XCELBIO FOR BIOLOGICAL CLEANING OF WATER FEED LINES IN EGG PRODUCTION APPLICATIONS

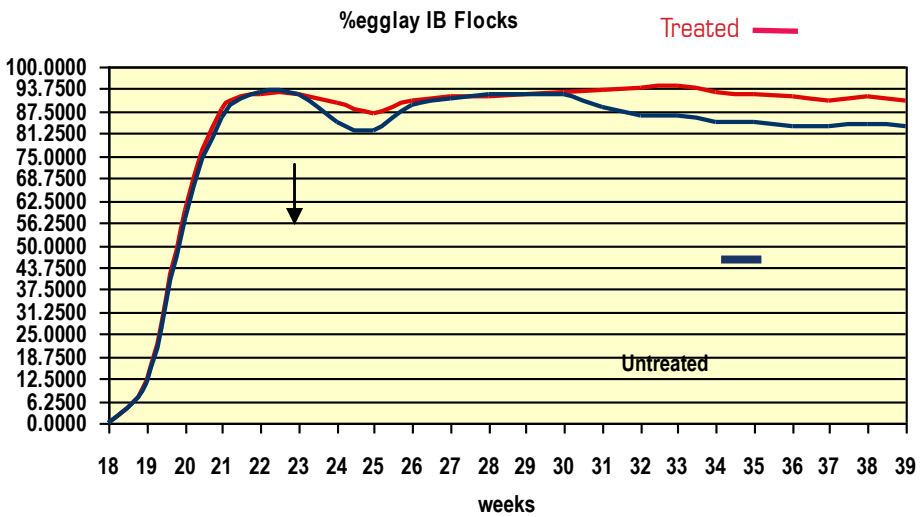
Introduction

Xcelbio technology has been used on more than 30 egg producing farms as a non chemical organic surface active agent in South Africa and Central Europe. In South Africa scientific evaluations are underway on split flocks at three commercial farms, with a one year trial recently completed by the Czech Institute of Poultry.

Over the past few years the following benefits have been determined in commercial flocks;-

1. Increased egg production. Flock to flock comparisons show increased egg lay of over 3,5% higher than breed standards.
2. Reduced mortality rate by over 3%.
3. 30-40 % reduction of antibiotics.
4. Improved recovery in performance following disease challenge and reduced impact of the challenge.
5. Increased body mass at culling by over 350 grams.
6. 38% reduced downgrades due to “cracks/leakers and dirties”.
7. Reduced feed requirements, yet still achieving greater overall results.

Xcelbio is applied via the drinking water of the birds. A solution is produced on site and then dosed into the drinking water. The technology replaces existing methods of using chemicals to clean the feed lines to remove biofilm and slime,it is thought that by eliminating chemicals the affect on the digestive performance of the microflora improves the membrane transfer processes of the digestive tract and reduce respiratory deseases. There is evidence to suggest that the immune system of the bird is enhanced resulting in better performance under the stressed conditions existing in commercial farms.



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Application of Xcelbio at Broiler Farms

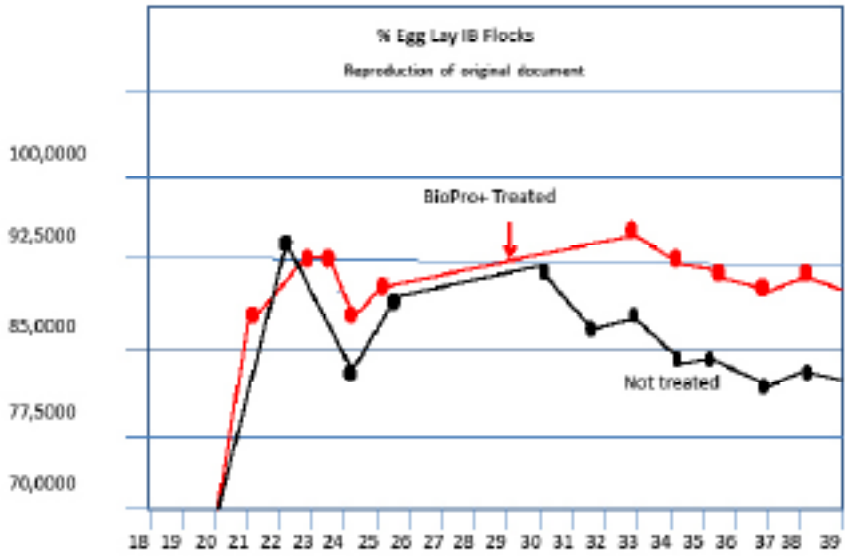
Benefits v Cost

1. In South Africa the sale of culls is an important factor in the profitability of the farm, reduced mortality and better cull condition are valuable benefits. A $0.375 increase in cull price is worth $375.00 per 1000 birds placed. A 1% reduction in mortality results in an additional 1300 eggs per 1000 birds placed, as well as the value of the culls. A typical value of a 1% reduction in mortality after accounting for the additional feed used is $116.25 per 1000 birds at an egg transfer price of $8.62

