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To the Manager  
of DZZD PANAMIN & CO  
Mr. Angel Kinanov

We are enclosing one copy of a scientific-economic test of food additives PANAMIN ANIMAL and PANAMIN ANIMAL DETOX.

Director (*Sgd. illegible*)  
/Professor DSc Stanka Laleva/

*Round seal of Agricultural Institute - Stara Zagora*



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## SCIENTIFIC-ECONOMIC TEST OF FOOD ADDITIVES PANAMIN ANIMAL and PANAMIN ANIMAL DETOX

**Contractor:** Agricultural Institute – Stara Zagora

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**Location of the test:** Cattle farm at the Agricultural Institute – Stara Zagora

**Client:** DZZD PANAMIN & CO, BULSTAT 177046659, Sofia, district Lozenets, 5 Universitetska St., represented by Angel Kinanov

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## Scientific-economic test

### Introduction

Upon assignment by PANAMIN CO - Sofia, a test was carried out to identify the main productive characteristics of dairy cows fed with two new natural food additives - Panamin Detox and Panamin Animal. The purpose of the test was to examine the differences in the productivity, the composition of the milk, its renneting properties and other assay parameters /urea/ in three groups of cows, one control and two fed with different dietary additives. The test methodology was discussed and adopted beforehand.

### Material and methods

The scientific and economic test was carried out with three groups of 11 lactating cows (two test and one control) from November 22, 2016 to April 04, 2017.

The groups were fed with rations balanced in terms of productivity, livestock mass and two natural dietary additives - Panamin Detox and Panamin Animal.

### WHOLE RATION MIX

Component	Share, kg		
	Group I - Panamin Detox	Group II - Panamin Animal	Group III - Control
Concentrated fodder	8,000	8,000	8,000
Brew mash	10,000	10,000	10,000
Maize silage	26,000	26,000	26,000
Hay	3,000	3,000	3,000

### RECIPES FOR COMBINED FODDER

COMPONENT	Group I - Panamin Detox	Price per ton	Group II - Panamin Animal	Price per ton	Group III - Control	Price per ton
	% share		% share		% share	
Dicalcium phosphate	0.600	1500,00	0.600	1500,00	0.600	1500,00
Chalk	2.000	156,00	2.000	156,00	2.000	156,00
Salt	0.500	276,00	0.500	276,00	0.500	276,00
Wheat	73.150	300,00	73.150	300,00	73.150	300,00
Pre-mix 96645	0.250	3636,00	0.250	3636,00	0.250	3636,00
Sodium bicarbonate	1.000	700,00	1.000	700,00	1.000	700,00



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<b>Rumanol</b>	1.000	1764,00	1.000	1764,00	1.000	1764,00
<b>Soybean groats</b>	7.000	1020,00	7.000	1020,00	7.000	1020,00
<b>Sunflower groats</b>	14.500	516,00	14.500	516,00	14.500	516,00
<b>PANAMIN DETOX/PANAMIN ANIMAL</b>	<b>50 g/day</b>		<b>50 g/day</b>			
		<b>414.14</b>		<b>414.14</b>		<b>414,14</b>

**During the test, the dynamics of the following indicators characterizing the milk yield and the coagulation properties of the milk were examined:** daily milk yield /kg/; fat and protein substances (%); Dry non-fat residue / % /; Urea /mg / dL/, coagulation time /min/; hardness of the coagulum /mm/

**During the test, the following parameters of the fodder included in the animals' rations were analyzed:**

- Colour
- Odour
- Dry substance, %
- Crude protein, % - initial moisture
- Crude protein, % - absolute DS
- Crude fats, initial moisture %
- Crude fats, % - absolute DS
- Available moisture, %
- Crude ash, % - initial moisture
- Crude ash, % - absolute DS
- Neutral-detergent fibers (NDF), %
- Acid-detergent fibers (ADF), %
- Digestibility, TD%
- Gas Production, 24 dm, ml
- Gas Production, 48 dm, ml



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- Determination of the quantitative and qualitative indicators of milk – milk yield, % fat and protein substances, dry non-fat residue (DNFR), lactose, urea and coagulation ability of milk.

