Influence of Panamin Animal® and Panamin Detox® on milk production of dairy cows

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Abstract

The aim of the study was to evaluate the differences in milk yields, milk composition in three groups of dairy cows receiving the dietary supplements Panamin Detox® and Panamin Animal®.

The present group production experiment was conducted in the experimental cattle farm of the Agricultural Institute – Stara Zagora, Bulgaria with three groups (two experimental and one control) each comprising 11 lactating dairy cows. The following parameters were monitored: daily milk yield (kg), milk fat and protein contents (%). The analysis of milk quality was done on 436 milk samples from cows.

Obtained phenotypes were corrected for main factors influencing test-day milk yield. The used model considered each test day milk yield as independent observation and unbiased estimates of traits were obtained by a linear mixed-effects model.

Data were processed with statistical software products Systat 13 and Pest /Groeneveld/, and graphs were generated in MS Excel.

The supplementation of cows' ration with dietary supplements Panamin Detox® and Panamin Animal® had a statistically significant beneficial effect on milk yield ($P < 0.001$).

The lowest milk fat and protein values were determined in cows supplemented with Panamin Detox – 3.98% and 3.32%, respectively.

The differences between milk fat and protein contents in the group supplemented with Panamin Detox® and controls were significant ($P < 0.001$).

Key words: milk yields, milk composition, Panamin Detox®, Panamin Animal®, zeolite.

The genetic potential of dairy cows for high milk yields is in the beginning of lactation when the body experiences the metabolic load for production of high amount of milk. This is associated with sharp increase of harmful metabolites in the circulation as well as altered hormonal status.

The main causes for culling high-yielding animals at farms are gastrointestinal diseases, rumen acidosis, liver diseases (cirrhosis), hoof diseases and mastitis.

The dietary supplement Panamin Detox® contributes to the natural elimination of harmful substances (heavy metals, ammonia) as it binds selectively and very efficiently toxins e.g. ammonia, formed during digestion or ingested with food.

Panamin Animal® is an excellent supplement to daily ration, especially to supply of proteins and carbohydrates as it stabilises digestion and improves nutrients' utilisation. It has a protective physiological effect on gastrointestinal tract and activates microflora. The feed additives Panamin Detox® and Panamin Animal® based on natural Austrian minerals (Calcite, Dolomite, Zeolite) is simply added to the daily food. It can be applied with all kinds of livestock production.

Zeolite as dietary supplement has a wide range of effects. Its influence on milk yield and milk composition has been studied by numerous authors (Ilić et al., 2011; Dschaak et al., 2010; Karatzia et al., 2011).

Zeolite is a crystalline aqueous aluminosilicate including macro elements Na, K, Mg, Ca (Erwanto et al., 2012). Its effect comprises increased efficiency of animal nutrition and increases productive performance of dairy cows. Furthermore, it decreases the problems associated with mastitis (http://www.etszeolite.com/html/cattle.html).

An experiment has been carried out to evaluate the effect of zeolite on milk yields and milk chemical composition with 32 lactating Holstein cows (Bosi et al., 2002). Similar research have been also performed by Bergero et al. (1995); Johnson et al. (1988).

Opposite to these authors who affirmed that dietary supplementation of zeolite decreased daily milk yield and feed intake, Roussell et al. (1991) found that feeding diets with zeolite increased produced milk.

Hornig et al. (1999) provided evidence for positive effect of dietary supplementation of 2% zeolite on milk fat and protein contents and milk lactose levels.

Higher lactation yields were reported by Ilic et al. (2011). The authors investigated 3 groups of cows with 15 animals each – control, experimental group I (whose feed was supplemented with 2% zeolite) and experimental group II (supplemented with 4% zeolite). According to the data, the addition of 2% and 4% zeolite to cow' diets resulted in higher lactation milk yield and milk fat content.

Ural et al. (2013) affirmed that the supplementation of 2% zeolite to cow rations led to significantly higher daily milk yield. The average milk yield of cows that received zeolite was 24.01 kg vs 20.1 kg in controls.

Similar studies were conducted with 80 clinically healthy Holstein-Friesian cows in Aydin province, Turkey (Ural, 2014). The author demonstrated statistically significant difference between groups with respect to milk yield and total somatic cell counts in milk in favour of zeolite-supplemented groups.

