

FIBRE SPEKTRUM OBSERVATION IN PRESERVED MAIZE HYBRIDS FOR LIVESTOCK FEEDING

OBSERVAȚII PRIVIND CONTINUTUL IN FIBRE A HIBRIZILOR DE PORUMB UTILIZAȚI ÎN HRANA ANIMALELOR

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The composition of plants harvested for maize silage on the used hybrids and the environmental conditions. If the hybrid moisture content at the time of harvest (too wet or too dry) may also be a problem if the proper maturity is not matched to the area. Poor quality of maize sorts may result due to decreased grain content.

Key words: maize hybrids, nutrients, fibre, ADL, ADF, NDF, rumen degradation.

Introduction

The production of the roughage is in some detail influenced by climatic effects but in principle feed's quality is influenced by farmer. In many farming business isn't crop rotation for intensive animal production and rational nutrition chosen well, which is connected with technical and technologies means of the farmer.

The maize is a very good material for intensive and economic feed production. The new hybrids make dynamic growing, which is usually 2 – 3% year on year progression. The largest reserve for using in agricultural routine is low utilisation of the genetics progress.

The maize plant is composition many different parts. These parts aren't constant in any case because -are affected by type of maize hybrid, climatic effects, time of harvesting and technical performance during the harvest. The final feed effect is a result of feed value of several plant parts.

The ear-corn is the most important for energy, which has 65% nutrients on the whole. Pandrůněk (1982), Čermák et al. (2001) determine concentration of energy ear-corn 8,0-8,2 MJ NEL/Kg DM. During maize the milk maturity is very intensive accumulation of starch into the corn that gets yellow. Accumulation of starch ends of deposit brown or black stripe on the gemmule. In this time is corn glassy, has 35% moisture and ear-corn has around 60% DM (Pandrůněk 1982, Čermák et al. 2002).

The silage maize is so much pliant feed. Intensive nitrogen fertilization (above all salpeter's form) turned the maize to product with middle or narrow proportion of nutrients. It happens frequently in early vegetative stages, i.e. flowerage, milk and wax maturity (Flíček 1977), -therefore -when semiearly varieties on foothills areas are used for feeding or ensilage. In these stages, in nitrogen spectrum appear high proxy NPN -and very important bindings with nitrogen and oxygen, which are anbiologic and toxic for the most of the livestock (Míka 1986). But the amino acids spectrum and biologic value of proteins are also changing. Overgraduating by nitrogen in fertilizer for plants causes falling of a concetration of lysine.

Frequently discussed variety differences in cumulation of nitrogen are showed in extreme surroundings most often or only in short-time, especially during intensive growing. That also indicate results which were taken from 15 different maize hybrids produced on balanced fertilization (Tetter 1986).

Nitrates content in plants and especially in maize has high value in early stage of development, falls with stand age. It may be a problem in feeding green-stuf maize but also maize silage that have been fertilized by high rations of nitrogen from gross vegetation. Nitrates are totally degraded in „clostride silages“, with high butyric acid content. This reduction is total, the final product is ammonia. If there are presented nitrates at silages, rising hydrogen spends for their reduction and butyric acid in these silages doesn't rise (Ataku and Narasaki 1981, Čermák et al. 1999, Loučka et al. 2001).

For yield quality have decisive effect on part of ear-corn in dry mass, which has to be over limit 50%. Rising of part of ear-corn increases energy concentration and with connection also grows hectare energy production (Pandrůněk, 1982, Loučka, 2002). By maize can be practically produced several feedstuff -which are different in part of various fractions of plant, in particular ear-corn. The feedstuff -that is produced by ear-corn will get well-founded especially in continuity with need for high production dairy cow, regarding the needs of high-production cows, where they can contribute finding the solution of effective energy dotation in conditions of limited consumption of feed ration dry mass at the beginning of lactation.

Maize silage presents high-quality sugar feedstuff, which shouldn't miss in stability view fied ration for cattle in the winter and the summer feed period. Quality silage also contains enough of residual sugar that have good effects on the digestive rumen processes. It's well known that quality of fermentation proces s influences structure of epifyt microflora by silage crops.