## **1. Methodology for determination qualitative composition of the milk and the total number of somatic cells**

The analysis of the qualitative composition of the milk and the total number of somatic cells was carried out in the laboratory of the Agricultural Institute – Stara Zagora by means of ultrasonic milk analyzer Lactoscan and Lactoskan somatic cell device for determination of the total somatic cells count based on a fluorescence microscopic cell counting technique with low magnification and image analysis software.

## **2. Methodology for determination of the renneting properties – indicator ‘coagulation ability of the milk’**

### **2.1. Determination of the individual coagulation ability of the milk:**

In order to determine the individual coagulation ability of the milk, analysis of **436** milk samples from cows bred at the farm of the AI – Stara Zagora was carried out.

The individual milk samples were taken during the morning milking without adding a preservative.

### **2.2. Laboratory analysis:**

- The analysis of the individual coagulation ability of the milk was carried out by the laboratory of Agricultural Institute – Stara Zagora by means of Computerized Renneting Metter - Polo Trade, Italy. The milk is tested within 3 hours after the sampling
- 10 mL milk is dispensed in each well
- The milk is heated to a temperature of 35 degrees
- 0.2 mL yeast /rennet chymosin/ is dispensed
- Upon reaching a temperature of 35 °C the starter is added to the milk
- The mixture is homogenized 15-20 times
- The analysis starts

## **3. Determination of the chemical composition of the rations and the protein additives:**

The analysis of NDF and ADF has been carried out by means of **Fiber Analyzer 2000, Ankom, USA**. The analysis of the Digestibility has been carried out by means of **Daisy Incubator, Ankom, USA**. The analysis of the Gas production has been carried out by means of **Gas Production System, Ankom, USA**.



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## 4. Determination of the content of urea:

The content of urea was determined according to the methodology described by **Angelov, Ibrishimov, Milashki (1999) based on the urease method with Conway cup.**

In the inner chamber of the Conway cup, 3 ml of 0.01 n solution of sulfuric acid and 1-2 drops of Tashiro's indicator are placed. In the outer chamber, 2 ml of deproteinized milk and 3-4 drops of bromthymolblau indicator are placed. The mixture was neutralized to pH 7 with 0.1 n potassium hydroxide solution. 1 ml of phosphate buffer and 0.4 ml of urease are added, the cup is sealed and left in a thermostat for 40-60 minutes at 38-42°C. Then the mixture is cooled, the lid is raised carefully and the 2 ml of 30% sodium hydroxide are added. The cup is left at room temperature for 20 hours for diffusion. The unbound sulfuric acid in the inner chamber is titrated with 0.01 n sodium hydroxide.

Urea in the milk (mg/dl) = (A - B) · 0.3, 100, where

A - the quantity of sodium hydroxide used in the titration of the test sample.

B - the quantity of sodium hydroxide used in the titration of the control sample.

## 5. Statistical analysis

The obtained phenotypes were corrected for the major factors affecting the milking on a particular control day. A model was used in which each daily milk control was considered as a separate observation and a mixed linear model was used to achieve an unbiased assessment of the hypothesis implications:

- vector of the observation for the milk quantity in kg for the respective control day of each individual included in the analysis; fatty and proteinaceous substances, dry non-fat residue, urea in milk, coagulation time and hardness of the coagulum;
- vector of the fixed effects – group, consecutive lactation, age in days by the date of the control day, lactation days by the respective control day of the respective lactation of the animal.

$$Y_{ijklm} = \text{Group}_i + \text{Par}_j + \text{Testdim}_k + \text{Age}_l + e_{ijklm}$$

where:

$Y_{ijklm}$  – the m-th respective observation of the indicator;

$\text{Group}_i$  – fixed effect of the i-th group;

$\text{Par}_j$  – fixed effect of the j-th consecutive lactation;

$\text{Testdim}_k$  – random regressive effect of the k-th lactation days by the respective control day of the respective lactation of the animal;

$\text{Age}_l$  – effect of the l-th age of the consecutive calving;

$e_{ijklm}$  – random effect of non-observed factors;



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## 6. Economical analysis of the obtained results

The economic analysis was carried out using a common biological economic model in which all indicators characterizing the production system, the reproductive, growth, etc. indicators were accepted as constant, including the market assessment of the outputs, the fixed and the specific costs. The economic forecasts about the economic effect are entirely due to the different test results obtained from the feeding of the test and control group and the cost of the used rations used.