2. A 1% increase in average egg lay produces an extra 3150 eggs per 1000 birds housed over a production period of 45 weeks. At $8.62 egg transfer price this is worth $271.87

3. Other benefits such as reduced downgrades, reduced impacts of challenges etc are difficult to quantify in a general way and will vary from application to application.

The following graphs show the differing impact of a challenge from infectious bronchitis (IB) on a flock of pullets placed in a number of different houses on the same farm. Of the six houses placed four are treated and two are controls.



South African Rand prices quoted R5 to the $ at the time of the trials

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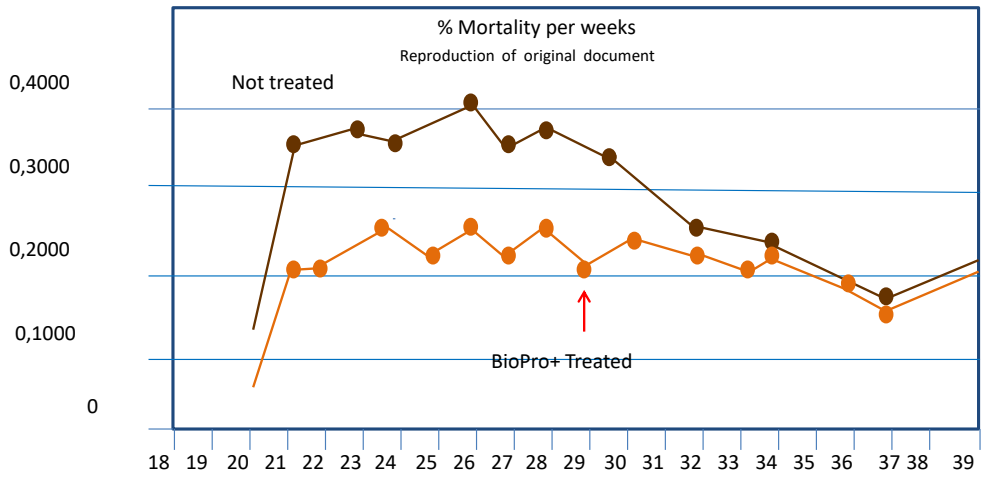

These graphs show measurable benefits from direct comparison of treated and untreated birds which suffered from the same diseases under the same conditions. In the past it was often thought that treated birds resisted diseases better but there was no data.
With the dosing of Xcelbio (L) it increases the ability of treated birds to cope with the environmental and disease stresses of the intensive production environment.

The following table summarises the major benefits per 1000 birds housed compared to costs. Other benefits such as reduced downgrades have not been included.

Parameter	Change	Benefit per unit change	
Egg lay	+ 3.5%	$271.87	$952.56
Mortality	- 2.0%	$116.25	$58.12
Cull size	+ 300g	$0.375 per cull	$375.00
TOTAL Benefit			$1386.00
COST per 40 weeks			$209.00
Bottom line			$1595.00

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When Xcelbio is added to the feed water of broilers the water becomes biologically active, which then, after ingestion by the bird it enhances the gut flora, elevating the metabolic process, which in turn increases the feed/weight gain ratios.

We have also found that, as in the layers Xcebio program the antibiotic dosing and feed can be reduced, however, still maintaining and increasing weight gain.

It has also been observed that common leg disorders such as "tibial dyschondroplasia" have been minimised.

- **Xcelbio** is a 100% natural biotechnology based on the symbiotic relationship between
- Crenarchaeota which is the basis of the technology and bacteria/gut flora.

- **Xcelbio** is harvested naturally from the ocean and terrestrial sources and is not genetically modified.

- We also have NO REACH registration obligations in terms of Xcelbio import to the European Union, China, Thailand & India.

- **Xcelbio** is added to the feed water system via a standard "dosatron unit" so the installation is minimal in terms of cost. Xcelbio works directly with the producers and trains the operatives in all aspects of the application.

NETHERLANDS ASSESSMENTS
Assessments were made on a farm in the Netherlands since August 2016 with a flock of 400 000 birds.
Some of our observations have been: up to 200g weight gain with increased feed conversion lower rates of mortality, higher quality meat.

