

Erfolg im Stall

SPECIAL ISSUE



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Aminotrace

Optimum provision right from the start

Newborn and young calves have a particular need for trace elements which cannot be met by whole milk along. Schaumann has developed Aminotrace containing organically bound trace elements to ensure that they are properly nourished. You can benefit from this innovation!

Dr. Leonhard Raab

► Newborn calves do not always have enough of certain elements: in the case of manganese, copper, cobalt and iron they may have well below 10% of what they need. If a suckler cow has not received enough copper, and especially selenium, during the dry period, her calf will be born with insufficient reserves. This is why calves need to be given sufficient trace elements from the first day of their lives. The form in which the trace elements are bound is important. Calves with good weight gain responded particularly well to organically bound trace elements when they were fed around 1 kg of high-quality milk replacer (MR) per day. The same applies to calves exposed to stress factors.

Success with Aminotrace

Schaumann began to use organically bound Aminotrace trace elements in Rindamin, Rindavit and Rindavital products in 2012. The

rising demand for these innovative products, and other factors, confirmed the outstanding effect of these trace elements. It has also been demonstrated in further extensive studies on calves, which tested the organically bound compounds of the trace elements iron, zinc, manganese and copper against the inorganically bound form. As **figure 1** shows, animals receiving Aminotrace achieved on average 6% higher daily weight gains than animals given the same MR and basic feed. The expenditure of convertible energy per kg weight gain was 6% lower (see **figure 2**). If we look more closely at the development of daily weight gains over time, we see that there is a rise in daily weight gains in both the control animals and the trial animals. However, it is noticeable that the calves in the trial group achieved much higher weight gains in the first two weeks (12.8%). There is also a positive difference after that, though it is less marked (see **figure 3**). These positive results



were the impetus behind the decision to add Aminotrace trace elements to Schaumann milk replacers and milk boosters.

High-quality Kalbi milk range

The Kalbi milk products dynamise the content and composition of trace elements, as do Rindamin and Rindavit. The trace elements iron, zinc, manganese and copper in the form of Aminotrace glycinate make up a third of MR for conventional rearing, two-thirds of MR for a drinking phase of 8 to 10 weeks, and 100% of high-quality MR for early weaning. Zinc, manganese and copper levels can be reduced because of the outstanding quality of the glycinate binding. However, iron levels are not reduced in whole milk replacers, because very many calves have below-average blood iron levels after birth. For example, 33% of calves on the Neumühle farm were found to have a severe iron deficit four days after birth, and 25% had a mild iron deficit. Only 42% of calves had adequate iron levels (van Ackeren 2013). The combination of high iron levels and high iron availability in the organic compound (Kunz 2013) is what ensures that calves start to receive an adequate supply more quickly. The benefits of high-quality glycinate compounds are also present in milk boosters, as calves fed on whole milk must receive trace element supplementation. Iron, zinc, manganese and copper are present in the form of Aminotrace glycinate at 100% in Kalbi Start Protect, Kalbi Start Spezial, Kalbi Phosphoral SL and KalbiAktiv Protect. The same is true of the acidifier KalbiCid. This supplement ensures that even new-born calves receive the right amount of trace elements from the day of their birth. ■



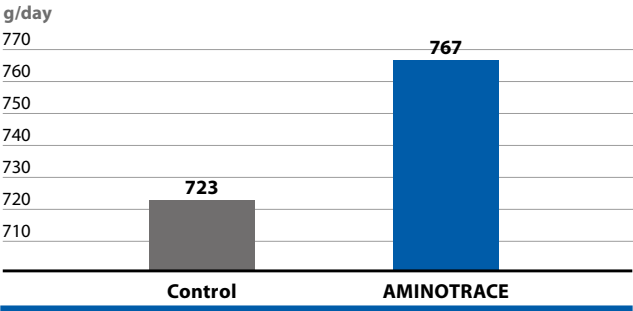
aminotrace



In brief

Getting enough trace elements from the first day of life is crucial for the development of calves. Iron, zinc, manganese and copper supplements must be given immediately after birth. Kalbi milk replacers and Kalbi milk boosters now contain organically bound Aminotrace trace elements, because all calves have a deficit that cannot be made up for by whole milk.

