EFFECTS OF BIO-ALGAE CONCENTRATES ADDED TO THE DIET OF DAIRY COWS

Research protocol, guidance and invention provided by Michael Kiriac, PhD, ND

North American Research sponsored by BIOSUPERALIMENT INC.

1. CONFIDENTIALITY AND COPYRIGHT

2. THE PURPOSE OF THE STUDY

Bio-Algae Concentrates (BAC) provided by BioSuperaliment Inc. will be evaluated in regards to a set of productivity markers for dairy cows from a herd of 50 Holstein cows. The BAC provided by BioSuperaliment Inc. will be incorporated into the commercial feeds that are fed daily to the cows with the purpose of increasing overall cellular nutrition resulting in better health and increased productivity. At the start of evaluation, the herd is already performing above average, but for the purpose of this evaluation certain parameters are targeted for amelioration:

- milk volume
- texture of the udder
- somatic cell count (SCC)
- overall productivity
- emptying of the udder
- gestation
- reduction of nervousness of the cow during milking which may lead to greater emptying of the utter

In the dairy milk industry, there are many more productivity markers (such as loss of bone density) that are not listed here and not controlled in this evaluation. The health of the udder in dairy milk production is of critical importance for the cow's health and for the productivity of the farm and its economic results. The evaluation is initially performed with 20 cows from a herd of Holstein dairy cows. The herd of over 50 heads resides at "Line and Alain Forget Dairy Farm", 8270 Mille Isles Blvd., Laval, Quebec, H7A4C6. The farm occupies 400 acres of land.

3. BIO-ALGAE CONCENTRATES (BAC) FOR THE COW

The blend BAC under evaluation is composed of four microalgae specifically selected to yield completeness, balance and synergies. Those are the algae Spirulina Pacifica, Spirulina Platensis, Dunaliella Salina and Haematoccocus Pluvialis, which are maintained whole, pure and free of pesticides or herbicides. The ingredients in BAC are rich with thousands of naturally occurring nutrients such as: vitamins A, B complex, C, E, complex dietary carbohydrates, essential fatty acids (EFA), minerals and trace elements, complete proteins, and more then 4,000 types of active enzymes. BAC is also an exceptional source of beta and alpha carotene, chlorophylls, phycocyanin and astaxanthin. Its proteins concentration and quality remains unmatched amongst foods. BAC contains as much as 60% of complete

proteins (including all essential amino acids) of which 95% to 98% are assimilated. Each alga in BAC is individually pushed to nutritional peaks via innovative hydroponic technologies applied during their growth. When blended together, the algae in BAC reach extraordinary bioavailability because of the balance and synergy obtained. BAC is developed for the needs of animals and its microalgae combination nutritionally stimulates endocrine homeostasis and the natural balance of all metabolic functions towards overall wellness. When the cow's natural digestive metabolism is stimulated such, there is greater assimilation of nutrients from their daily diet.

4. PROTOCOL FOR EVALUATION

With aim to better the productivity markers listed above, an agreement was reached with Alain Forget the owner and manager of the farm, to begin incorporating BAC to the commercial feeds that is fed daily to the cows and this according to the instructions found in "Animal Nutrition Industry" by Michael Kiriac. It was agreed that no other change in feeds or supplementation would be introduced during the period of evaluation.

5. CONTROLS

To monitor the results of the evaluation, it was agreed to utilize the independent controls that are already in place in the Quebec dairy industry. Those controls are performed at regular intervals by Valacta, a provincial dairy production center of expertise regulated by the Quebec Dairy Industry.

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6. SUMMARY OF RESULTS

We have included the evaluation summary results after 36 months of evaluation as written by Alain Forget owner and farm manager at Farm Alain Forget, 8270 Milles Isles Blvd., Laval, Quebec. Detailed results will be presented next.

Laval, August 2008

For 36 months we have been using bio-algae concentrates with a group of cow within our Holstein dairy herd. The results show a 3,000 kg augmentation of milk production over 36 months, a general augmentation of the Breed Class Average (BCA) of 20% for milk, 9.3% in fat and 8.6% in proteins.

These results have earned us the General Herd Performance award from Valacta, the Quebec milk control agency. We have also observed the following results when compared to provincial averages; a gestation interval of 384 days as compared to 426 for the provincial average; a milk production of 12,186 kg per year compared to 8,622 kg; with a 434 kg production of fat versus a provincial average of 329 kg; and a proteins production of 399 kg as opposed to 278 kg for provincial. Additionally, the longevity of the herd has increased to 42.4 days as compared to 39.4 days for provincial.