**Assessment of the economic weights.** The assessment of the economic weights was carried out by means of: **Programs for Calculating Economic Weights in Livestock**, Version 5.1.1. Part 1: Programs EWBC /Version 2.2.1/ and EWDC /Version 2.1.2/ for Cattle by **Jochen Wolf, Marie Wolfova and Emil Krupa, 2011.**



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## Results and discussion

### RESULTS OF THE ANALYSIS

Whole ration mixture			
INDICATORS	TEST RESULTS		
	Group I - Panamin Detox	Group II - Panamin Animal	Group III - Control
Colour	CHARACTERISTIC	CHARACTERISTIC	CHARACTERISTIC
Odour	CHARACTERISTIC	CHARACTERISTIC	CHARACTERISTIC
Dry substance, %	36.58	40.45	40.45
Crude protein, % - initial moisture	6.77	7.39	7.09
Crude protein, % - absolute DS	17.17	17.27	16.36
Crude fats, initial moisture %	1.64	1.86	1.85
Crude fats, % - absolute DS	4.15	4.36	4.26
Available moisture, %	63.42	59.55	59.45
Crude ash, % - initial moisture	2.60	2.92	2.85
Crude ash, % - absolute DS	6.60	6.82	6.57
NDF, %	43.756	43.219	43.348
ADF, %	28.59	30.66	29.38
Digestibility, TD%	66.28	68.89	68.17
Gas Production, 24 dm, ml	206.75	220.40	173.27
Gas Production, 48 dm, ml	223.77	228.07	182.55
ME, MJ/kg DS	9.21	9.61	8.23

The test additives, concentrate mix and the whole ration mixture have good organoleptic characteristics, high crude protein content and high digestibility.

When Panamin Animal is included in the mixture and in the ration, there was a significantly higher gas production compared to Panamin Detox and to the control group without these ration additions.

In the Panamin Animal group, the metabolic energy of the concentrate mixture is the highest - 9.80 MJ/kg DS, while when Panamin Detox is included, it is 9.00 MJ/kg DS and in the control group it is 8.18 MJ/kg DS.

When the animals were fed with the whole ration mixture with both additives included, higher metabolic energy was found compared to the control group - 9.61 MJ/kg DS for the Panamin Animal group; when Panamin Detox is included, it is 9.21 MJ/kg DS and in the control group it is 8.23 MJ/kg DS.

The food additive Panamin Animal produces more gas for 48 hours /228.07 dm, ml/ compared to Panamin Detox. The results for a higher metabolic energy content of the fodder with higher protein content are logical.





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<b>Concentrate mixture</b>			
<b>INDICATORS</b>	<b>TEST RESULTS</b>		
	<b>Group I - Panamin Detox</b>	<b>Group II - Panamin Animal</b>	<b>Group III - Control</b>
Colour	CHARACTERISTIC	CHARACTERISTIC	CHARACTERISTIC
Odour	CHARACTERISTIC	CHARACTERISTIC	CHARACTERISTIC
Dry substance, %	89.49	89.50	89.29
Crude protein, % - initial moisture	16.45	16.55	16.18
Crude protein, % - absolute DS	18.38	18.49	18.12
Crude fats, initial moisture %	4.28	4.21	4.19
Crude fats, % - absolute DS	4.78	4.70	4.69
Crude ash, % - initial moisture	4.67	4.84	4.41
Crude ash, % - absolute DS	5.22	5.41	4.94
Available moisture, %	10,71	10.50	10.51
NDF, %	14.202	12.252	14.188
ADF, %	6.465	6.423	6.219
Digestibility, TD%	90.231	90.754	90.326
Gas Production, 24dm,ml	199.43	227.15	171.50
Gas Production, 48 dm, ml	209.37	255.59	184.96
ME, MJ/kg DS	9.00	9.80	8.18