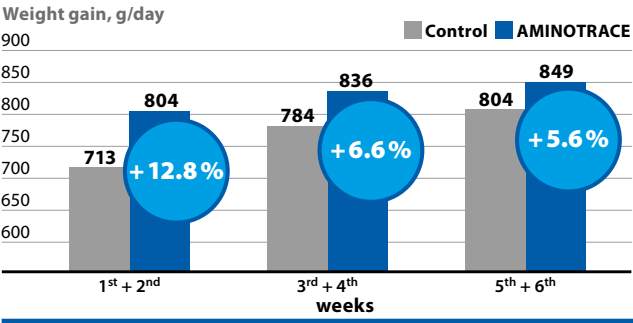
1 AMINOTRACE improves daily weight gains in calf rearing



2 AMINOTRACE reduces energy expenditure per kg weight gain



3 Daily weight gain trend during the trial period



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Lactation period

A strong start to lactation or teething problems?

The success of the initial part of the lactation period is determined in the preceding dry period.

Dipl.-Ing. agr. Dirk Breer

► The main reasons for dairy cattle being culled are udder, hoof and fertility problems in the first hundred days of lactation. The first third of the lactation period is particularly crucial. We know that these diseases are due to metabolic disorders, the reasons for which are often to be found towards the end of the preceding lactation period or in the transit phase. This phase, which runs from around three weeks before to three weeks after calving, has a decisive impact on the whole of lactation and possible problems. One important topic is the negative energy balance, which is almost impossible to avoid. Feed intake after calving, and bearing birth-related stress in mind as well, cannot keep pace with the rapid rise in energy requirements caused by the start of milk production (see figure 1). Cows need approximately 70 MJ NEL while pregnant. Once they have calved, the energy requirement shoots up to over 150 MJ NEL per animal based on a milk yield of 35 kg.

Energy balance and provision of concentrated feed

It is almost impossible to meet this requirement as cows only eat about 16 kg of DM a day when they are starting to produce milk. The energy concentration required would then be a utopian 9.5 MJ NEL/kg DM in the total ration. But good rations of around 7 MJ NEL/kg DM would require a feed intake of 22 kg DM per day, which is only achieved at peak lactation, if at all.

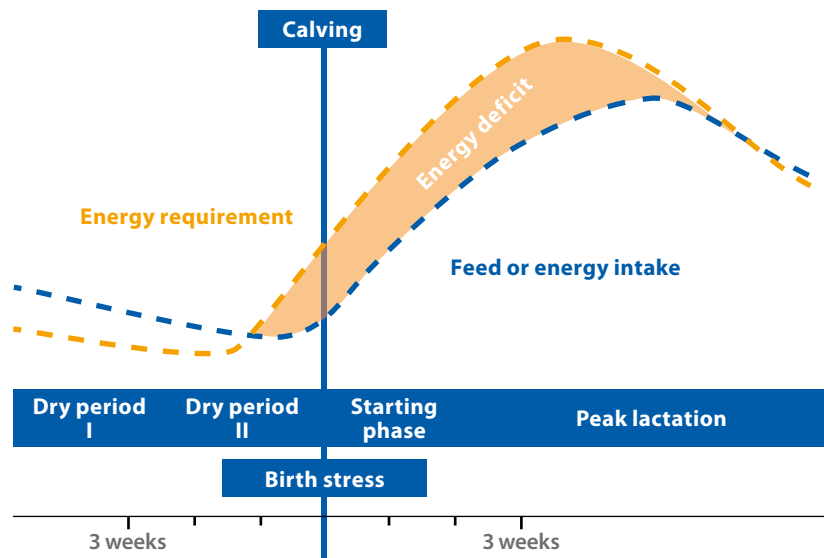
Farmers often try to compensate for the high energy requirement by rapidly increasing the amount of concentrated feed given, which is associated with a risk of rumen acidosis. So there is a dilemma: on the one hand, a negative energy balance, and on the other hand, a ration which is skewed too far in the direction of concentrated feed.

One of the consequences of negative energy balance is the dramatic melting of fat reserves. This causes significant liver damage, and even fatty liver and ketosis.

