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EFFECT OF USE OF PREMIX IN DAIRY COWS

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Abstract

The aim of our study was to analyze the effect of using premix on milk production and reproduction indicators. The study was conducted for a period of 12 months, in 10 small (up to 4 cows) and medium farms (about 6 cows), which are breeding Holshtein breed, in Lushnja and Fier districts. The data are showing that, cows that have received throughout lactation premix have produced 162 liters of milk more than those not treated with premix. Also, the days open period was 21 days shorter than cows not treated with premix and the insemination index was improved. Farmers note that cows consume premix are vital and have better appetite than the group of cows that do not take premix. Statistical data processing was done with Statgraphics Centurion XVI.

Key words: *Milk production, days open, insemination index, breed, management.*

INTRODUCTION

A successful nutrition program combines a proper balance of energy, protein, vitamins, and minerals [1]. Most milk producers in Albania are providing to their cows' proper levels of energy and protein however, often they overlook the minerals and vitamins. In general, the role of minerals and vitamins tends to be underestimated, because of the small proportion compared to other nutrients, and the false assumption that "micro" means less important than "macro"[3]. In addition, producers often do not see the clinical signs of trace mineral & vitamins deficiency described in text books. In many herds trace mineral levels are not deficient enough to cause these outward signs – but it is the sub-clinical deficiencies that may be the most costly to the producer because they often go unnoticed since they do not have an immediate impact on milk yield or growth and may take several months before reduced reproductive performance or impaired health appears [5]. Thirty years ago, balancing rations for dairy cows to meet maintenance and production requirements as far as energy, protein, vitamins, minerals and water was considered enough to prevent any deficiency or nutrient imbalance that could impact reproduction [2, 4]. In recent years, the relationship between nutrition and reproduction is a topic of increasing importance and concern among dairy producers, veterinarians, feed dealers and extension workers. Even though minerals have been an important component of a dairy cow ration, little is known about marginal effects of mineral deficiencies, imbalances orexcessive intakes.

MATERIAL AND METHOD

In this article, we'll explore the role of minerals and vitamins, and their deficiencies; especially trace minerals, focusing on milk production and reproduction only.

The difference in feeding between the control group (without premix) and experimental group (with premix) consisted that animals from experimental group in addition to the basic diet received 100 gr/daily of mineral and vitamin premix (or a proportion of 2-3% from the concentrate feed). Accelerated Genetics premixes are formulated to meet all the mineral and vitamin needs of dairy cattle. They can conveniently be added to any dairy ration or added along with any supplemental protein-grain mix. Dairy premixes contain the highest quality minerals and vitamins needed for optimal animal performance.

At formation of groups of cows were considered the following: performance for the

previous lactation, fat contents in milk, age of animals, and state of health.

Data collection: During 12 months were collected data on:

- Milk Production
- Open Days (Uterine repose)
- Insemination Index

Open Days represents the time interval, in days, from calving until the fecund insemination.

The Insemination Index represents the mean number of artificial inseminations performed in order to obtain a pregnancy.

The data from 10 small (up to 4 cows) and medium farms (about 6 cows), in total 59 cows which are breeding Holshtein breed, in Lushnja and Fier districts were processed.

Data statistic processing was carried out with Statgraphics Centurion XV.

RESULTS AND DISCUSSIONS

Milk production: The data against the type of farms are showing in the table below:

Table 1: Data on milk production, days open and insemination index

Farms		Control group			Experimental group		
		Yield (kg)	Day open	Ins. Index	Yield (kg)	Day open	Ins. Index
Small (20 cows)	Mean	4070	110	1,6	4220	89,7	1,3
	Range	3545-4568	82-157	1-3	3751-4654	65-124	1-2
Medium (39 cows)	Mean	4274	108,8	1,65	4449	87,8	1,43
	Range	3630-4700	79-165	1-3	3620-5445	67-127	1-3
Total (average)		4173	109,2	1,64	4335	88,4	1,39

Table 2: Summary statistics on milk yield

	Control group Milk yield--all cows	*Exp. Group Milk yield-all cows*
Count	28	31
Average	4201.43	4374.9
Standard deviation	338.26	393.079
Coeff. of variation	8.05108%	8.98487%
Minimum	3550.0	3620.0
Maximum	4700.0	5450.0
Range	1150.0	1830.0
Stnd. skewness	-0.887787	0.604215
Stnd. kurtosis	-1.06244	0.845615

This table shows summary statistics for the two samples of data. Of particular interest here are the standardized skewness and standardized kurtosis, which can be used to determine whether the samples come from normal distributions. Values of these statistics outside the range of -2 to +2 indicate significant departures from normality, which would tend to invalidate the tests which compare the standard deviations. In this case, both standardized skewness values are within the range expected. Both standardized kurtosis values are within the range expected.

Use of this premix for the cows' feeding showed positive influence on the balance of the ration as for contents of micro elements resulted to the increasing of the animals' milk.

While milk yield in control group of cows during the experimental period was 4173 kg per cow (4070 kg for the small farms and 4274 kg for the medium farms), in the experimental group it amounted 4335 kg milk per cow (4220 kg for the small farms and 4449 kg for the medium farms) or 162 kg more (3.9%) .

Photo 1. View from a Dairy Farm using premix in Lushnja district, Albania.

Reproduction

(a) Days open. The relationship between the level of milk production and reproduction is currently the subject of much debate. Data from some university research herds suggests that high producing cows do not have poorer reproductive performance than their lower producing herdmates [4].

The high incidence of the reproduction disorders in dairy cows is influencing the main reproductive parameters and causing important economic losses by not accomplishing the desired milk production. An increase in the number of days between

calving and conception is typically associated with reduced profitability in dairy cows. This reduction is partly caused by factors such as increased breeding cost, increased risk of culling and replacement costs, and reduced milk production.