The aim of this study was to evaluate the differences in milk yield and milk composition in cows whose ration was supplemented with different dietary supplements – Panamin Detox® and Panamin Animal®.

Material and methods

The present group production experiment was conducted in the experimental cattle farm of the Agricultural Institute – Stara Zagora, Bulgaria with three groups (two experimental and one control) each comprising 11 lactating dairy cows.

The groups were fed balanced rations compliant with milk yield and live body weight of cows, supplemented with 0.50 g/day of two natural dietary additives – Panamin Detox® and Panamin Animal®.

Throughout the experiment, the following parameters of milk yield were monitored: daily milk yield (kg); milk fat and protein (%).

The analysis of milk quality was done on 436 milk samples from cows reared at the Agricultural Institute cattle farm – Stara Zagora. Individual milk samples were obtained during the morning milking without adding preservative. Milk quality analysis was done at the laboratory of the Agricultural Institute – Stara Zagora on Lactoscan ultrasonic milk analyzer.

Statistical analysis

Obtained phenotypes were corrected for main factors influencing test-day milk yield. The used model considered each test day milk yield as independent observation and unbiased estimates of traits were obtained by a linear mixed-effects model.

- observation vector of individual test-day milk yield (kg); milk fat and protein,
- fixed effects vector – group, number of lactation (parity), age (days) to the respective test-day, days in lactation to the respective test-day of respective lactation of the cow.

$$Y_{ijklm} = Group_i + Par_j + Testdim_k + Age_l + e_{ijklm}$$

where:

Y_{ijklm} – m^{th} observation of a trait;

$Group_i$ – fixed effect of the i^{th} group;

Par_j – fixed effect of the j^{th} parity;

$Testdim_k$ – random regression effect of k^{th} days in lactation to the respective milk test-day of the respective lactation

Age_l – effect of l^{th} age of calving;

e_{ijklm} – random effect of unobserved factors

Data were processed with statistical software products Systat 13 and Pest (Groeneveld), and graphs were generated in MS Excel.

Results and discussion

Synthetic zeolites are used to control the availability of dietary minerals (e.g., Ca, Mg, and P) in dairy cows. Due to calcium demand increasing with lactation onset, most cows become hypocalcemic immediately postpartum, which likely contributes to poorer immune function because calcium is important for immune cell signaling (Crookenden et al., 2020).

During the experimental period, the highest milk yield was recorded in the group whose feed was supplemented with Panamin Detox®– 22.69 kg, while the lowest (10.85 kg) was recorded in the group supplemented with Panamin Animal® – 19.85 kg (Fig. 1).

Our data were in line with those of Ural et al. (2013); Ilic et al. (2011), and confirmed that the supplementation of cows' rations with zeolite increased milk yields.

The statistical analysis demonstrated a highly significant difference in milk yields between the group supplemented with Panamin Detox® and controls ($P < 0.001$) as well as between the group supplemented with Panamin Animal® vs. controls ($P < 0.001$) – Table 1. No significant differences were obtained between both supplemented groups.

A probable reason for the obtained results was the body detoxication associated with improved liver function and enhancement of systemic metabolism. As indicated by Karatzia et al. (2013) the benefits of adding zeolite is expressed in significantly increased body condition score and