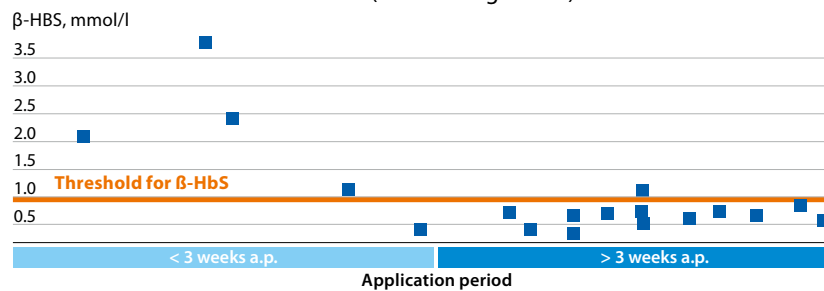
Making sensible use of reserves

Cows which were significantly overconditioned towards the end of the preceding lactation period are characterised by very poor feed intake and extreme fat reserve melting after calving. The harmful consequences need to be alleviated. The range of dry period mineral feeds Rindavital VK C Plus ATG with rumen-protected L-carnitine is recommended to allow melted fat reserves to become a source of energy. These feeds contain L-carnitine to “transport” the fatty acids released from the melted fat into the mitochondria (the “power plant” of cells) and stop them ending up in the liver where they would cause damage.

1 Energy balance in the transit phase



2 Reduction in ketone body levels in the blood after application of RINDAVITAL VK C PLUS ATG (Hülseberg estate)



3 Levels of feed intake before calving determine later success

| | Feed intake kg DM | Declines at 100 days | Yield kg/day (100 d) |
|------------------|----------------------|-------------------------|-------------------------|
| Average | 11.9 | 10% | 45.6 |
| 20% good feeders | 15.9 | none | 48.2 |
| 20% poor feeders | 7.8 | 23% | 42.0 |

Rindavital VK C Plus ATG is used on the Hülseberg estate. It improves yields at the start of lactation, and has also been found to significantly reduce ketone bodies in the blood. As figure 2 shows, Rindavital C Plus is the speciality product to optimise metabolism and protect the liver after calving.

Maximising feed intake

The clear aim after calving is to maximise the intake of feed that is both energy-rich and contains structurally effective ingredients. Experiments at the field trial centre in Iden showed that the rate of decline in the first hundred days of lactation was zero in cows with the highest feed intake before calving (good feeders). Decline was highest among animals with the lowest feed intake (poor feeders) (see figure 3).

This means that success depends on the basic feed being of optimum quality. As the options for using “rumen-tolerant” concentrated feed are limited, glucoplastic substances like propylene glycol and glycerin are an alternative way of increasing the energy input and flavour of the ration without increasing the risk of acidosis. Schaumann offers a variety of products for this purpose (see box). Large quantities of blood sugar need to be formed to produce the high milk yields seen at the start of lactation. Tirsana Spezial, Tirsana Plus and Tirsana BSK support this process and can be administered via the TMR, drinking water, or the transponder/milking machine.

More energy without rumen acidosis

The Ca-saponified fats in Schaumann Energy are another proven way of improving the energy supply to cows that have just started to lactate. Tests show that the fertility of cows that received protected fat increased dramatically. The proportion of rumen-protected Omega 3 fatty acids in Schaumann Energy Vital is particularly high. These substances reduce embryo decline due to inflammation after insemination, and so improve fertility results.

The liver is a key organ in the immune defence system, and therefore damage to this organ is very serious at the start of lactation, when cows are vulnerable to disease. The liver is also involved in fertility, and so liver damage will affect fertility as well.

