

## IMPACT ON THE ZEOLITE USAGE IN DIARY COWS NUTRITION TO THEIR HEALTH CHARACTERISTICS\*\*

Z. Ilić <sup>1\*</sup>, S. Pešev <sup>2</sup>, M. Milenković <sup>1</sup>, B. Milošević <sup>1</sup>

<sup>1</sup> Agricultural faculty, Zubin Potok, Serbia

<sup>2</sup> Agroinvest fond, Leskovac, Serbia

\*Corresponding author, e-mail: ilzoama@ptt.yu

\*\* Communications

**Abstract:** The aim of this research is to examine how zeolite as nutrition additive will impact on health characteristics of the diary cows and calves.

Examined health characteristics are inner diseases, udder injuries and delivery.

Examined inner diseases are pneumonia, indigestion multiplex, gastroenteritis, rachitis, osteomalatia, hypomagnesaemia, and omphalitis.

Examined cow udder diseases are mastitis, udder edema, udder hyperemia, injuries and sores.

As for the researches which lasted for 15 months, diary cows of domestic spotted breed. Experimental animals have been divided into three groups.

Control group consisted of the cows which did not get zeolite while the first experimental group got nutrition with 3 % addition, and the second experimental group with 2 % zeolite addition within the meals.

Achieved results imply to the fact that zeolite usage in diary cows' nutrition did not have any impact on the changes in mammas. There was no statistical dependence between control group and the groups which got tufozel either in 2% or 3% quantity.

Based on the performed statistical analysis it can be concluded that changes on the mammas appeared because of the environment.

As for the inner diseases appearances, in comparison to the control group, the group which got 2% of tufozel in diary cows feeding had seldom appearance of the inner diseases of the experimental animals vs. the group with 3% of tufozel. This is supported by stronger correlative dependence (0,65), determined for the group which got 2% of tufozel, in comparison to (0,59), which was determined for the experimental group, which got 3% of tufozel.

**Key words:** diary cows, zeolite, health characteristics

## Introduction

Health characteristics of dairy cows are mostly influenced by regular feeding. Selection of feedstuffs for dairy cows nutrition as well as their quality is significant for the health status of the animals and directly impacts on the productive and reproductive characteristics of animals.

Natural zeolite as an additive to nutrition is applied with success in animal husbandry with some breeds and categories of domestic animals. Milking cows examination were performed by *Harvey et al.* (1991) and *Neustroyev et al.* (1995), *Nešić* (2000), *Pešev* (2002), *Ilić et al.* (2005).

Mold food can contain lot of toxins which badly affect health condition of the animals. It comes to grow decrease and food intake increase per item with all species and categories of domestic animals. Mycotoxicosis are not cured but prevented, if possible.

Nutrition influences the animal health through micotoxins, impacts productive and reproductive determinates as well and to other characteristics of cows, also. *Harvey et al.* (1991) and *Neustroyev et al.* (1995), *Pešev et al.* (2005), *Ilić et al.* (2006) emphasize feasibility of zeolite appliance in animal nutrition with cows in lactation.

The aim of this paper is to investigate in which amount zeolite as an additive to nutrition in tufozel will influence on some of the health characteristics of dairy cows.

## Material and method

The experiments have been performed on the sample of 24 dairy cows of domestic spotted breed. The experimental animals have been divided into three groups per eight cows. The groups were formed based on the quantity of tufozel added into meals. Control group (K) consisted of eight cows which did not get tufozel within meals, while the first experimental cow group (I-O) consumed the meal with 3 % of tufozel addition and the second experimental cow group (II-O) with 2 % of tufozel addition.

Zeolites are crystal aluminosilicate, which possesses undetermined three-dimensional structure. They have capability of reversible water detainment and liberation and changes of some of their constituent cations, without any major changes within the structure. Klinoptilolit is the most spread zeolite species in the nature which is significant for domestic animals feeding because of their cation characteristics. Earlier researches performed by

several authors from couple of countries show better growth and efficiency in food usage with all domestic animals species. It is also ustanovljeno that preparation based on zeolite inhibits plesan growth.

