

PRODUCTIVITY AND QUALITY OF MAIZE HYBRIDS FOR SILAGE

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Abstract

The objective of this research was to identify the potential of some maize hybrids for silage production. The DKC5542, MIKADO, Fundulea376 and P0725 (Pioneer) hybrids were cultivated, the productivity per hectare and chemical composition of each hybrid being accordingly recorded.

There were no statistical significant differences between the tested hybrids, the average dry matter production being 13,32 t per hectare. Regarding the chemical characteristics, a higher percentage of DM was observed at Fundulea376 hybrid, 42% as compared to 39.8%, 37.10% respectively 34.70% recorded in the other hybrids. The average value for CP was 6.29%, the NDF content of the silo ranged between 45.60 and 49.05%, while the ADF content ranged from 16.80 to 21.2%. In light of these results, it may be concluded that the hybrids taken into study are recommended for use in silage.

Key words: Dry matter, Hybrids, Silage

INTRODUCTION

Along with the development of Romanian agriculture, the demand for efficient production systems, which may contribute imperatively for stimulating competitiveness and ensuring sustainability, is increasing. There is a high need for investments and exploitation of animals with greater genetic potential, which require a well-balanced ration, with a high nutritional value. In this context, the production of food in sufficient quantity and quality throughout the year becomes a necessity in all production systems aiming at higher productivity. Corn silage has been used as an alternative in the conservation of feed, in order to increase productivity and performance of animals, and is currently increasingly used in Romania. This increased tendency to use corn for silage production is mainly due to its chemical composition, which meets the requirements for optimal silage, has high productivity, low buffering

power and adequate soluble carbohydrate levels [3]. However, attempts are made annually to identify the hybrid with the best productive potential and the nutritional quality for silage, with an optimal ratio between stems, leaves and berries and a high digestibility, because there is a high correlation between the nutritional value of a crop and its silage. The higher proportion of grains in the material to be silage is desirable [8]. Conservation of corn by silage is an anaerobic fermentative process, which converts soluble carbohydrates from the plant into organic acids through microbial activity. The quality of the silo depends on the efficiency of this process and the conditions that determine it, such as the degree of settling, humidity, temperature, the presence of oxygen, the concentration of soluble carbohydrates and the productive characteristics of the silage of the plant [15]. Thus, the objective of this study was to evaluate the productivity per hectare of four maize hybrids and also the quality of the silo obtained from each hybrid, by determining its chemical composition.

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MATERIAL AND METHOD

The experiment was carried out at the Research and Development Station for Cattle Breeding Dancu, Iași, on good quality soil, in an unirrigated area. Four maize hybrids (DKC5542, MIKADO, Fundulea376 and P0725) were grown on adjacent plots. The corn was sown at a distance between rows of 70 cm, its fertilization being carried out according to the characteristics of the soil, using 150 kg / ha NPK (16-16-16). At 110-120 days after sowing, when the plants showed the optimum harvesting stage, the silage process was carried out.



Figure 1 NIR Analyzer Perten DA 7200

The chemical composition was determined with the NIR Analyzer (Perten DA 7200), in the Cattle Nutrition laboratory of S.C.D.C.B. Dancu, Iasi (Figure 1).

RESULTS AND DISCUSSIONS

The dry matter content of the plant contributes to the conservation of maize by inhibiting the growth of unwanted organisms. The silage of the hybrids taken in the study presented an average dry matter content of 38.4%. The values recorded fall within the

range indicated by Kenilworth and Warwickshire (2012) as ideal to ensure an adequate fermentation of the corn silage.

The dry matter content is one of the first parameters to be evaluated, as it is related to productivity and is used for silo sizing. There were no statistical significant differences between the tested hybrids, with the average dry matter production being 13.32 t per hectare (tab. 2). Fundulea376 hybrid showed lower productivity, but with a higher dry matter content, respectively 42% DM (tab. 1).

The knowledge of the dry matter content of the silo is important, because based on it the ration administered to the animals is calculated, the feed consumption being determined in kg dry matter / animal / day. The average value for CP was 6.29% (tab. 1), close to the conclusions of Oliveira et al. (2010) who found an average of 6.1% protein in the types of silos evaluated. These values are lower than those found by Pinto et al. (2010), who evaluated twelve maize samples, observing a CP concentration between 7.1 and 8.8%. The NDF content of the silo varied between 45.60 and 49.05% (tab. 1), with no differences between the studied hybrids. These values are lower than those found by Pinto et al. (2010), which ranged from 49.1 to 56.2%. Gonzalez et al. (2010) evaluated the characteristics related to maize silage productivity and observed that in most cases, the hybrid that showed high degradability usually had a low percentage of NDF. The ADF concentrations of the silo varied between the four studied hybrids, from 16.80 to 21.2% (tab. 1), values lower than those found by Khan et al. (2015), which ranged from 26.92 to 28.92%. For the gross ash an average of 5.53% (tab. 1) was observed, a value lower than 7.9% recorded by Ali et al. (2014).

Table 1 Chemical composition of hybrids

Hybrid	DKC5542	MIKADO	Fundulea376	P0725
DM %	37.10	34.70	42.00	39.80
CP %	6.60	6.90	5.90	5.77
ADF %	21.20	19.40	16.80	18.22
NDF %	47.80	45.60	49.05	48.50
Ash %	4.10	5.80	6.19	6.03

Table 2 Productivity of hybrids for silage

Hybrid	DKC5542	MIKADO	Fundulea376	P0725
t/ha	38 (14.09 DM)	40 (13.88 DM)	28 (11.76 DM)	34 (13.53 DM)
Mean t/ha	13.32 DM			

CONCLUSIONS

Corn silage is an efficient way of feeding the animals during the grazing period, with a very high degree of consumability. The evaluated hybrids had similar nutritional and production characteristics and are recommended for use in silage. The fodder obtained from silage maize has relatively low production costs, due to the high yields obtained per unit area and the small number of necessary maintenance works.

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