Trace element provision

The immune function and fertility are very closely linked to trace element provision. Copper, zinc and manganese are the crucial elements. Studies by Nemec et al. (2012) show that the immune response of cows that received organically bound trace elements was much better than that of cows that received inorganically bound trace elements. This is why the dry period mineral feeds Rindavital VK C Plus ATG and Rindavital VK Plus ATG contain the new organically bound Aminotrace trace elements copper, zinc and manganese. High stability and maximum availability are guaranteed. The provision of trace elements to cows during the dry period is also very important to the quality of colostrum and calf nutrition. Schaumann offers mineral feeds and speciality feeds that are very useful in the transition from the dry period to lactation. Your Schaumann specialist advisor will work with you to devise the right feeding plan for a good start to lactation. ■

In brief

The foundations for a good start to cow lactation are set in the dry period. This period is crucial to successful milk production. Schaumann has developed a logical programme for successful transit feeding of dairy cows. It takes account of all aspects of modern, profitable livestock farming and feeding, with precisely measured minerals and active ingredients. High-yielding cows receive top products in every feeding situation.

The SCHAUMANN transit feeding programme

RINDAVITAL VK C PLUS ATG

Mineral feed for milk fever prophylaxis with a high vitamin E and magnesium content. With AMINOTRACE, rumen-protected carnitine and toxin binder.

Application: 3-6 weeks before calving, 105 g/day

TIRSANA 1312

Liquid energy booster based on glycerin and propylene glycol, with vitamin B₁₂. To stabilise metabolism and increase blood sugar levels.

Application: 500 g (1 unit) per animal per day on at least three consecutive days

RINDAVITAL C PLUS

Top-dressing to improve energy metabolism during the transit phase. With rumen-protected carnitine to improve the use of mobilised fat reserves.

Application: 3-6 weeks before calving: 100-200 g/day; After calving: 100 g/day

TIRSANA PLUS / BSK / SPEZIAL

Liquid energy booster based on glycerin and propylene glycol, with BOVIN-S-KOMPLEX, copper and manganese. Improves flavour, increases blood sugar levels and stabilises metabolism.

Application: up to 500 g/animal/day during lactation

SCHAUMANN ENERGY / SCHAUMANN ENERGY VITAL

Easily digestible feed fats that are stable in the rumen for concentrated energy supplementation and targeted Omega 3 fatty acids for improved fertility.

Application: up to 500 g/day during lactation, or 6% of the total volume of fat in the DM of the daily ration



A healthy start

Farmers have been using Provita LE to improve calf-rearing outcomes for 17 years. A new study confirms their positive experience.

Dr. Leonhard Raab

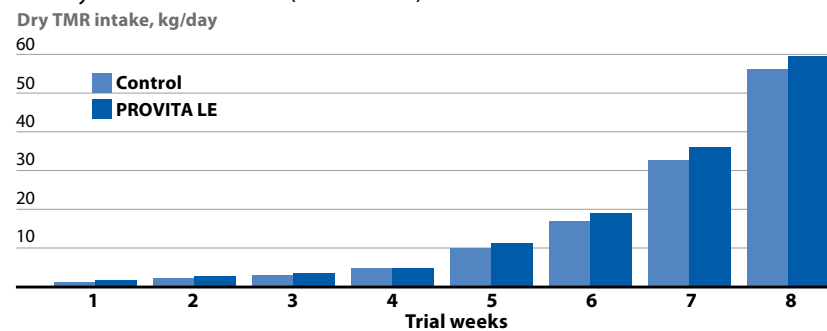
► The feed trial conducted by Bingen technical college was carried out at the Neumühle farm teaching and trial site. A total of 80 male Fleckvieh calves were used in the test.

Test design

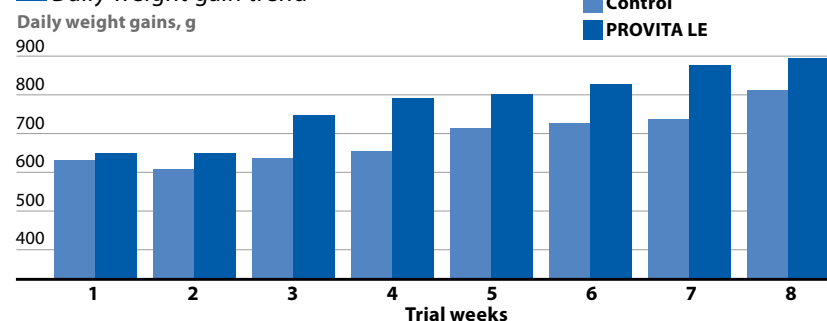
The calves were between 14 and 21 days old when they were placed in the pens, and the average weight was 63 kg. The calves in the control group were given a particular milk replacer (MR). The Provita LE group was given the same MR enriched with the probiotic Provita LE. The MR concentration was 125 g per litre of drink. It was given for 7 weeks. The maximum drink intake was 8 litres. The calves were weaned from the 6th week. They were given unrestricted amounts of an appropriate dry TMR in a trough.