Tufozel is micronized fine powder, a thermally and technologically prepared additive to nutrition with highly selective absorptive potential towards micotoxines. Tufozel firmly links (inactivates) micotoxine taken in by contaminated food and restrains their toxic influence. This activity is specially emphasized towards well as to ochratoxin, zearalenon and other micotoxines. Tufozel is harmless, undiluted, non-resorptive and does not leave residues in milk.

Having in mind the aforementioned, the subject of this research was consideration of the influence of different concentrations of tufozel type of zeolite to some of health characteristics of the animals used in the experiment.

Examined health characteristics were inner diseases, udder injuries and delivery.

Examined inner diseases are pneumonia, indigestio multiplex, gastroenteritis, rachitis, osteomalatio, hypomagnesaemia, omphalitis.

Examined udder diseases are mastitis, udder edema, hyperemia, injuries and sores.

## **Research results and discussion**

Delivery presents a physiological end of gravidy characterized by transition of fetus from the inner sterile to the outer non-sterile environment as well as throwing out of placenta.

This presents parturition or normal delivery which does not need help but only surveillance whereas expert assistance is needed with heavy delivery.

Heavy delivery can happen because of mother, fetus or placenta. Heavy deliveries with cows during this experiment happened in 6 cases and causes for this were narrow vagina, insufficient opening of cervix and narrow pelvis.

Pulling out by several assistants, previously well prepared by vet, has been used as a method of delivery finalization. Strength of 4-6 assistants has been used. In one case a cow torsion was used and in other a C-section.

All calves delivered with assistance were live and vital and after few days there have not been any difference from calves delivered naturally without any help.

All cows, with whom the method of delivery finalization was applied, pregnanced later.

In all three cow groups it has been intervened in six cases (2 per group). Interventions with I-O and II-O group were easier than with control group where one torsion of cow and one C-section was performed.

However, based on statistical analysis it cannot be concluded that usage of zeolite of tufozel type in experimental animals feeding was the reason for this to happen.

Some malformations, as edema, hyperemia, acute mastitis and mechanical injuries, were noticed by a detailed examination of cow udders.

It is seen in the table 1 that pathological changes are various and that they were present with 8 cows. With I-O and K-group there were three changes on udder, while II-O group had two changes.

Largest number of changes are edema in three cases, then hiperemia and acute mastitis in 2 cases. Mechanical injuries happened in only one case.

Edema was most frequent change on udder and they appeared with the cows which delivered for the first time, just before the delivery itself. In case of inadequate therapy edema leave numerous consequences, which will reflect in the first and the following lactations.

Presence of hiperemia was noticed in I-O group and in the control group. Number of animals with hiperemia is one per group.

**Table1. Changes on cows' mummies**

Group	Change		Tumors		Edema		Hyperemia		Acute mast.		Meh. Inj.		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
I-O	8	3	12.5	0	0	1	4.16	1	4.16	1	4.16	0	0
II-O	8	2	8.32	0	0	1	4.16	0	0	0	0	1	4.16
K	8	3	12.5	0	0	1	4.16	1	4.16	1	4.16	0	0
Total	24	8	33.33	0	0	3	12.48	2	8.32	2	8.32	1	4.16

Acute mastitis is presented in lower percentage than in data from the literature *Al-Anbari Ahmed* (1978). Cleanness, type and quantity of rugs are very important in prevention of mastitis which is in line with the results given by *Eberhart, R.J.* (1979). In her research, *Mijajlović Jasmina* (2000) emphasizes that the percentage of mastitis in the experiments of the mentioned authors is around 10%.

Mechanical injuries mostly appear because of inadequate method of

milking and bite of calves during sucking. Injury could appear also because of presence of different tools in stable or on pasture.