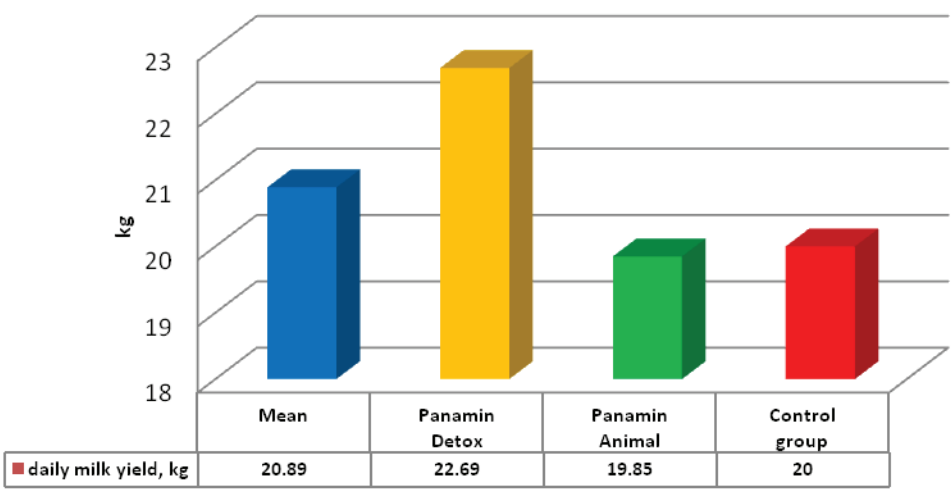

Fig. 1. Effect of Panamin Animal and Panamin Detox dietary supplements on daily milk yield

Table 1. Mean differences and significance between experimental and control groups

Variable	Mean Difference	Standard Deviation of Difference	p-Value
Milk yield, kg – Panamin Detox® – Group 1 Milk yield, kg – Panamin Animal® – Group 2	0.835	8.059	0.221
Milk yield, kg – Panamin Detox® – Group 1 Milk yield, kg – Control group® – Group 3	4.430	8.818	0.000***
Milk yield, kg - Panamin Animal® – Group 2 Milk yield, kg – Control group® – Group 3	3.647	7.086	0.000***

*Levels of significance: * – p < 0.05; ** – ; p < 0.01м; *** – p < 0.001*

blood serum concentration of glucose and significantly decreased blood serum concentration of ketone bodies. Clinoptilolite also improved significantly the reproductive parameters evaluated and significantly increased milk production. These results indicate that daily dietary administration of 200 g of clinoptilolite can be used for the improvement of animal performance in dairy herds.

The milk from all three groups was characterised with high fat content, specific for the breed. Milk fat and protein contents were the highest in animals supplemented with Panamin Animal® – 4.28% and 3.38% respectively (Fig. 2 and 3). The lowest milk fat and protein values were determined in cows supplemented with Panamin Detox® –3.98% and 3.32%, respectively.

The control group of animals were distinguished by values of the traits studied similar to those treated with Panamin Animal®. According to statistical analysis results, the differences between milk fat and protein contents in the group supplemented with Panamin Detox® and controls were highly relevant (P < 0.001) – Table 2 and 3. There were also substantial differences between the two groups that received dietary supplements with very significant effects on milk protein (P < 0.001), and significant effect on milk fat content (P < 0.01). Similar results are reported in an experiment conducted by Khachlouf et al. (2019)

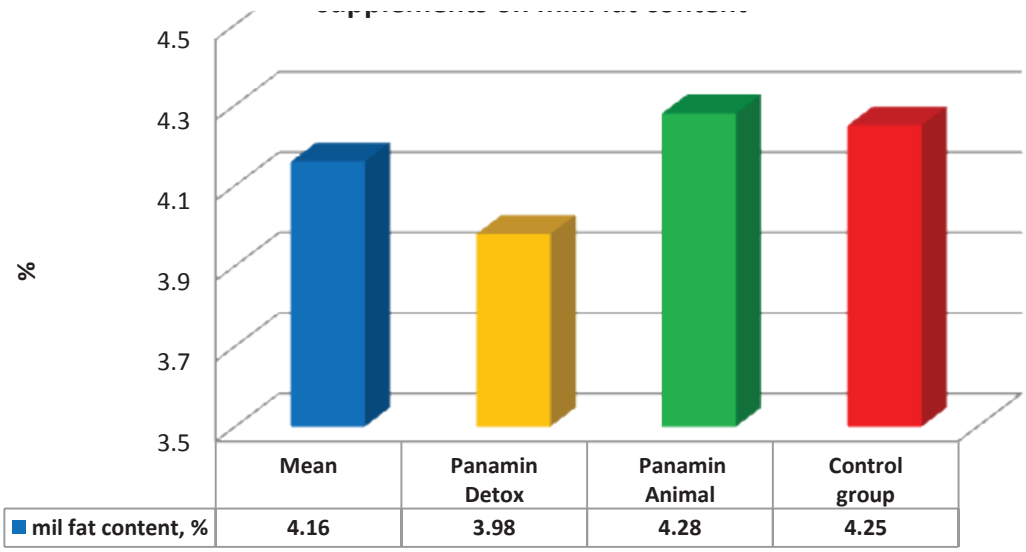

Fig. 2. Effect of Panamin Animal and Panamin Detox dietary supplements on milk fat content