During the period, the evaluated herd passed from 22 cows to 40 lactating cows. The augmentation of the average age of the herd has an influence on the somatic cell count (SCC). We observed our SCC distorted by nearly 34% because of two or three cows. With the deviation, the count stands at 235,000, slightly over the provincial average. During the months of March to May, the SCC stood below the provincial average of 110,000, with 105,000 in March, 102,000 in April, and 65,000 in May.

Because of the independently and statistically measured results obtained with our herd, we believe that BAC must affect positively the brain organ hypothalamus responsible for the regulation of all metabolisms of health. We are exited to continue the evaluation with focus on a healthier utter, on increasing the average age and the longevity of the herd, and thus on increasing the profits of the farm.

Alain Forget, President, Alain Forget Dairy Farm
Laval, Quebec, Canada

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7. DETAILED RESULTS AND INTERPRETATIONS AT INTERVALS

Prior to this document, three reports had been provided by Alain Forget at intervals of 6 months, 12 months and 24 months. Those reports can be made available to the reader upon request. Find next the productivity markers as collected at the various intervals and shown here in graphical form with comments.

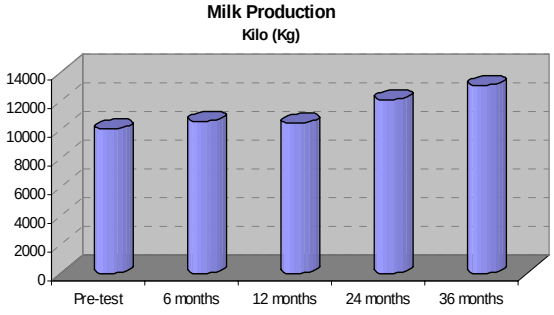
7.1 PRODUCTIVITY AS COMPARED TO BREED CLASS AVERAGE

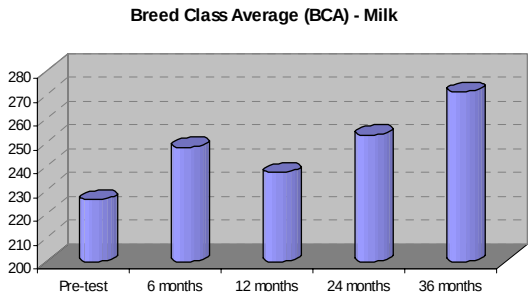
In the dairy cow industry there are several criteria used to measure and compare results within the different breeds of cows. The cows tested in this evaluation are Holstein and the following table shows the Breed Class Average (BCA) data collected at the different intervals during the evaluation.

	Milk Production	Milk	Fat	Proteins
Pre-test	10039 kg	226 kg	219 kg	223 kg
6 months	10565 kg	248 kg	242 kg	236 kg
12 months	10439 kg	237 kg	228 kg	227 kg
24 months	12039 kg	253 kg	239 kg	242 kg
36 months	13039 kg	271 kg	239 kg	242 kg
Difference	3000 kg	45 kg	20 kg	19 kg
Improvement	29.9%	20.0%	9.3%	8.6%

7.1.1 MILK PRODUCTION

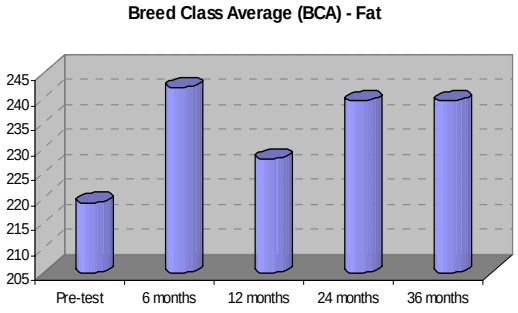
The addition of BAC to the cows' diets during the evaluation period proves noteworthy. A trend has been firmly established for the increase in milk production over the 36 months period and in the milk daily average when compared to the start of the evaluation. At this point, it is reasonable to believe that an overall increase to the vitality of the cows leads to greater productivity.