There is no statistical dependence of mummies between control group and groups which got tufozel either in quantity of 2% or 3%.

The interesting thing is that the number of changes on mummies with control group and group which got 3% of tufozel is identical, which supports statistical analysis. There is no correlative dependence in comparison to the control group. Based on the statistical analysis performed it could be concluded that the changes on mummies appeared because of the environmental impact.

Inner diseases were noticed with 11 cows and 11 calves, that is 22 beefs or 45.81 %, out of total number of beef in the experiment (cows + calves=48).

Out of total number of sick beef, 7 are from I-O group or 14.56 %, 5 beef from II-O group or 10.40 % and 10 from K-group or 20.70 %.

In table 2 inner diseases of experimental animals during experiment are shown.

**Table 2. Inner diseases of the experimental animals noticed in the experiment**

Disease	Number of sick cattle			%	Group					
	Cow	Calf	Total		I-O		II-O		K	
					No.	%	No.	%	No.	%
Pneumonia	3	3	6	12.50	2	4.16	1	2.08	3	6.24
Indigestio	2	2	4	8.33	1	2.08	1	2.08	2	4.16
Gastroenteritis	2	2	4	8.33	1	2.08	1	2.08	2	4.16
Rachitis	0	3	3	6.25	1	2.08	1	2.08	1	2.08
Osteomalatio	2	0	2	4.16	0	0	1	2.08	1	2.08
Hipomagnestemia	2	0	2	4.16	1	2.08	0	0	1	2.08
Omphalitis	0	1	1	2.08	1	2.08	0	0	0	0
<b>Total</b>	<b>11</b>	<b>11</b>	<b>22</b>	<b>45.81</b>	<b>7</b>	<b>14.56</b>	<b>5</b>	<b>10.4</b>	<b>10</b>	<b>20.70</b>

During observation period, pneumonia was noticed in 6 cases which presents the most often disease, in terms of frequency of appearance. There were three cases of cows and three cases of calves with this disease. Control group had pneumonia in three cases, first experimental group had two and second experimental group one case.

Four cases of indigestio were evidenced out of cured animals. There were two cases in the control group and in I-O group and II-O group one case each.

Gastroenteritis with diarrhea was evidenced with four calves. In K-group

there were two cases of gastroenteritis and in I-O group and II-O group one case each group. It is considered that usage of “tufozel” preparation increased appearance of this disease in low percentage. Calves had also small number of gastroenteritis, only two cases, which is excellent result.

Rachitis appeared in three cases. There was one case of rachitis in each group. Calves Rachitis was noticed with calves whose mothers lived too long in stable and where deficit of vitamin D increased.

Cases of demineralization of formed skeleton, appeared by disorder of relation of Ca and P in organism, were noticed with two dairy cows. Disease appeared with cows in high lactation period which is a consequence of intensive metabolism which is in line with quotation given by *Jovanović and ass.*, (2000).

Pasture tetania happened in two cases in the structure of disease. Both cases appeared in spring which tells about hypocalcaemia presence. There was per one case in each group, control and I-O group.

Muscle fibre of umbilicus and umbilical cord are good basis for microorganisms which are present numerously around calf. Infection appears when infection spreads towards dermal part of umbilicus or in the area of umbilical blood vessel.

In only one case it presented in taking outer area of umbilici and manifested as ulcus umbilici. There reason for this was a consequence of an infection during assistance with delivery by non-professional people without using obstetrician asepsis and antisepsis.

In comparison to control group 2% of tufozel in feeding dairy cows influenced more positively on appearance of inner diseases of the experimental animals compared to the level of 3%. This is implied by stronger correlative dependence (0, 65), determined for the group which got 2% of tufozel, compared to (0,59) which was determined for the group which got 3% of tufozel.

## Conclusion

Based on the research on zeolite influence, used in dairy cows' nutrition, on their health condition, the following can be concluded:

Delivery with I-O and II-O group was easier in comparison to the control group cows where the interventions were harder and there were six interventions, that is to say, two cases per each group. However, it cannot be concluded, on the basis of statistical analysis, that the reason for this was usage of zeolite of tufozel type in experimental animals feeding.