### General statistical characteristics of the tested indicators

<b>Indicators</b>	<b>N</b>	<b>Mean</b>	<b>Min.</b>	<b>Max.</b>	<b>Std. Dev.</b>	<b>Std. Err.</b>
Milk yield, kg - average	435	20,89	14,00	39,00	4,66	0,22
Milk yield, kg - Panamin Detox	152	22,69	14,00	39,00	4,89	0,40
Milk yield, kg - Panamin Animal	141	19,85	14,00	32,00	3,56	0,30
Milk yield, kg - Control group	142	20,00	14,00	37,00	4,83	0,41
% fatty substances, average	435	4,16	2,21	6,71	0,81	0,04
Fatty substances, % - Panamin Detox	152	3,98	2,28	5,80	0,88	0,07
Fatty substances, % - Panamin Animal	141	4,28	2,58	6,29	0,69	0,06



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Fatty substances, % - Control group	142	4,25	2,21	6,71	0,82	0,07
% Protein substances, average	435	3,36	2,87	3,71	0,15	0,01
Protein substances, % - Panamin Detox	152	3,32	2,87	3,71	0,19	0,02
Protein substances, % - Panamin Animal	141	3,38	3,17	3,64	0,10	0,01
Protein substances, % - Control group	142	3,37	3,08	3,61	0,13	0,01
DNFR, average	435	9,17	7,84	10,13	0,40	0,02
DNFR, % - Panamin Detox	152	9,07	7,84	10,13	0,51	0,04
DNFR, % - Panamin Animal	141	9,24	8,66	9,94	0,26	0,02
DNFR, % - Control group	142	9,20	8,40	9,85	0,35	0,03
Coagulation time of the milk, minutes - average	435	16,27	5,23	30,00	5,95	0,29
Coagulation time of the milk, minutes - Panamin Detox	152	15,42	5,23	30,00	5,77	0,47
Coagulation time of the milk, minutes - Panamin Animal	141	16,50	7,43	30,00	5,70	0,48
Coagulation time of the milk, minutes - Control group	142	16,94	5,40	30,00	6,30	0,53
Hardness of the coagulum - average	435	32,18	4,00	54,00	11,26	0,54
Hardness of the coagulum - Panamin Detox	152	31,86	4,00	54,00	10,41	0,84
Hardness of the coagulum - Panamin Animal	141	33,27	4,00	50,00	10,46	0,88
Hardness of the coagulum - Control group	142	31,45	4,00	52,00	12,80	1,07
Urea, mg/dl - average	435	7,11	3,00	15,00	2,01	0,10
Urea in the milk, mg/dl - Panamin Detox	152	6,73	3,00	12,90	1,76	0,14
Urea in the milk, mg/dl - Panamin Animal	141	7,31	3,00	15,00	2,27	0,19
Urea in the milk, mg/dl - Control group	142	7,30	3,00	12,90	1,94	0,16

During the test period, the general statistical characteristics of the obtained results show that the highest value of the milk yield is of the group receiving the Panamin Detox additive in the concentrate mixture - 22.69 kg, where the highest maximum value was obtained - 39.00 kg. In the test group with the Panamin Animal additive, the lowest standard deviation and the lowest standard error were found - 0.30 compared to the other groups included in the test.

The milk produced by the animals of the three groups has high fatty substances content characteristic for the breed. For fatty substances in the milk, the highest values were found in the animals receiving the Panamin Animal additive - the mean value is 4.28% and in the Panamin Detox group - average 3.98%. Here again the trend for lowest values of the standard deviation - 0.69 and lowest standard error - 0.06 is observed, which trend is also observed in the other indicators characterizing the quality composition of the milk.

For the percentage of protein and DNFR, the highest mean values were found for the milk produced by the animals in the Panamin Animal group - 3.38% and 9.24 average for the group.



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For the first indicator characterizing the milk coagulation ability - the coagulation time (RCT), the fastest coagulation time was found for the milk produced by the animals with Panamin Detox - 15.42 min, followed by the Panamin Animal group - 16.50 min.

For the second indicator characterizing the milk coagulation ability - the hardness of the coagulum (A30), the highest value was found in the animals with Panamin Animal - 33.27 mm. In the Panamin Detox group and the control group, lower values were found - 31.86 and 31.45mm.

