

## References

- KUKLA, F. : Chov kožušinových zvierat. Brno : ES – VSŽ, 1991. 140 s.  
 SÜVEGOVÁ, K. : 1996 : Zveľaďovanie domácich populácií vybraných druhov kožušinových zvierat. Záverečná správa. Nitra : VÚŽV, 1996. 14 s.  
 TOČKA, I. : 1999. Chov nutrií na Slovensku. In : Slovenský chov, roč. 3, 1999, č. 10, s.19.

Table 1 Number of animals, sexual ratio and nutria's fur production in the Slovak republic within the years 1990 - 2000

Year	Number of animals				Furs produced	
	Females	Males	Total	%	Pieces	%
1990	15 000	3 000	18 000	100	80 000	100
1991	12 000	2 500	14 500	80,5	60 000	75
1992	4 000	700	4 700	26,1	25 000	31,2
1993	2 000	400	2 400	13,3	10 000	12,5
1994	1 500	300	1 800	10,0	8 000	10
1995	500	100	600	3,3	3 500	4,3
1996	800	150	950	5,2	5 500	6,8
1997	1 000	200	1 200	6,6	8 000	10
1998	1 200	250	1 450	8,0	9 000	11,2
1999	1 300	300	1 600	8,8	9 500	11,8
2000	1 500	300	1 800	10,0	9 800	12,2

## INFLUENCE OF BIOLOGICAL ADDITIVES ON NUTRIENT CONTENT IN ALFALFA SILAGES

**Miroslav JURÁČEK, Daniel BÍRO, Milan ŠIMKO**  
 Slovak Agricultural University in Nitra, Department of Nutrition

### Summary

In the experiments were verified the influence of biological additive application to nutrient content in alfalfa silages with different content of dry matter. In the experimental alfalfa silages with lower content of dry matter addition of lactic acid bacteria increased significantly the dry matter in comparison to nontreated silages. Application of biological additive significantly was increased content of crude protein in silages by 12,3 g. The silages with additional homofermentative lactic acid bacteria had significantly the lowest content of nitrogen free extract (NFE) and reduced sugars. In the experimental alfalfa silages with higher content of dry matter the addition of biological additive increased significantly content of dry matter by 7,7 g in comparison to control silages. As well as in the first series of experiments, in the silages with biological additive was the lowest content of NFE and significantly lowest content of reduced sugars. Experimental silages in both levels of dry matter had the lowest content of organic matter.

**Key words:** biological additive, alfalfa, silage, nutrient content

### Introduction

Effectivity of cattle milk and meat production is significantly influenced by quality of fodders. Alfalfa belongs to the most important proteine fodders because of stabile and high dry matter production. In the balanced diets altogether with maize make alfalfa the main portion of fodder (Bíro, 2000). At present we are able to in Slovakia produced around 2 800 thousand tones of fodder dry matter and out of this there are 720 thousand tones dry matter from yearly fodders, 800 thousand tones dry matter from more years fodders and 1 270 thousand tones dry matter from permanent fodders (Sommer, 2000). Out of whole year needs of fodders are in our condition (60 – 70 %) conserved fodder and the rest 30 – 40 % is feeding fresh (Bíro, 1995). The composition of conserved fodders is cca 40 – 45 % silaged and 15 – 20 % is hay (Gallo, 1999 b). The decision problem in Slovakia is quality of sillages, while one of the factors which can improve the quality of silages is use of silages preparations. The suggestion of silages preparations either chemical or biological is small in comparison to other countries. At present there is in Slovakia allowed only 9 biological and 4 chemical preparations (Gallo, 1999 a).

### **Material and methods**

In laboratory conditions was silaged alfalfa (*medicago sativa*) variety Palava from second harvest. In the variants  $K_1 - P_1$  was silaged slightly fadded matter with content of dry matter  $234 \text{ g.kg}^{-1}$  and in the variants  $K_2 - P_2$  was silaged fadded matter with dry matter content  $288,4 \text{ g.kg}^{-1}$ . The matter of alfalfa was cutted by stationar cutter to 15 mm lenght of chopped straw. In the control variants  $K_1$  and  $K_2$  was silaged nontreated matter of alfalfa. In the positive controls was alfalfa treated by concentrated formic acid ( $A_1$  and  $A_2$ ). In the experimental variants  $P_1$  and  $P_2$  was the matter treated by powder biological additive which was composed of *Lactobacillus rhamnosus* and *Enterococcus faecium*. The matter was by pneumatics press pressed in to silaged cylinders in the volume of  $15 \text{ dm}^3$ , heaved by 10 kg weight and hermeticed. Each variant was silaged in 4 repeats. The fermentation process carried out at  $20 - 25 \text{ }^\circ\text{C}$  and lasted 8 weeks. After the cylinders were open and samples were taken to establish content of nutrients according to STN 467092. The results of experiments were statistically worked out and tested by the methods of programme Statgraphics.