Material and Methods

In years 2002-2005 were experiments done at two locations. The experiments were done in so-called rain shadow, altitude 550 m., for experiments were chosen altogether 21 maize hybrids. Half of hybrids were fertilised in normal way and second half got more fertilizer „subbase“ fertiliser rate 150 kg Amofos. In both cases were growing of vegetation subjectively monitored. Hybrids were sed on 26. 4. aside form Diana hybrid, which was sed on 10.5. Harvest of all hybrids was

always done from the half of september appropriate year. The similar results were detected from harvests in several years. Samples were taken from the average stand. During the sampling were measured plant height, setting of ears and weight of plant on the square metre. Then we also monitored hybrids quantity of plants per hectare, average weight of ears, dry of ear matter and total dry ear weight. During the harvest we sampled on the vehicle sacks from each one hybrid, marked and put into the silo for keeping fermentative processes. In the feeding time, when strobe machines found stored samples, we put off this sacks and promptly transported them to laboratory of department of genetics, cultivation and feeding. There we analysed these samples in agreement with usual methods UKZÚZ Feed law (2001). I determined chemic compositions, the nitrogen degradability using *in sacco* method, and of rumen digestibility of organic matter using the *in sacco* bag technique. Samples were incubated in rumen 0, 12, 24, 48 and 72 (96) hours were incubated. For the *in sacco* method were used dry cows with a large permanent fistulas into the rumen.

Results valued statistic data processing by Statgrafic and ANOVA methods.

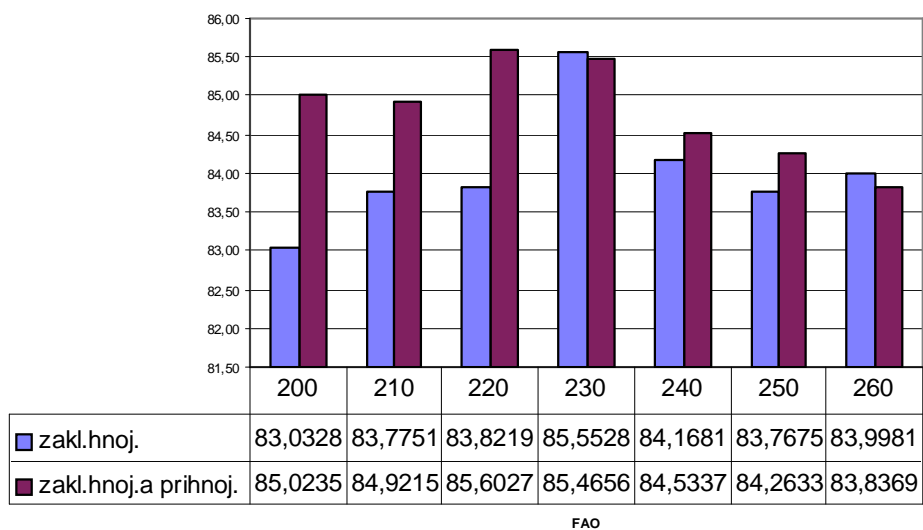
Results and Discussions

In table 1. we presented results monitoring yield of masses according to each habrids, with FAO numbers for maize silage. Count of plants per hectar sowed around 90 000 units per hectar, during harvest was in range 84-87 000 by each hybrid. Differences between hybrids aren't statistical significant. Same results features Loučka et al. (1999), Čermák et al. (2001) and other authors in long-term attempts. Yields of masses durign harvest weren't statistical significant. Same variants fertilized Amofos „subbase“ during harvest weren't significant difference. Differences between fertilized and nonfertilized were apparent during vegetation, but in crop's time offseted. Pandrůněk (1982) features significant differences of yields not only during vegetation , but also in crop's time. Čermák et al. (2005) ascertained trends by lower fibre, lower starch in ears and higher proxy of nitrogen by different maize hybrids in crop.

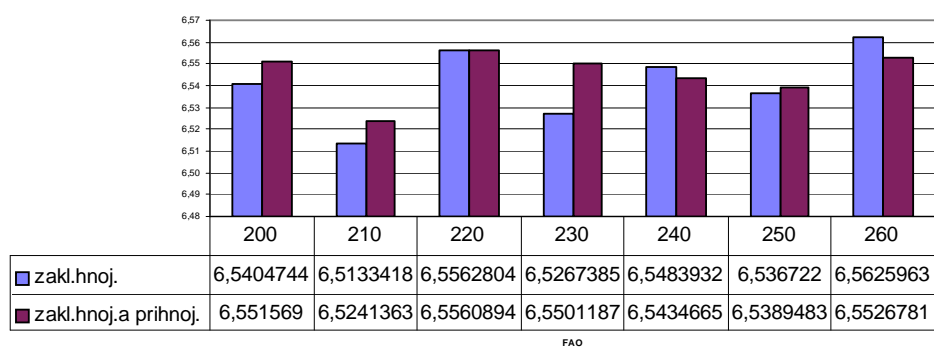
Table 1. Nutrient variation in corn silage of different hybrids:g/kg DM.