The values of the control group and the Panamin Animal test group for urea in the milk are close - 7.30 and 7.31 and the lowest value was found in the Panamin Detox group - 6.73.

It is noteworthy that, contrary to the established trend of the indicators characterizing the milk quality composition, the standard deviation and the standard error values are the highest for the Panamin Animal group.

## Average differences and confidence between the test groups and the control group

Variable	Mean Difference	95,00% Confidence Interval		Standard Deviation of Difference	t	df	p-Value
		Lower Limit	Upper Limit				
Milk yield, kg - Panamin Detox - Group 1	0,835	-0,507	2,177	8,059	1,230	140	0,221
Milk yield, kg - Panamin Animal - Group 2							
Milk yield, kg - Panamin Detox - Group 1	4,430	2,967	5,893	8,818	5,986	141	0,000***
Milk yield, kg - Control group - Group 3							



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Milk yield, kg - Panamin Animal - Group 2	3,647	2,467	4,827	7,086	6,111	140	0,000***
Milk yield, kg - Control group - Group 3							

\*: p<0.05      \*\*: p<0.01      \*\*\*: p<0.001

The confidence analysis of the indicator milk yield between the groups shows that there is a highly confident difference between the values of the Panamin Detox group and the control group (P <0.001) and the Panamin Animal additive and the control group (P <0.001). In two groups receiving the additives no confident differences were found.

Probably, the results are due to the detoxification of the body, which we associate with the enhanced function of the liver and the acceleration of the metabolic processes in the body.

Variable	Mean Difference	95,00% Confidence Interval		Standard Deviation of Difference	t	df	p-Value
		Lower Limit	Upper Limit				
% fatty substances - Panamin Detox - Group 1	-0,484	-0,833	-0,135	2,095	-2,741	140	0,007**
% fatty substances - Panamin Animal - Group -2							
% fatty substances - Panamin Detox - Group 1	-0,662	-0,964	-0,360	1,822	-4,330	141	0,000***
% fatty substances - Control group - Group 3							
% fatty substances - Panamin Animal - Group 2	-0,181	-0,461	0,100	1,685	-1,272	140	0,205



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<b>% fatty substances - Control group - Group 3</b>						
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\*: p<0.05      \*\*: p<0.01      \*\*\*: p<0.001

The confidence analysis of the indicators % fatty and protein substances in the milk between the groups shows that there is a highly confident difference between the values of the Panamin Detox group and the control group (P <0.001). For both food additives - Panamin Animal and Panamin Detox, for the indicator % protein content we found high confidence effect (P <0.001), while for % fatty substances we found confidence effect (P <0.01).

The deviations of the mean value of the indicator % DNFR in the milk logically follow the same trends as in % fatty and protein substances. There is a highly confident difference between the groups with food additive 2 - Panamin Animal and the control group, (P <0.001) and confident difference between the Panamin Detox and Panamin Animal groups (P <0.01).

Variable	Mean Difference	95,00% Confidence Interval		Standard Deviation of Difference	t	df	p-Value
		Lower Limit	Upper Limit				
% protein substances - <b>Panamin Detox - Group 1</b>	-0,633	-1,013	-0,254	2,280	-3,298	140	0,001***
% protein substances - <b>Panamin Animal - Group 2</b>							
% protein substances - <b>Panamin Detox - Group 1</b>	-0,889	-1,238	-0,541	2,101	-5,046	141	0,000***
% protein substances - <b>Control group - Group 3</b>							
% protein substances - <b>Panamin Animal - Group 2</b>	-0,262	-0,546	0,022	1,705	-1,823	140	0,070*
% protein substances - <b>Control group - Group 3</b>							

\*: p<0.05      \*\*: p<0.01      \*\*\*: p<0.001



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Variable	Mean Difference	95,00% Confidence Interval		Standard Deviation of Difference	t	df	p-Value
		Lower Limit	Upper Limit				
% DNFR - Panamin Detox - Group 1	-0,709	-1,220	-0,198	3,069	-2,745	140	0,007**
% DNFR - Panamin Animal - Group 2							
% DNFR - Panamin Detox - Group 1	0,416	0,012	0,820	2,436	2,035	141	0,044*
% DNFR, - Control group - Group 3							
% DNFR - Panamin Animal - Group 2	1,127	0,708	1,546	2,515	5,321	140	0,000***
% DNFR, - Control group - Group 3							

For the groups with food additive Panamin Detox and the control group, we found level of confidence of the tested indicator ( $P < 0.05$ ).