One third of examined cow had changes on mummies presented as edema in 3 cases, hyperemia and acute mastitis in 2 and mechanical injuries in 1 case.

Eight changes on mummies were noticed as follows: three cases in I-O group, two in II-O group and three in K-group.

There is no statistical dependence with changes on mummies between control group and groups which got tufozel either in quantity of 2% or 3%.

There is no correlation dependence in comparison to the control group. Based on the statistical analysis performed, it can be concluded that changes on mummies appeared because of the environment.

Inner diseases in I-O group were noticed with seven animals while II-O group had five cases. Greatest number of inner diseases appeared in the control group with ten cases.

As of inner diseases, pneumonia was diagnosed in six cases, gastroenteritis in four, rachitis in three, ostomalatio in two, hypomagnesaemia in two and omfalitis in one case.

As for the inner diseases appearances in comparison to the control group, the group which got 2% of tufozel in diary cows feeding had seldom appearances of inner diseases of the experimental animals compared to the group with 3% of tufozel. This is implied by stronger correlation dependence (0,65), which was determined for the group which got 2% of tufozel, in comparison to (0,59), which was determined for the experimental group with 3% of tufozel.

Based on the abovementioned data, it can be concluded that adding of zeolite to the meals for diary cows was without any influence on appearance of changes on mummies while as for inner diseases appearance, a level of 2% of zeolite was sufficient for gaining of the better results.

## **UTICAJ KORIŠĆENJA ZEOLITA U ISHRANI KRAVA MUZARA NA NJIHOVE ZDRAVSTVENE OSOBINE**

*Z. Ilić , S. Pešev , M. Milenković , B. Milošević*

### **Rezime**

U ovom radu cilj istraživanja je bio da se ispita u kojoj će meri zeolit kao

dodatak stočnoj hrani uticati na zdravstvene osobine krava muzara i teladi.

Od zdravstvenih osobina ispitivane su unutrašnje bolesti, bolesti vimena i porođaj.

Od unutrašnjih bolesti ispitivani su pneumonija, indigestio multiplex, gastroenteritis, rachitis, osteomalatio, hipomagnestemia, omphalitis.

Od bolesti vimena krava ispitivan je mastitis, edem vimena, hiperemija vimena, rane i ragade.

Za ispitivanja koja su trajala 15 meseci korišćene su krave muzare domaće šarene rase. Ogledne životinje su bile podeljene u tri grupe.

Rezultati do kojih se došlo tokom istraživanja ukazuju na to da korišćenje zeolita kao dodatka stočnoj hrani kod promena na mlečnim žlezdama nije imalo uticaja na statističku zavisnost između kontrolne grupe i grupa koje su dobijale tufozel bilo u količini 2% ili 3%.

Interesantno je da je broj pojava promena na mlečnim žlezdama kod kontrolne grupe i grupe koja je dobijala 3% tufozela identičan, što potvrđuje statističku analizu. Ne postoji korelaciona zavisnost u odnosu na kontrolnu grupu. Na osnovu urađene statističke analize može se zaključiti da su promene na mlečnim žlezdama nastale zbog uticaja sredine.

Što se tiče pojava unutrašnjih bolesti u odnosu na kontrolnu grupu, grupa koja je dobijala 2% tufozela u ishrani krava muzara imala je ređe pojavljivanje unutrašnjih bolesti eksperimentalnih životinja u odnosu na grupu sa 3% tufozela. Na to ukazuje jača korelaciona zavisnost (0,65), koja je utvrđena za grupu koja je dobijala 2% tufozela, u odnosu na (0,59), što je utvrđeno za eksperimentalnu grupu, koja je dobijala 3% tufozela.

**Ključne reči:** krave muzare, zeolit, zdravstvene osobine

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