Nutrient	x	sd	min	max
Org. matter, OH	930.8	14.9	910	945
NI -CP	97.02	1.8	59	165
Tuk-Fet	42.3	6.7	31	74.2
NDF	456.7	48.3	311	591
ADF	239.1	12.1	198	291
BNLV-NPex	519.1	48.1	195	260
Starch	184.3	47.1	164	350
Str.OH ₂ DOM%	70.2	3.1	66	75

In the year 2002 – 2005 we monitored selected green maize hybrids and silages from this hybrids. Nitrogen fertilization „subbase“ in ration 150 kg Amofos showed lower grow of fibre, nitrogen’s rise and low protein content. Another changes get into during silage storage. Variability nutrients content green and silage masse depend on fraction of ear and corn maturity (Jambor 2003, Čermák 2002, 2003, 2005). We are continue attempts. Differences graphic-represented in diagrams 1, 2 advert to PDI and NEL dependence by FAO average content of maize hybrids. PDI values for hybrids with FAO number 200 – 220 are significant as compared to another hybrids. NEL value isn’t significant.



Graf 1. Comparison of PDIE in maize hybrids



Graf 2. Comparison of NEL contint in maize hybrids

For statistical data result land area stabilization maize-growing-Growing oriented to increase by area for LKS crop or CCM. As well grows dry matter harvested maize under 400 grams.

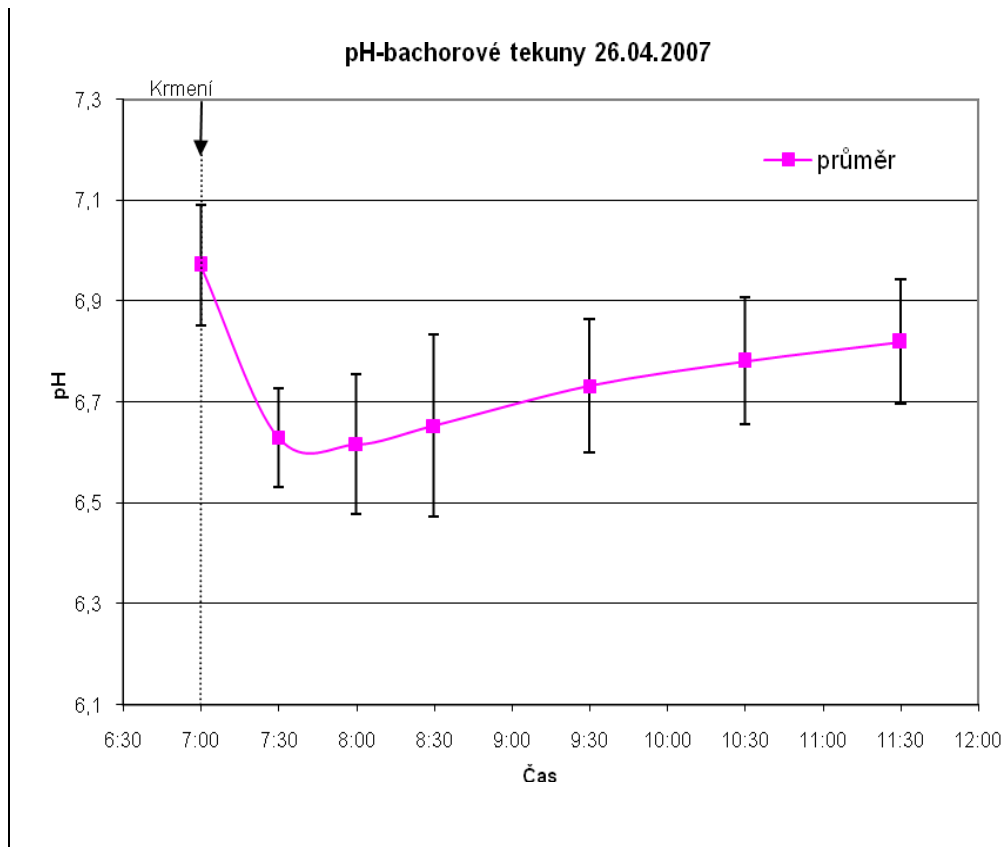
Table 2. Qualitative parameters of average maize silages