Variable	Mean Difference	95,00% Confidence Interval		Standard Deviation of Difference	t	df	p-Value
		Lower Limit	Upper Limit				
Milk butter, kg - Panamin Detox - Group 1	0,020	-0,056	0,096	0,457	0,527	140	0,599
Milk butter, kg - Panamin Animal - Group 2							
Milk butter, kg - Panamin Detox - Group 1	0,194	0,117	0,272	0,467	4,963	141	0,000***
Milk butter, kg - Control group - Group 3							
Milk butter, kg - Panamin Animal - Group 2	0,176	0,120	0,233	0,338	6,191	140	0,000***
% fatty substances - Control group - Group							



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\*: p<0.05      \*\*: p<0.01      \*\*\*: p<0.001

There is a highly confident difference between the groups with food additive - Panamin Detox and the control group, (P <0.001) and food additive Panamin Animal and the control group (P <0.001) for the indicators milk butter and milk protein in kg. In two groups receiving the additives no confident differences were found.

Variable	Mean Difference	95,00% Confidence Interval		Standard Deviation of Difference	t	df	p-Value
		Lower Limit	Upper Limit				
<b>Protein, kg - Panamin Detox - Group 1</b>	0,038	-0,011	0,086	0,291	1,534	140	0,127
<b>Protein, kg - Panamin Animal - Group 2</b>							
<b>Protein, kg - Panamin Detox - Group 1</b>	0,192	0,140	0,244	0,313	7,305	141	0,000***
<b>Protein, kg - Control group - Group 3</b>							
<b>Protein, kg - Panamin Animal - Group 2</b>	0,156	0,116	0,196	0,239	7,758	140	0,000***
<b>Protein, kg - Control group - Group 3</b>							

### **Renneting properties of the milk**

The confidence analysis of the indicators coagulation time of the milk and hardness of the coagulum between the groups shows that there is a highly confident difference between the values of the Panamin Animal group and the control group (P <0.001) for both indicators characterizing the coagulation ability of the milk.

Variable	Mean Difference	95,00% Confidence Interval		Standard Deviation of Difference	t	df	p-Value
		Lower Limit	Upper Limit				
<b>RCT - Panamin Detox - Group 1</b>	-1,666	-2,931	-0,402	7,595	-2,605	140	0,010*



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RCT - Panamin Animal - Group -2							
RCT - Panamin Detox - Group 1	1,663	0,182	3,144	8,927	2,219	141	0,028*
RCT - Control group - Group 3							
RCT - Panamin Animal - Group 2	3,366	1,977	4,755	8,343	4,791	140	0,000***
RCT - Control group - Group 3							

\*: p<0.05      \*\*: p<0.01      \*\*\*: p<0.001

For the groups with food additive Panamin Detox and the control group, we found a highly confident difference ( $P < 0.001$ ) for the indicator coagulation time of the milk.

Variable	Mean Difference	95,00% Confidence Interval		Standard Deviation of Difference	t	df	p-Value
		Lower Limit	Upper Limit				
A30 - Panamin Detox - Group 1	1,273	-1,904	4,450	19,081	0,792	140	0,430
A30 - Panamin Animal - Group 2							
A30 - Panamin Detox - Group 1	7,347	4,198	10,496	18,981	4,613	141	0,000***
A30 - Control group - Group -3							
A30 - Panamin Animal - Group 2	6,161	3,117	9,205	18,281	4,002	140	0,000***
A30 - Control group - Group -3							

