

VALOAREA NUTRITIVĂ A FÂNULUI NATURAL ÎN CÂTEVA GOSPODĂRII AGRICOLE DIN COMUNA MIROSLOVEȘTI

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The natural hay represents a basic fodder in dairy cows feeding both in winter and grazing time. In this study we focused on the dynamics of the basic indexes of nutritive and energetic value of natural hay used in dairy cows diet from some small farms, from Mirosllovești village. The natural hay samples were collected from the dairy farms which participated in a dairy cows feeding improvement programme financed by World Bank. There was a variability of raw chemical composition of natural hay samples. The protein content varied between 8.30- 14.31% CP, the highest value belonging to the natural hay from Siminciuc Liviu farm. The fibre content varied between 26.01- 28.47% CF, the highest values were recorded by the on natural hay from Neofet Elena and Vezetu Carmen farms. Thus, crude chemical content influenced the energetic and proteic values of the analysed samples.

Keywords: natural hay, diet optimization, cow's alimentation, nutritive value, energetic value.

Drying green fodders represents one of the most used fodder conservation methods for the winter time, but also during the grazing period as an energetic and fibrous fodder.

Hay is a basic fodder in herbivore alimentation, seldom being used as unique fodder during the winter time when the animals can not be fed with green fodder.

In many dairy farms, hay covers up to 40% of energy requirements and over 50% of protein requirements in herbivore feeding; and it is a good source of minerals and vitamins, especially in winter time. (Halga and col., 2005)

In this study we focused on the dynamics of the basic indexes of nutritive and energetic value of natural hay used in dairy cows diet, especially during the winter time, in some small dairy farms from Mirosllovești village.

MATHERIAL AND METHOD

Natural hay samples were collected with the purpose of determining the nutritive value. The data were used to calculate the dairy cow's diet in a dairy cows feeding improvement programme, organised by I.S.P.A. Association, Iasi and financed by World Bank.

The natural hay samples were collected from 6 dairy farms which took part in this programme in Miroslavcești village. The raw samples were taken from every location and analysed in laboratory.

The nutritive value of natural hay was assessed having the crude chemical composition as basis.

The samples have been chemically analysed in the laboratory of "Animal nutrition and alimentation" department, Faculty of Agriculture, Iasi.

Natural hay characterisation from the energetic and nutritive point of view took into account the following indexes: UFL, UFC, ENL, ENC, PDIE and PDIN using the specific equations for the nutritive value estimation in the INRA system [INRA- France, 1988].

Samples preparation

The natural hay samples were dried in the drying closet at 60°C and mill-grinded. After having had the samples prepared the dry, organic and mineral matters were assessed using the methods presented in table 1:

Table 1

Working method used in Proximate Analyse

Estimation	Method- method principle	Equation
Water content content	The samples were dried to drying closet at 105°C for 4 hours	$Ua\% = \frac{100 \times (a - b)}{a}$
Raw ashes content	The samples were calcined to 600°C	$Cen.B\% = \frac{cx100}{m}$
Raw protein content	Kjeldhal method– mineralized organic matter till CO ₂ , H ₂ and NH ₃	$CP\% = \frac{(n_1f_1 - n_2f_2) \times 0,0014 \times 6,25 \times 100}{m}$
Raw fat content	Soxhlet method– dissolving fat in organic solvent	$EE\% = \frac{m_1 - m_2}{m} \times 100$
Raw cellulose content	Acid hydrolysis – filtration – calcinations	$CF\% = \frac{m_1 - m_2}{m} \times 100$
Raw non-structural carbohydrates	Hanneberg method	S.E.N.= OM - (CP%+ EE%+ CF%)

The nutritive value was assessed using the following equations after having previously established the raw chemical content of natural hay samples:

Table 2

Equations for estimating the protein value of natural hay

Index	Equation
PDIA	PDIA= CP * (1,11*(1-TD))*1*dr
PDIN	PDIN= PDIA + PDIMN
PDIMN	PDIMN= CP * [1-1,11*(1-TD)]*0,9*0,8*0,8
PDIE	PDIE= PDIA+ PDIME
PDIME	PDIME = MOF* 0,145* 0,8* 0,8
SOF	MOF= MOD- CP (1-TD)- CF- FP

Source: INRA, 1989

Table 3

Equations for assessing the energy value of the natural hay

Index	Equation
Digestible energy	ED = EB*dE
Metabolic energy	EM = ED*EM/ED EM/ED = 0,8417-9,9*10 ⁻⁵ CFo-1,96*10 ⁻⁴ CPo+0,0221NA
The fodder concentration= in metabolic energy	q = EM/EB

Index	Equation
Efficiency of using the metabolic energy in net energy	
For lactation	$kl = 0,60 + 90,24 \cdot (q - 0,57)$
For maintenance	$km = 0,287q + 0,554$
For fattening	$kf = 0,78q + 0,006$
For maintenance and meat production	$kmf = (km \cdot kf \cdot 1,5) / (kf + 0,5 \cdot km)$
UFL value	$UFL = EM \cdot kl / 1700$
UFC value	$UFC = EM \cdot kmf / 1820$

RESULTS AND DISSCUSIONS

Raw chemical content

The results obtained in proximate analyse are presented in table 4:

Table 4

Raw chemical content of the natural hay (g/kg)

Farmers	U%	DM%	Ashes%	O.M.%	CP%	EE%	CF%	SEN%
Aiordăchioaei Ileana	11,25	88,75	7,10	81,65	8,30	1,67	26,91	44,77
Corcăcel Constantin	10,60	89,40	6,69	82,71	9,81	1,87	26,80	44,23
Hogaș Gabriela	10,00	90,00	7,13	82,87	10,72	3,94	26,60	41,61
Neofet Elena	9,00	91,00	6,15	84,85	8,45	3,23	27,19	45,98
Vezeteu Carmen	9,60	90,40	6,55	83,85	9,67	3,17	28,47	42,54
Siminciuc Liviu	8,97	91,03	7,22	83,81	14,31	2,02	26,01	41,47

Analysing the data from the table 4 one notices that there is a variability of raw chemical content of natural hay in studied village.