### **Results and discussion**

Content of nutrients in fadded alfalfa, alfalfa silages with lower content of dry matter and significance of differencies in nutrient content are presented in table 1 and 2. The sillages treated by formic acid ( $A_1$ ) contains significantly highest content of dry matter. The content of crude protein in the silages treated by biological additive ( $P_1$ ) was significantly increased by 12,3 g in comparison to control silages  $K_1$ . The lowest content of fibre was found in the silages treated by formic acid ( $A_1$ ). Simmilary Jambor (1999) in the alfalfa silages with formic acid (dry matter content 22,4 %) observed lower content of dry matter in comparison to control variant  $K_1$ . In opposite, the lowest content of nitrogen free extract (NFE) was found in the silages with addition of lactic acid bacteria ( $P_1$ ). The content of reduced sugars was in the silages very variable, and vary from  $5,7 \text{ g.kg}^{-1}$  dry matter ( $P_1$ ) to  $99,5 \text{ g.kg}^{-1}$  dry matter ( $A_1$ ). Decreasing of organic matter content by 9,1 g in the silages of the variant  $P_1$  was statistically significant in comparison to control silages of the variants  $K_1$ . The nutrient content in the fadded alfalfa, in the alfalfa silages with higher content of dry matter and significe of differencies in nutrient content are presented in table 3 – 4. Addition of formic acid ( $A_2$ ) significantly increased content of dry matter in comparison to control silages ( $K_2$ ). Simmilary Jambor and Chromec (1997) found in alfalfa silages with formic acid significantly increasng of dry matter in comparison to nontreated silages. Either adding of lactic acid bacteria in the variant  $P_2$  significantly increased content of dry matter in silages. The highest content of crude protein was found in the silages treated by formic acid ( $A_2$ ). Incresing by 13,4 g was significant in comparison to control silages ( $K_2$ ). Incresing of crude protein content in alfalfa silages with formic acid in comparison to nontreated silages observed Jambor (1999) either. In the silages treated by

Table 1 Nutrient content in the fadded alfalfa and in alfalfa silages with lower content of dry matter (in  $\text{g.kg}^{-1}$  dry matter)

		dry matter (1)	crude protein (2)	fat (3)	fiber (4)	ash (5)	NFE (6)	reduced sugars (7)	organic matter (8)
$L_1(9)$	$\bar{x}$	234	155,1	13	404,4	82,8	343,9	16,2	917,3
	s	10,2	4,5	0,4	20,5	3,6	16,4	4,2	3,6
	v	4,4	2,9	3,2	5,1	4,4	4,8	26,0	0,4
Variant(10)									
$K_1$	$\bar{x}$	232,7	157,2	23,3	396,5	85,5	337,6	11,1	914,6
	s	1,4	2,0	1,4	5,5	2,3	3,4	3,2	2,3
	v	0,6	1,2	6,2	1,4	2,7	1,0	28,4	0,3
$A_1$	$\bar{x}$	245,4	163,8	18,5	370,7	82,0	365,1	99,5	918,0
	s	4,7	5,5	1,9	10,0	1,5	10,0	49,7	1,5
	v	1,9	3,4	10,5	2,7	1,9	2,7	49,9	0,2
$P_1$	$\bar{x}$	238,2	169,5	26,7	377,0	94,5	332,3	5,7	905,5
	s	1,6	3,0	1,2	1,6	2,2	3,0	1,3	2,2
	v	0,7	1,8	4,5	0,4	2,4	0,9	22,8	0,3