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Application of Xcelbio to pig-hog feed water

TEST OF EFFECTS OF XCELBIO ON PERFORMANCE OF PORKERS - POMNENICE PIG FARM - CZECH REPUBLIC

Summary

The ADG 9 (average daily gain) of pigs with Xcelbio added to their feed water was significantly higher than the control groups. Three different rates of addition were tested and the % improvement over the control varied from 9,25 to 18,1 with an average of 12,9. The lower rate of addition gave the highest gain indicating that the choice of concentrations was too high and the effects should be optimised at lower addition rates.

There was a significant difference in the health status of the animals between the treated and control groups. In the treated group there were no mortalities and no veterinary treatments whereas the control group had a number of veterinary treatments and 14,3% mortalities. (Trials conducted in unfavourable winter conditions with outside temperatures down to -20oC and house temperatures only 5-7oC).
The tests were conducted by independant researchers from the Czech Institute of Technology in Prague on behalf of AlphaBio Ecoservice the certified Xcelbio company for the Czech Republic.

Trial Description

Weaners were randomly selected from litters produced within 4 days of each other and were then randomly divided into 7 groups. Three of the groups were used as the test groups (TGs) and the other four as control groups (Cgs).

All groups were fed with the same quality and quantity of feed three times per day. The feed method was a wet feed which is delivered to the pens hydraulically. For the TGs the feed was made up using water with Xcelbio at three different concentrations for the three test groups. The feed was premixed in a Brunnthaler@ mixer at a feed to water ratio of 3:1.

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Application of Xcelbio to pig-hog feed water

The feeding process was computer controlled according to the number of animals in the pen and their current age.

The trial commenced on 7th December and continued until the 10th April when all surviving animals were sent to the abbatoir. The feeding was suspended from the afternoon of the 9th April and the animals were weighed prior to loading on trucks to the abbatoir.

The animals were also weighed in January and early February, however there was not a great difference in ADG between any of the groups. Based on the recommendations from the South African associated company, Alpha Biotech, the concentration of Xcelbio was reduced dramatically as their work had indicated that a high concentration of Xcelbio was undesirable. In addition it was pointed out that there was an adjustment period wherein the treated animals could be expected to perform worse than the control.
Where necessary the pigs were given veterinary attention and treatment. This was only necessary for animals in the control groups and were mainly respiratory infections and enteritis.

Results

The following table summarises the results of the test runs for the treated and control groups

Group	Mortality pcs	ADG Kg/day	Average gain Kg/per pig	Total gain Kg/group
TG 1	0	0,543	66,8	467,5
TG 2	0	0,552	67,9	475,3
TG 3	0	0,587	72,2	505,4
Average TG	0	0,561	69,0	483,0
CG 1	0	0,510	62,7	439,1
CG 2	2	0,472	58,1	290,3
CG 3	1	0,518	63,7	382,3
CG 4	1	0,484	59,5	357,2

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Application of Xcelbio to pig-hog feed water

Due to the higher ADG and the abscence of mortality the production of saleable carcass mass in the treated groups is much higher.

Conclusions

1) The use of too high a concentration of Xcelbio is undesirable and confirms the findings of Alpha Biotech in South Africa. (JV partner)

2) The difference in performance between the treated and control groups is statistically significant at greater than the 95% confidence level in the efficacy of the technology.

3) Xcelbio has a major effect on feed utilisation and ADG. The lower concentration of Xcelbio gave the better result.

4) Further tests at lower concentration ranges should be conducted to determine the optimum level.

5) The tests indicate that the use of the Xcelbio has a beneficial effect on the health of the animals even under adverse climatic conditions.

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Xcelbio improves weight gain at Karan Beef Cattle Farm

Introduction

Two trials were conducted on the addition of Xcelbio to the drinking water at the Karon Beef Cattle farm.
In the first trial a statistically valid higher average daily weight gain was measured of 8.1% for the treated, over the control group. In the second trial where "as received" cattle were tested the improvement was better at 10.2%.

Background

The digestive process of cattle is dependant on the function of certain archaea microorganisms in conjunction with other microbes such as bacteria and fungi. It is well known that cattle produce large amounts of methane in their stomachs it is less well known that all this methane is produced by Crenarchaeota.

Beef cattle are fed an enriched unnatural diet in order to maximize weight gain at the lowest input costs - a time versus feed cost optimization. The unnatural part of the diet is that cattle evolved to be grazing animals eating largely cellulose containing plant material. At the beef cattle farm they are fed much smaller amounts of natural grazing material and lots of other components. The microbial bio-system in their rumen is no longer natural, it is distorted.