This table below shows summary statistics for the two samples of data (days open for the cows with and without premix).

Table 3: Summary statistics on Days open

Of particular interest here are the standardized skewness and standardized kurtosis, which can be used to determine whether the samples come from normal distributions. Values of these statistics outside the range of -2 to +2 indicate significant departures from normality, which would tend to invalidate the tests which compare the standard deviations. In this case, both standardized skewness values are within the range expected. Both standardized kurtosis values are within the range expected.

(b) Insemination index. As is shown in Table 1 the insemination index for the cows treated without premix is 1,64 (range 1,6-1,65) while for the cows treated with premix is 1,39 (range 1,3-1,43).

According to **Smith and Chase,** higher producing cows tend to receive their first service later after calving, require more services per conception and have more days open. However, the heritability of reproductive traits is very low. Thus, it appears that we must look to the areas of physiology, nutrition and management rather than genetics for solutions to the reproductive problems encountered in today's high producing, intensively managed dairy herds.

Relation - Days open vs. Milk yield-no premix. The output shows the results of fitting a linear model to describe the relationship between Days open and Milk yield-no premix (total). The equation of the fitted model is

Days open = -21.942 + 0.0310415*Milk yield-no premix (total)

Since the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between Days open and Milk yield-no premix (total) at the 95.0% confidence level. The R-Squared statistic indicates that the model as fitted explains 18.9446% of the variability in Days open. The correlation coefficient equals 0.435253, indicating a relatively weak relationship between the variables.

	Control group Day open	*Exp. Group Day open*
Count	28	31
Average	109.214	88.4516
Standard deviation	24.6762	18.5056
Coeff. of variation	22.5943%	20.9217%
Minimum	79.0	65.0
Maximum	165.0	127.0
Range	86.0	62.0
Stnd. skewness	1.7886	1.39982
Stnd. kurtosis	-0.455694	-0.722833

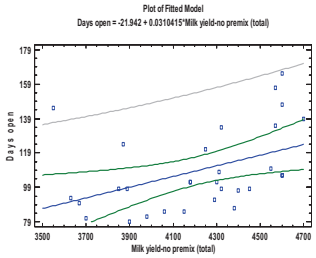

Fig 1. Relation between Days open vs. Milk yield-no premix-no premix

Relation - Days open vs. Milk yield-with premix. The output shows the results of fitting a linear model to describe the relationship between Days open and Milk yield-with premix (total). The equation of the fitted model is

Days open = -32.9244 + 0.0279533*Milk yield-with premix (total)

Since the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between Days open and Milk yield-with premix (total) at the 95.0% confidence level. The R-Squared statistic indicates that the model as fitted explains 34.3823% of the variability in Days open. The correlation coefficient equals 0.586364, indicating a moderately strong relationship between the variables

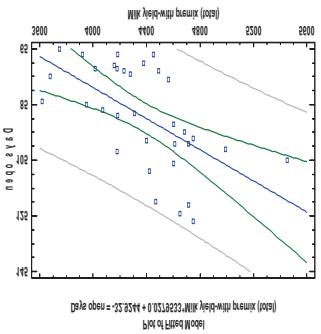

Fig 2. Relation between Days open vs. Milk yield-with premix

Relation - Insemination index vs. Milk yield-no premix. Since the P-value in the ANOVA table is greater or equal to 0.05, there is not a statistically significant relationship between Insemination index and Milk yield--all cows no premix at the 95.0% or higher confidence level. The R-Squared statistic indicates that the model as fitted explains 3.70027% of the variability in Insemination index. The correlation coefficient equals 0.192361, indicating a relatively weak relationship between the variables.

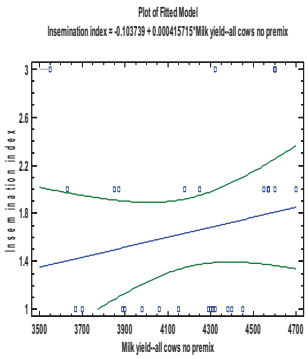

Fig 3. Relation - Insemination index vs. Milk yield-no premix

Relation - Insemination index vs. Milk yield-with premix. Since the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between Insemination index and Milk yield--all cows with premix at the 95.0% confidence level. The R-Squared statistic indicates that the model as fitted explains 56.664% of the variability in Insemination index. The correlation coefficient equals 0.752755, indicating a moderately strong relationship between the variables.

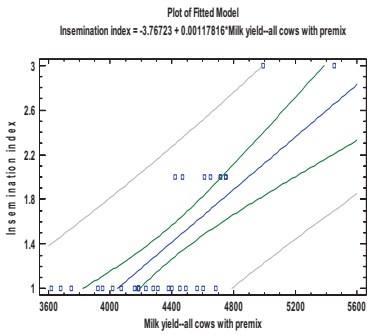

Fig 4. Relation between Insemination Index vs. Milk yield-with premix

CONCLUSIONS

- The experimental group (using premix in their diet) produced 162 kg more milk than the control group. In addition the experimental group had 21 days open shorter than control group and the insemination index was 1, 39 while in control group 1,64.
- The farmers' attention should be focused on close monitoring the pregnant cows, feeding and proper attendance of the cows during the dry period, calving assistance, the control of the puerperal period, heat detection and artificial insemination at optimal time.
- Producers should avoid the mineral and vitamin deficiencies and overfeeding. If a little bit is enough, twice as much will not be better and may in fact cause problems.
- Proper vitamin and mineral balance must be provided in dry cow rations when feed intake is restricted and (or) low quality forage is fed to control or reduce body condition. To ensure adequate intake, vitamins and minerals should be fed in small amounts of low energy concentrates or mixed in a complete dry cow ration.

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