6) NFE– nitrogen free extract, (9) wilted alfalfa, (10) lower content of DM – treatments:  $K_1$  – control,  $A_1$  – with formic acid,  $P_1$  – with lactic acid bacteria

biological additive ( $P_2$ ) was nonsignificantly higher content of crude protein than in control silages ( $K_2$ ). The highest content of fibre ( $350,2 \text{ g.kg}^{-1}$  of dry matter) was marked in the silages treated by biological additive ( $P_2$ ). Svetlanská et al. (1999) present in the alfalfa silages, with dry matter content 25 – 30 %, the content of fibre vary from 273 g to  $416 \text{ g.kg}^{-1}$  dry matter with average content  $351 \text{ g.kg}^{-1}$  of dry matter. In the silages treated by formic acid ( $A_2$ ) was significantly increased content

of nitrogen free extract (NFE) by 15,3 g in comparison to silages without treatment (K<sub>2</sub>). The lowest content of NFE we found in the silages of experimental variant P<sub>2</sub>. Similar tendency was found in the content of reduced sugars. The highest content of reduced sugars was in the silages with formic acid (A<sub>2</sub>). The formic acid altogether with conserving effect contribute to storing of higher concentration of soluble saccharides (Škultéty et al. 1993). Significantly the lowest content of organic matter was found in the silages treated by biological additive (P<sub>2</sub>).

Table 2 Significance of differences in nutrient content in alfalfa silages with lower content of dry matter

	K <sub>1</sub> :A <sub>1</sub>	K <sub>1</sub> :P <sub>1</sub>	A <sub>1</sub> :P <sub>1</sub>
dry matter (1)	++	++	+
crude protein (2)	-	+++	-
fat (3)	++	+	+++
fiber (4)	++	+++	-
ash (5)	+	++	+++
NFE (6)	++	-	+++
reduced sugars (7)	+	-	+
organic matter (8)	+	++	+++

6) NFE – nitrogen free extract, - non-significant, + significant P < 0,05,  
 ++ significant P < 0,01, +++ significant P < 0,001

Table 3 Nutrient content in fatted alfalfa and in alfalfa silages with higher content of dry matter (in g.kg<sup>-1</sup> dry matter)

		dry matter (1)	crude protein (2)	fat (3)	fiber (4)	ash (5)	NFE (6)	reduced sugars (7)	organic matter (8)
L <sub>2</sub> (9)	$\bar{x}$	288,4	174,7	16,1	336,5	107,3	373,4	16,9	892,7
	s	6,5	3,0	1,2	21,8	5,6	18,2	2,1	5,6
	v	2,3	1,7	7,4	6,5	5,2	4,9	12,1	0,6
variant(10)									
K <sub>2</sub>	$\bar{x}$	277,9	163	21,6	348,9	114,0	352,5	5,2	886,1
	s	3,0	2,8	0,7	5,1	2,8	3,0	1,3	2,8
	v	1,1	1,7	3,3	1,5	2,4	0,9	24,4	0,3
A <sub>2</sub>	$\bar{x}$	293,6	176,4	20,5	321,9	113,5	367,8	17,1	886,6
	s	1,2	2,8	0,6	7,7	4,6	6,6	4,9	4,6
	v	0,4	1,6	3,0	2,4	4,1	1,8	28,7	0,5
P <sub>2</sub>	$\bar{x}$	285,6	166,3	19,4	350,2	117,6	346,4	1,4	882,4
	s	1,4	3,6	0,6	12,2	1,2	8,8	0,2	1,2
	v	0,5	2,2	3,0	3,5	1,0	2,5	14,2	0,1

6) NFE– nitrogen free extract, (9) wilted alfalfa, (10) lower content of DM – treatments: K<sub>1</sub> – control, A<sub>1</sub> – with formic acid, P<sub>1</sub> – with lactic acid bacteria

Table 4 Significance of differences in nutrient content in alfalfa silages with higher content of dry matter

	K <sub>2</sub> :A <sub>2</sub>	K <sub>2</sub> :P <sub>2</sub>	A <sub>2</sub> :P <sub>2</sub>
dry matter (1)	+++	++	+++
crude protein (2)	+++	-	++
fat (3)	-	++	+
fiber (4)	+	-	++
ash (5)	-	+	-
NFE (6)	++	-	++
reduced sugars (7)	++	+++	++
organic matter (8)	-	+	-

(6) NFE – nitrogen free extract, - non-significant, + significant P < 0,05,  
 ++ significant P < 0,01, +++ significant P < 0,001