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Xcelbio improves weight gain at Karan Beef Cattle Farm

Chart of results Trial 1 and Trial 2

Factor	Trial 1	Control 1	Diff 1	Trial 2	Control 2	Diff 2
ADG kg/d	1.834	1.697	8.1%	2.18	1.98	10.1%
Gain	144.4	135.3	9.1%	183.2	166.3	16.9
In Wt	202.6	203.2		199.1	200.5	
Final Wt	347.0	338.5		382.3	366.8	
No Cattle	60	60		60	60	
Ave days	78.7	79.7	1	84	84	

The greater weight gain in trial 2 shows the effect of cold winter weather in trial 1 and is consistent to experience across the farm.

Natural bio-technology systems have been around since the beginning of life on earth and comprise of a variety of micro-organisms. They have a number of basic characteristics;

- Exist in a state of nutrient limitation, poverty and starvation are the rule.
- Typically they exhibit slow growth.
- They are unchanging and in balance with their environment.
- Totally breakdown and utilise waste from higher organisms.
- Recent research suggests that many contain Crenarchaeota.

Man has been around for a relatively short period of biological time but has managed to make severe impacts on biotechnology. Man affected biological systems generally have the following characteristics;

- They have excessive nutrients concentrations.
- They are under stress, which affects the functioning of the microbial population.
- Highly variable and hence unstable.
- They contain fewer Crenarchaeota.

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Xcelbio contains a mixture of a large variety of naturally occurring Crenarchaeota at high population densities (> 1011 /gram). The archaea are harvested and cultivated by a proprietary process before being incorporated into a natural substrate for storage and subsequent activation and propagation.

Addition of the Crenarchaeota (Xcelbio) to stressed biological systems assists in re-establishing balance and leads to better performance.

Protocols

Two different protocols were used in the trials. For the first trial the method normally used for testing an additive was used where animals were selected as high potential. In the second trial "as received" animals were used to more accurately reflect the situation that applies in the main feedlot.

Trial 1

200 animals were supplied from pre-processing in the weight range 180-220 kg. Animals adjudged to be non-doers were rejected and the group reduced to 150. The group was further reduced to 120 animals by removing poorer potential animals. The 120 were ranked by weight and then equally divided amongst 12 pens. Six pens were used as the trial and six as control. Water and feed was withheld and the animals weighed on an empty stomach basis the next day. The average weight per pen was between 195.6 and 202.4 kg.

Xcelbio was added daily to the feed water troughs of the treated animals otherwise all parameters were kept the same.
Animals were selected for slaughter when they were assessed to slaughter out at the desired grading of A2 or A3.
Selections were made at 71,78,85 and 92 days. The animals were weighed on an empty stomach basis prior to dispatch to the abattoir, carcass mass was recorded at the abattoir.

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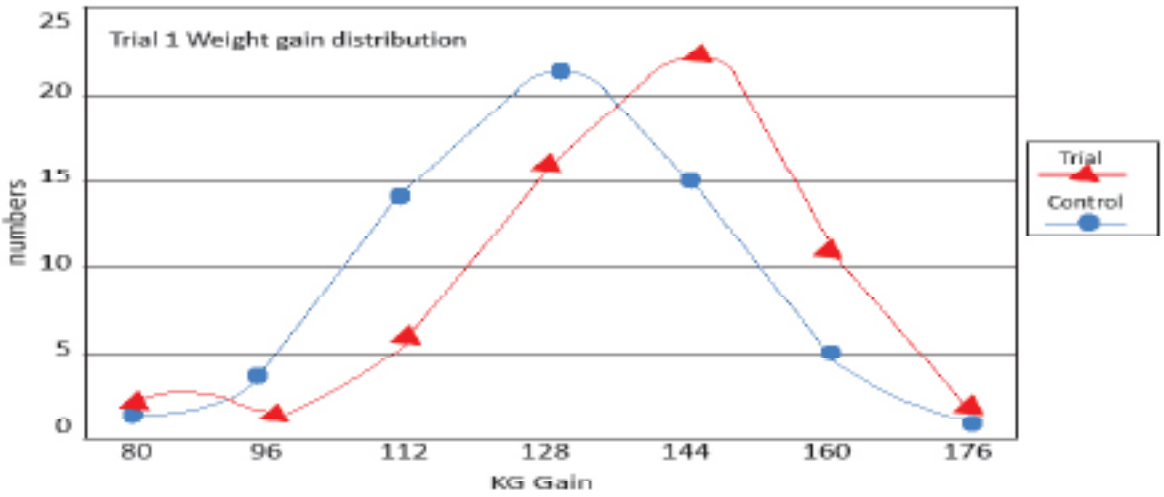

