decisive factor for the silage quality of wet corn, the three trials were, therefore, set up in another phase of the research in order to determine the effect of moisture content on the silage quality of the wet corn. In the first trial, silaged corn grits were brought to 20, 25 and 30% moisture and silaged in the smaller silo trenches. The corn with 20% moisture, had a poor fermentation, low pH, a low rate of milk acid and soluble protein. In the silage with corn of 25 and 30% moisture, fermentation was increased, pH decreased, milk acid and soluble proteins increased.

The research on the milking cows nutrition was published by Grubic and Adamovic, 1998., and by Obracevic, 1986., while the feeds application in the cattle diet was published by Radovanovic, 1970. and 1997. and Cobic et al., 1984. Also, Sevkovic et al., 1991., suggested ensilage to be utilized of the wet corn.

The silage of the ground maize grain brought up to the moisture level of 20, 25 and 30%, was used in the second trial. This silage contained more milk acid than that in the first trial did, more of the soluble protein and milk acid with higher rate of moisture in the ensilaged mass.

The third trial implied the silage of the natural corn with 25 and 28.5% moisture. The corn with greater moisture rate had greater soluble protein and milk acid rates, but lower pH than that in the maize with lower moisture. The ground corn had higher rates of the soluble protein and milk acid, and a lower pH than that in the grits did.

All the trials confirmed a crystal clear correlation between the degree of moisture of the silaged corn grain and of the soluble protein content.

The regression coefficient between the soluble protein and moisture was recorded to be 2.0 and a correlation coefficient 0.75 indicating that if the grain moisture is increased by 1%, the percentage of the soluble raw protein is increased by 2%, at which, due to moisture, the soluble protein rate accounted for 73%.

Conclusion

Studying of corn moisture while feeding animals, has gone through two phases, the first one implying the two basic trials.

- The first basic trial implied comparison of the nutritional value of the wet corn silage, when used as the basic energetic meal portion for milking cows.

- The first basic trial used silages of wet corn, dry corn and a complex pelleted mixture.

- The second basic trial used the silage of corn grain and that of the wet corn ear

- Both trials had the meals with soya rape seed added, and the basic meal portion contained hay added optionally.

- In the first basic trial, the diet with the silage of the wet corn caused a significantly lower consuming of the bulky roughages, especially of hay and a mild decrease in the percentage of milk acid in the milk, while milk production seemed to be significantly higher.

In the second basic trial, the diet with silage of the wet maize corn and ear, caused the same effects.

These basic trials have shown that the silage of the wet maize proved to be a good fodder in order to maintain milk production, particularly in the first maximal lactation stage.

The trials have shown that the meals of the corn silage as the only energetic meal's portion with addition of soya rape seed as well as the multistructural pelleted mixture had a positive effect on the milk production.

The results suggest that good cattle performances be expected if the corn moisture is below 30% and if the corn is in the form of grits and not ground.

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ISPITIVANJE VLAŽNOG KUKURUZA U ISHRANI DOMAĆIH ŽIVOTINJA

-stručni rad-

Rezime

Ispitivanje vlažnog kukuruza u ishrani životinja obavljeno je u dve faze. U prvoj fazi izvedena su dva osnovna ogleda.

U prvom osnovnom ogledu upoređena je hranljiva vrednost silaže vlažnog kukuruza kada se upotrebljavao kao primarni energetska deo obroka za muzne krave.

U prvom osnovnom ogledu upotrebljene su silaže od vlažnog kukuruza, suvi kukuruz i složena koncentratna smeša.

U drugom osnovnom ogledu upotrebljena je silaža zrna kukuruza i silaža vlažnog klipa kukuruza.

U oba ogleda obroku je dodavana sojina sačma, a osnovni deo obroka sačinjavalo je seno koje je davano po volji.

U prvom osnovnom ogledu ishrana silažom vlažnog kukuruza izazvala je signifikantno smanjenje konzumiranja kabaštih krmiva, naročito sena i blago smanjenje procenta mlečne masti u mleku, dok je signifikantno bila veća proizvodnja mleka.

I u drugom osnovnom ogledu ishrana silažom vlažnog zrna i klipa kukuruza izazvala je iste efekte.

Ovi osnovni ogledi su pokazali da je silaža vlažnog kukuruza dobro krmivo u održavanju proizvodnje mleka, naročito u prvom-maksimalnom stadijumu laktacije.

Ogledi su pokazali da su obroci od silaže kukuruza kao jedinog energetskog dela obroka sa dodatkom sojine sačme, imali isti pozitivan efekat na proizvodnju mleka kao i multistrukturana peletirana smeša.

Prema rezultatima dobijenim ovim istraživanjima može se zaključiti da je objektivno očekivati dobre performanse goveda, ako je vlažnost kukuruza ispod 30%, i ako je on samo prekrupljen, a ne sitno mleven.