## References

- BÍRO, D. 1995. Zásady konzervovania krmív silážovaním. In: Debrecéni, O. a kol.: Praktická príručka pre chovateľa hovädzieho dobytka. Nitra: VŠP, 1995, 41-56.
- BÍRO, D. 2000. Technologické aspekty výroby kvalitných lucernových siláží. In: Slovenský chov, roč. 5, 2000, č. 4., s. 31 – 32.
- GALLO, M. 1999 a. Využitie silážnych prípravkov pri výrobe siláží. In: Slovenský chov, roč. 4, 1999, č. 6, s. 5 a 8.
- GALLO, M. 1999 b. Súčasný stav vo výrobe silážovaných krmív na Slovensku. In: Slovenský chov, roč. 4, 1999, č. 10, s. 8 – 9.
- JAMBOR, V. – CHROMEC, P. 1997. Vliv absorbentů na fermentační proces a nutriční hodnotu vojtěškové siláže. In: Aktuální problémy šlechtění, zdraví, růstu a produkce skotu. České Budějovice: JU, 1997, s. 282 – 284.
- JAMBOR, V. 1999. The effect of chemical additives on fermentation characteristics and nutritive value of alfalfa silage. In: 9. Medzinárodné sympórium: Konzervovanie objemových krmív. Nitra: VÚŽV, 1999, s. 144 – 145.
- SOMMER, A. 2000. Výživa, technika a technológie krmenia hospodárskych zvierat. Slovenský chov, roč. 5, 2000, č. 4, s. 25.
- STN 46 7092. 1986. Metódy skúšania krmív
- SVETLANSKÁ, M.- ČEREŠŇÁKOVÁ, Z.- PETRIKOVIČ, P. – SOMMER, A. 1999. Vplyv obsahu hrubej vlákniny a jej frakcií na výživnú hodnotu siláží. In: Najnovšie poznatky pri výrobe a využití krmív, krmných zmesí, krmných doplnkov vo výžive zvierat a ich smerovanie do budúcnosti. Ivanka pri Dunaji: VÚK, 1999, s. 107 – 111.
- ŠKULTÉTY, M. – ŠKULTÉTYOVÁ, N. – BENCOVÁ, E. 1993. Výživná hodnota silážovaných krmív. In: Výživná hodnota krmív a ich vplyv na kvalitu živočíšnych produktov. Nitra: VŠP, 1993, s. 216 – 221.

## ANATOMICAL STUDY OF MALE GENITAL APPARATUS IN ONDATRA

M. BURA, A. GROZEA, Gabi DUMITRESCU

Faculty of Animal Sciences, Calea Aradului nr. 119, Timisoara, 1900, ROMANIA, FAX 0040.56.200296; E-mail: marian\_bura@yahoo.com

### Summary

Four ondatra male bodies (two in formalin and two fresh corps) were used in the experiments, which were done in April. It was established that the bottom of abdominal diverticules helped by distal side of testicular ligament, which pass by the epididim, anchors the backside of the testicles. Seminal vesicles have the top curved crania-caudal. Prostate has 3 pairs of lobes that are in symmetric disposition with urethra. Bulbous-urethral glands, blackberry-shaped, communicate with urethra within fine tube. Preputial glands, have great volume, cream coloured and give of a musk good smell.

**Key words:** *ondatra, male, anatomy, genital apparatus.*

Ondatra is a fur bearing species relatively recent arrived in Romanian fauna, and this is the aim for what it is a little studied. Because of the economical importance of this species, and the informations penury about its biological particularities, we consider opportune to make some anatomical study regarding ondatra's male genital apparatus.

### Material and methods

Studies were made in April, using 4 ondatra male bodies, two formalined and the other two were fresh. For formalining it was injected in abdominal cavity 200 ml of formalin 10%. These animals were opened after 8 days after formalin injection data.

### Results and discussion

Like the other mammals, in ondatra males, genital apparatus can be systematized in three segments: *gonads*, represented by testicles, *conducting ducts (tubular portion)* composed by epididim and vas deferens, *urinary-genital portion*, made from pelvic urethra and extra pelvic one. Around the pelvic portion of urinary-genital channel, annex glands are placed: seminal vesicles, prostate and bulbous-urethral glands. Lateral of penis portion there are two preputial glands (fig. 1, 2).

*Testicle* is a pare organ, with ovoid shape, situated in inguinal region without to differentiate a real scrotal burse. Right testicle have longitudinal diameter expanded between 19 and 22 mm and transverse one between 13.8 and 15 mm. Left testicle have longitudinal diameter expanded between 17.5 and 21 mm and transverse one between 11 and 15 mm.