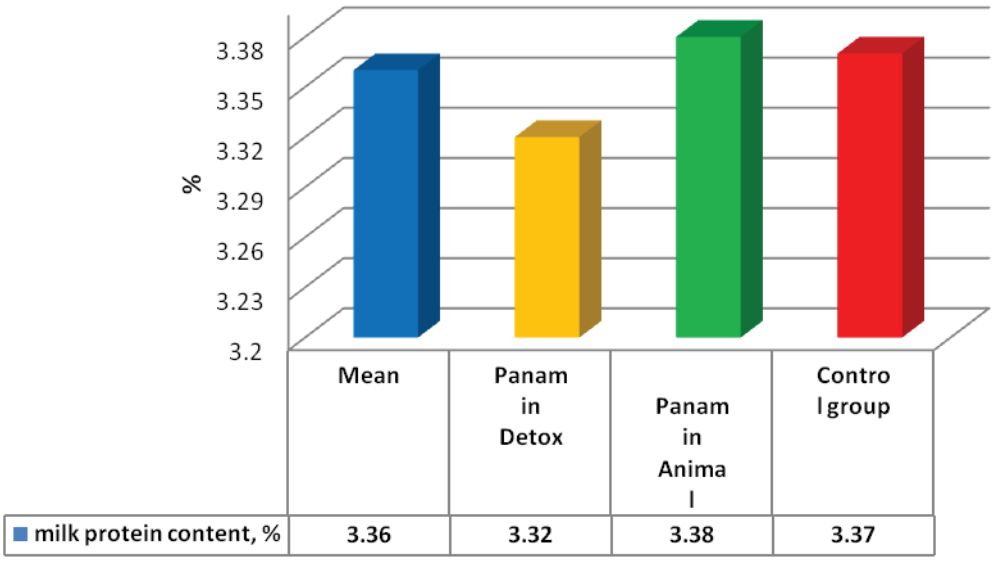

Fig. 3. Effect of Panamin Animal and Panamin Detox dietary supplements on milk protein content

Table 2. Mean differences and significance between experimental and control groups

Variable	Mean Difference	Standard Deviation of Difference	p-Value
Milk fat content, % – Panamin Detox® – Group 1 Milk fat content, % – Panamin Animal® – Group 2	-0.484	2.095	0.007**
Milk fat content, % – Panamin Detox® – Group 1 Milk fat content, % – Control group – Group 3	-0.662	1.822	0.000***
Milk fat content, % – Panamin Animal® – Group 2 Milk fat content, % – Control group – Group 3	-0.181	1.685	0.205

*Levels of significance: * – $p < 0.05$; ** – $p < 0.01$; *** – $p < 0.001$*

Table 3. Mean differences and significance between experimental and control groups

Variable	Mean Difference	Standard Deviation of Difference	p-Value
Milk protein content, % – Panamin Detox® – Group 1 Milk protein content, % – Panamin Animal® – Group 2	-0.633	2.280	0.001***
Milk protein content, % – Panamin Detox® – Group 1 Milk protein content, % – Control group – Group 3	-0.889	2.101	0.000***
Milk protein content, % – Panamin Animal® – Group 2 Milk protein content, % – Control group – Group 3	-0.262	1.705	0.070*

*Levels of significnace: * – $p < 0.05$; ** – $p < 0.01$; *** – $p < 0.001$*

with pregnant dry Holstein cows, randomized into two groups. The authors conclude that zeolite can be effectively used in rations of dry and lactating cows with a positive effect on milkiness, without detecting any adverse effect on milk composition or blood parameters. Dschaak et al. (2010) indicate that the addition of natural zeolite to the rations of dairy cows helps to increase the content of % protein in milk.

Conclusions

The supplementation of cows' diet with dietary supplements Panamin Detox® and Panamin Animal® had a highly pronounced beneficial effect on milk yield ($P < 0.001$).

The lowest milk fat and protein values were determined in cows supplemented with Panamin Detox® – 3.98% and 3.32%, respectively.

The differences between milk fat and protein contents in the group supplemented with Panamin Detox® and controls were significant ($P < 0.001$).

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