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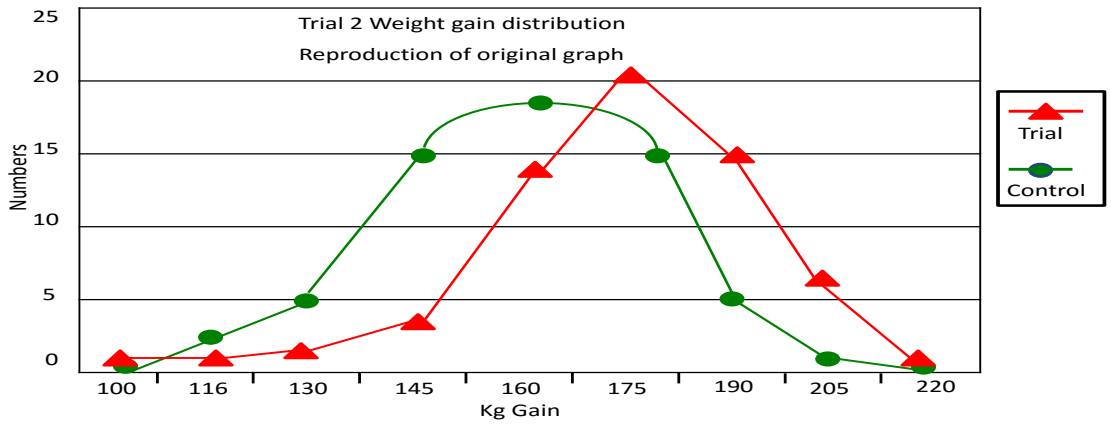
Xcelbio improves weight gain at Karan Beef Cattle Farm

Results Trial 2

120 animals were supplied from the preprocessing section from "beef type crossbreeds excluding bos indicus and dairy breeds as far as possible. The weight varied from 164 to 236 kg.
The animals were divided amongst the 12 pens according to weight ranking. The animals were weighed on an empty stomach basis the next day. The average empty weight of the treated group was 199.0 and the control 200.5.

The performance of the control group is a normal distribution often encountered when observing population data. The distribution of the treated group is skewed to better performance with the exception of two animals which performed very poorly and obviously were not identified at pre-selection. The average ADG was 1.834 kg for the treated group and 1.697 for the control group.

In the second trial the same effect on treated animals was confirmed. The graph below shows a perfectly formed bell curve normal distribution for the control group and the treated group skewed towards better performance.



The average weight gain of the treated group was 183 kg and for the control 166 kg.

Feed consumption.

In both trials the treated animals consumed more feed than the controls although their feed conversion was better. In trial 1 the feed consumption was 1.77% higher but the feed conversion was 2.2% better.
In trail 2 the treated group consumed 11 kg more feed per animal (1.2%) but gained 17 kg more weight with a feed conversion some 3.6% better.

Medication requirements

In trial 1 the medical requirements of the two groups were monitored as respiratory infections are common in feedlots in winter. The control group of 60 animals required 13 medical interventions compared to 3 for the treated group. The cost of treatment for the treated group was only 16.9% of that for the control group.

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XCELBIO FOR BIOLOGICAL ENHANCEMENT IN FISH FARMING

FISH FARMING

Xcelbio is a high potency formulation produced by a consortium of Crenarchaeota for use in controlling nitrates and ammonia through the competition of available nutrients in the water. This technology is designed for feed additive and water treatment, formulated to promote the production of healthy shrimp and fish. Xcelbio contains a specially formulated, proprietary blend of micro-organisms and multiple co-factors.

Because of the diversity of the micro-organisms (Crenarchaeota consortium), this technology is excellent for increasing water clarity through controlling & lowering COD and TSS levels. Xcelbio reduces harmful ammonia levels that can be toxic. The safe naturally occurring microorganism and enzyme systems are present in high numbers to handle high nitrates, COD and odour related problems. Organisms contained in Xcelbio works synergistically with existing gut micro-flora, destroying harmful metabolites and improving the efficiency of the digestive process.

This biologically active formula contains a proprietary blend of microbial strains that are selected and harvested naturally for the ability to breakdown excess waste material in shrimp ponds while helping to protect against shrimp and fish pathogens.
These naturally occurring cultures are selected for optimum biological efficiency, assuring efficient breakdown of proteins, carbohydrates, cellulose and fats. This leads to better feed conversion and less waste material in the tank system which results in cleaner water and higher oxygen levels.

The fish in the picture have been fed Xcelbiofor the last 3 years.
The picture does not do them justice, as the scales are glowing and completely fungus free.
Interesting to note that the tank carbon filter has never been changed in 3 years!

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