**Urea content in the milk**





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Variable	Mean Difference	95,00% Confidence Interval		Standard Deviation of Difference	t	df	p-Value
		Lower Limit	Upper Limit				
Urea - Panamin Detox - Group 1	-0,557	-1,153	0,039	3,578	-1,848	140	0,067*
Urea - Panamin Animal - Group 2							
Urea - Panamin Detox - Group 1	0,546	0,067	1,024	2,887	2,252	141	0,026*
Urea - Control group - Group 3							
Urea - Panamin Animal - Group 2	1,110	0,638	1,582	2,834	4,652	140	0,000***
Urea - Control group - Group 3							

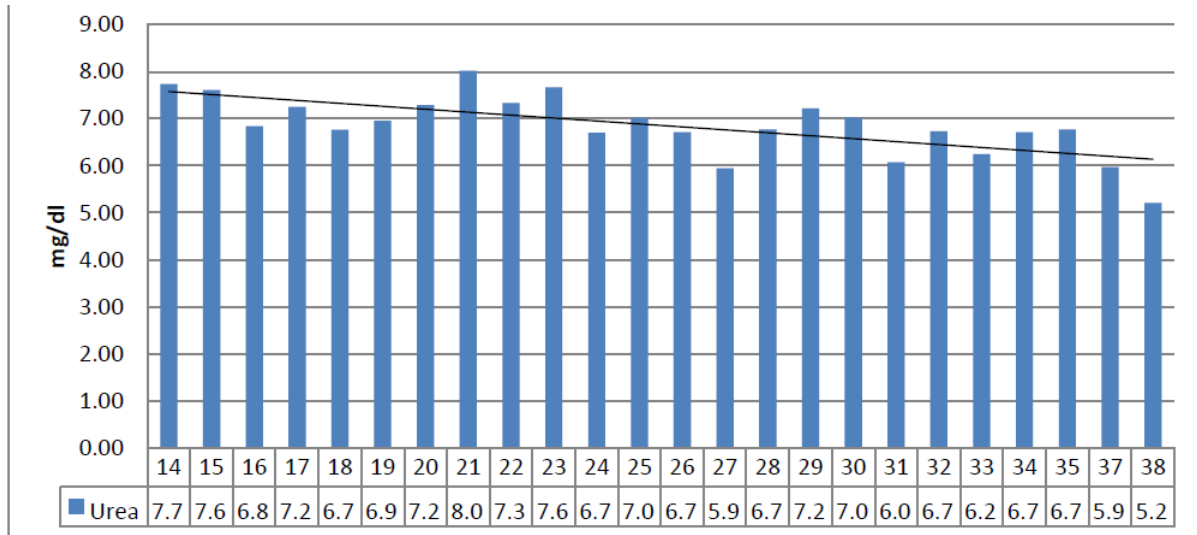
\*: p<0.05      \*\*: p<0.01      \*\*\*: p<0.001

The differences between the group receiving Panamin Animal and the control group are statistically confident ( $P < 0.001$ ). The confidence analysis between the groups shows that there is a confident difference between the two used additives 1 and 2 ( $P < 0,05$ ) and between food additive 1 and the control group ( $P < 0.05$ ). The results show a good digestibility of nitrogen from the fodder in these two groups, since the levels of lactic urea are in the normal range for the species and the breed of the animals.