The dry matter content of the analysed samples varied between 88,75 – 91,03%. The lowest value was recorded to the natural hay from Aiordăchioaei Ileana farm (88,75%DM).

The raw ashes content varied between 6,15- 7,22%, the lowest value was recorded to the hay from Neofet Elena farm.

The raw protein content varied between 8,30- 14,31%, the highest value was recorded to natural hay from Siminciuc Liviu farm, as well as the lowest value in crude fibre content 26,01%. This can be explained by the fact that hay was collected to the first mowing when plants were harvested at the right time. The natural hay was dried on supports that accounts for the great amount of leaves. This way, the crude protein content increased, for it is well known that the highest level of protein is found in leaves.

To natural hay samples collected from Neofet Elena farm presented a raw fibre content of 27,19%. The natural hay was harvested on second scythe, it was dried on the ground and it was stored into the haystack depot. Thus, a big amount of leaves was lost and the hay was mainly made up of stems.

Natural hay samples collected from Vezeteu Carmen farm had a fibre content of 28,47%. Due to unfavourable climate conditions the natural hay was harvested in an advanced vegetation phase. Another reason that accounts for the high level of fibre content in the natural hay is caused by inadequate transportation to haystacks depot (hay manipulation, the transport of the hay on warm weather).

Nutritive value

Natural hay energetic value was assessed and results are presented in table 5:

Table 5

The energetic value of alfalfa hay (/ kg fodder)

Farmers	UFL	UFC	ENL	ENC
Aiordăchioaei Ileana	0,53	0,44	900	803
Corcăcel Constantin	0,55	0,46	936	837
Hogaș Gabriela	0,56	0,47	950	848
Neofet Elena	0,55	0,46	943	840
Vezeteu Carmen	0,58	0,49	987	894
Siminciuc Liviu	0,60	0,51	1016	929

Analysing the data from tab 5 one notices a low variability of UFL (0,53 - 0,60) and UFC (0,44- 0,51) in natural hay. Energetic value of ENL varied between 900- 1016, the highest value being recorded by the natural hay from Siminciuc Liviu farm. The value of ENC varied between 803- 929, the highest value being recorded by the natural hay from Siminciuc Liviu farm.

Table 6

The protein value of the alfalfa hay (/ kg DM)

Farmers	PDIA	PDIN	PDIE
Aiordăchioaei Ileana	26,47	60,01	80,99
Corcăcel Constantin	31,06	70,41	85,66
Hogaș Gabriela	33,71	76,43	85,90
Neofet Elena	26,28	59,58	80,71
Vezeteu Carmen	30,28	69,64	82,43
Siminciuc Liviu	44,50	100,87	98,41

The data presented in table 6 offers information regarding the protein value of natural hay samples. Thus, the highest values were obtained by the natural hay from Siminciuc Liviu farm, 100,87 g PDIN/ kg SU and 98,41 g PDIE/ kg SU. The lowest values were obtained by natural hay samples from Neofet Elena farm (59,58 g PDIN/ kg SU and 80,71 g PDIE/ kg SU) and Aiordăchioaei Ileana (60,01 g PDIN/ kg SU and 80,99 g PDIE/ kg SU).

CONCLUSIONS AND RECOMMENDATIONS

As a result of natural hay analyses the following conclusions may be drawn:

- Natural hay is a valuable fodder for dairy cows both winter and grazing time.
- Natural hay from Siminciuc Liviu farm recorded the highest level of CP%, 26,01 % CP.
- The lowest level of crude protein content was recorded by the natural hay from Aiordăchioaei Ileana farm (8,3 % CP) and Neofet Elena farm (8,45% CP).
- Natural hay sample from Siminciuc Liviu farm had the lowest value of fiber content, 26,01% CF.
- Natural hay samples collected from Vezeteu Carmen farm and Neofet Elena farm had an increased level of crude fiber 28,47%, and 27,19% respectively.

- The energetic value of natural hay samples present a low variation; the UFL value varied between 0,53- 0,60 while the UFC value between 0,44- 0,51.
- The protein value varied depending on crude protein content; thus, the highest values were recorded by natural hay from Siminciuc Liviu farm 44,50 g PDIA/ kg DM, 100,87 g PDIN/ kg DM and 98,41 g PDIE/ kg DM.
- For the purpose of decreasing losses of organic matters and obtaining quality hay some things are worth paying attention to in what the preserving and depositing technologies are concerned:
 - the optimal moment for harvesting,
 - drying on supports or on the ground till the humidity is 14- 15%;
 - do not to transport the hay in the very warm periods of the day.

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