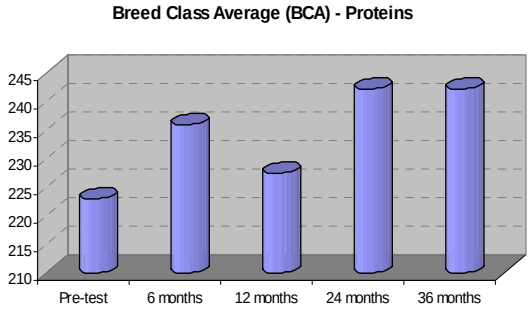




7.1.2 FAT AND PROTEINS

During this period of evaluation we have observed an interesting result in reference to the butterfat and proteins content of milk with the tested cows. Usually when there is an increase in cow productivity (amount of milk), you expect an inversely proportional decrease in the fat and protein content of the milk. In this evaluation the reverse has occurred, and there is more milk with higher contents in fat and proteins. Many factors have become evident since the start of the study. We believe that the increased health of the udder and the newfound calmness of the cows during milking leads to a more complete emptying of the udder, and that these combined factors account for the average increase in the milk's fat and proteins. We can only attribute the calmness of the cows to the known theory that the proper regulation of the hypothalamus-pituitary-adrenaline axis leads to healthy action of oxytocinase.





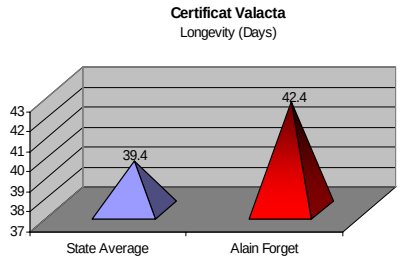
7.2 PRODUCTIVITY AS COMPARED TO PROVINCIAL AVERAGE

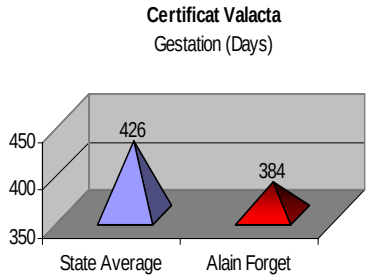
In the province of Quebec, Canada where the evaluation took place, Valacta is an independent agency whose mission is to better differentiate and strengthen the Quebec dairy production sector. It does this by stimulating the advancement of knowledge and its transfer to the dairy producers of Quebec. Valacta maintains several provincial productivity measurements and their statistics. The following results were collected and verified at the Alain Forget Dairy Farm by Valacta during the evaluation and are here shown alongside provincial averages for Quebec.

	Provincial	Alain Forget
Longevity	39.4 days	42.4 days
Proteins	278 kg	399 kg
Fat	329 kg	434 kg
Gestation	426 days	384 days
Milk Production	8622 kg	12186 kg

7.2.1 LONGEVITY AND GESTATION

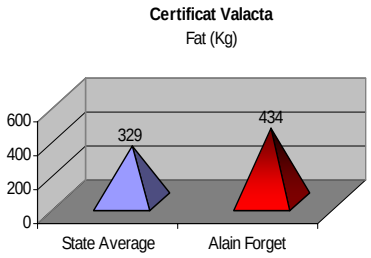
The following diagrams show in summary a very important trend that began with the start of the evaluation. The tested cows' average gestation periods (the gestation period is measured from conception to birth of a new calf) are shortening when compared to provincial average. At this rate, it is estimated that over time, the cows tested in this evaluation will conceive three additional cows in their productive lifetime.

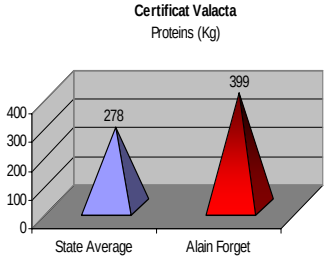




7.2.2 FAT AND PROTEINS

The tested cows' average production of fat and proteins has increased from the start of the evaluation and has consistently remained above state averages.





8. DISCUSSION

In general it is better to use animals when testing nutritional and dietary changes in regards to factors of health or productivity. With animals, it is easier to ensure that all participants are eating an exact diet and following the same lifestyle. In addition, there are no placebo effects to contend with. Based on the results obtained, it is apparent that BAC supports an increase in cellular nutrition, which delivers better milk quality, and delivers an increase in productivity with decreased nervousness of the cows during lactation (less stimulation of the teat and greater emptying of the utter). With the observed general increase of the cows' overall health, it is apparent that BAC brings about a positive impact on the central nervous system. We can safely say that the endocrine balance "homeostasis" obtained is achieved via cellular nutrition. And so we must conclude that when BAC is added, there is better health of the cow's hypothalamus-pituitary axis, the regulator of all metabolisms.

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