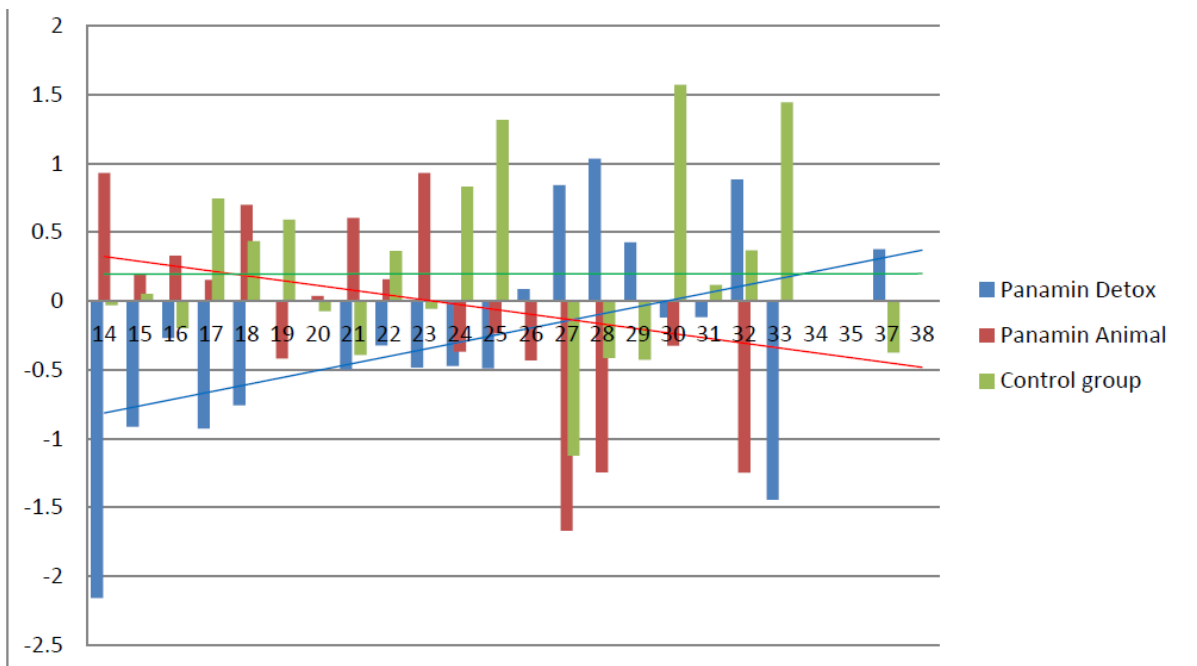


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**Trend of the urea in milk depending on the level of daily milk yield**



**Trend of the urea in milk depending on the level of daily milk yield per groups**



When the additive Panamin Animal is included, lower levels of urea in the milk are found for the cows with higher daily milk yield. It is possible that the additive has improved the ability of the liver to digest the ammonia produced in the rumen from the nutrition sources.

## Economical analysis of the test results

	Group I -	Group II -	Group III -
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	Panamin Detox	Panamin Animal	Control
<b>Income per cow per year</b>	2678.1	3032.8	2671.4
<b>Subsidies, BGN</b>	288.4	288.4	288.4
<b>Cost per cow per year</b>	2486.3	2454.6	2549.1
<b>Profit</b>	480.1	866.6	410.7
<b>Profitability, %/with included subsidies/</b>	19.3	35.3	16.1
<b>Profitability, %/without subsidies/</b>	7.7	23.6	4.8

The table shows that for 6000 liters milk yield the accumulated profit is the highest for the group receiving additive – Panamin Animal – 866.60 BGN. For the other two groups the recorded profit is much lower – 480.1 and 410.7 BGN, respectively.

### Economic weights of the indicators

Indicators	Group I - Panamin Detox	Group II - Panamin Animal	Group III - Control
<b>Milk yield for 305 days</b>	60.557	65.903	59.579
<b>% Fatty substances</b>	5.184	0.610	5.490
<b>% Protein substances</b>	2.430	1.585	2.575
<b>Coagulation time</b>	2.784	2.843	3.494
<b>Hardness of the coagulum</b>	2.179	1.936	2.216

The **conclusions** of the test are as follows:

1. The use of Panamin Detox and Panamin Animal as nutritional additives in the rations of the animals has a well proven positive effect on the milk yield.
2. The use of Panamin Detox and Panamin Animal highly confidently increases the production of milk protein and milk butter.
3. The use of Panamin Detox as nutritional additive in the rations of the animals has effect with tendency of proof on the urea levels in the milk, while Panamin Animal has a highly confident effect.
4. When the additive Panamin Animal is included, lower levels of urea in the milk are found for the cows with higher daily milk yield. In this relation, we allow ourselves to recommend that Panamin Detox is used during the second half of the lactation period and that Animal Panamin is added 15 days before calving and during the first 120–150 days of the lactation period. It could be said that the use of the two food additives improves the metabolism of the animal, especially the digestion of nitrogen-containing components in the rations.
5. The adding of Panamin Detox and Panamin Animal in the rations has a confidently proven positive effect on the renneting properties of the milk.



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6. The use of these additives increases the economic efficiency due to the positive effect upon the renneting properties of the milk and the better digestion of the nitrogen-containing components.