	\bar{x}	s_x	$X_{min.}$	$X_{max.}$	n
Sušina dry matter	328.1	42.5	223.84	421.82	155
NEL (MJ . kg ⁻¹)	2.02	0.17	1.38	2.61	155
PDI (g. kg ⁻¹)	15.98	3.21	10.02	21.05	155
K. mléčná lactic ac. (g. kg ⁻¹)	21.79	4.98	7.2	32.99	155
K. octová acetic ac.(g. kg ⁻¹)	6.99	2.63	3.67	16.53	155
K. máselná butyric ac.(g . kg ⁻¹)	0.05	0.21	0	1.2	155
pH	3.72	0.32	3.19	4.29	155
KVV (mg Na OH . 100 g ⁻¹)	1468	439	585	2185	155

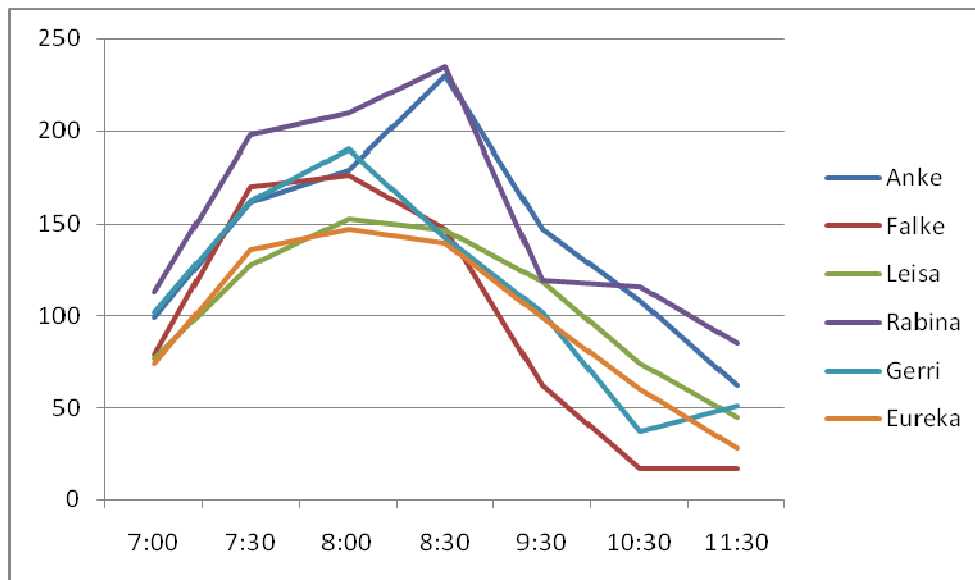
Table 3. Fibre fraction of maize hybrids (average fert.-AF, without fert.0)

Numer of hybrids	Ad fertiliser AF/0	% labor. Dry matter	ADL %	ADF %	NDF %	CF%
1	AF	93.89	2.08	25.05	46.93	20.4
	0	93.99	2.63	27	49.41	22.12
2	AF	93.75	2.2	25.22	47.01	21.21
	0	93.83	1.66	22.54	40.5	19.55

1-FAO nr. 10-220, 2- FAO nr. 230-300



Graf 3. pH of rumen's fluid



Graf 4. Content of $\text{NH}_3\text{-N}$ (mg/l) in ruminal's fluid, experimental cows

Conclusions

The maize is an arable crop providing high energy and mass yield, necessary for the cattle feed ration balance.

On the basis of long-term monitoring chosen hybrids is possible to recommend to every grower to test nutrients and potential of yield to environmental conditions and cattle wants. Basic for decision is maize dry matter at intervals 30 – 35 %. LKS or CCM harvest is optimal 50 % dry of ear matter. Crucial is meeting of harvest technology and conservation.

After feeding in ruminant's fluid is pH rate on minimum value, this value come back slowly (after 5 and more hours). In the same time is $\text{NH}_3\text{-N}$ content in luminal fluid very different. After feedig fast growing, then fall down under previous value.

Durig the long-term silage storage, nutrients are changing that is necessary minimalize with keeping of technology, feeding and storage (mixing, picking,...) to minimalize the second fermentation damage.

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