The following data was recorded: daily drink intake per animal, the amount of dry TMR consumed per group each week, and the weight of each animal measured by a digital continuous scale. Health status was recorded on the basis of a subjective assessment during the routine daily check.

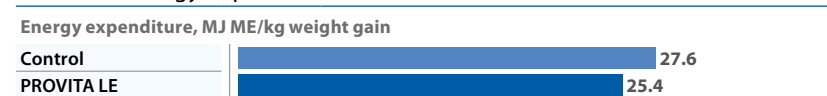
1 Dry TMR intake trend (cumulative)



2 Daily weight gain trend



3 Lower energy expenditure with Provita LE



provita^{LE}

The study results

Feed intake

The groups had limited access to drink, and the MR consumption was almost identical in both groups: 39.4 kg per animal in the control group and 39.3 kg per animal in the Provita LE group. The only way calves could get more nutrition was by eating dry TMR. The consumption of dry TMR rose over the study period from 56.22 in the control group to 59.47 kg in the Provita LE group (= 5.8% increase).

Figure 1 shows that dry TMR intake was still very low in the first couple of weeks, but rose steadily and significantly from week 3. Consumption levels were always higher in the Provita LE group than in the control group from week 4 onwards.

Weight development

The starting weights in both groups were almost identical (63 or 63.1 kg per calf). The weight in the control group after 56 days was 108.1 kg. The final weight in the Provita LE group was 5.1 mg higher. Daily weight gains rose by 90 g (11.1%) from 805 to 895 g. Although MR intake was almost identical in both groups in the first few weeks of the trial, and dry TMR intake was still very low, the calves in the Provita LE group were already gaining significantly more weight in this period (see figure 2).

Energy efficiency

It was possible to calculate the energy efficiency of the feed energy provided (energy expenditure per kg weight gain) from the dry mass intake and daily weight gains. The animals in the Provita LE group did eat 5.8% more of the dry TMR, but because their weight gain was 11.1% higher the energy expenditure was 8.0% lower: 25.4 MJ ME/kg weight gain rather than 27.6 (see figure 3).

Health status

Overall health status was good, but only seven calves in the Provita LE group were treated for diarrhoea by a vet as against seventeen in the control group. Faecal examinations in the first two weeks showed no difference between the two groups.

Economic considerations

The calves in the control group needed 1,244 MJ ME to gain 45.1 kg in weight. The calves in the Provita LE group needed only 1,146 MJ ME for the same weight gain (= 7.9% less). This means that they consumed less dry TMR (only 10 kg) for the same MR intake.

The calves in the control group needed approximately six more days to reach the weight of the calves in the Provita LE group. This means that more feed is consumed and pen space is occupied for a week longer. Higher vet fees are another cost factor.

The results of the Provita LE group underline the strong contribution to yields made by Provita LE. The calves are fitter, and develop more quickly and more uniformly. Ask your Schaumann specialist advisor about how to use this highly effective probiotic. ■

Sustainability

Active climate protection on the Hülseberg estate

A closed production cycle makes the best use of existing resources. On the road towards climate-friendly electricity generation thanks to the biogas plant.

Dr. Karoline Reckmann

► Agriculture has become more efficient in its use of resources in recent years, while yields have been rising. Among other things, progress has been made in efficient use of fertiliser. As a result, nitrogen surpluses fell by 30% between 1990 and 2009.

The improved performance of livestock farming has also had a positive impact. However, the dairy cattle sector is still thought to be responsible for 4% of global greenhouse gas emissions. The most significant greenhouse gases for agriculture are carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O).

A survey was conducted in conjunction with the Lower Saxony Chamber of Agriculture to record greenhouse gas balances from milk production and biogas production on the Hülseberg estate in 2012 in order to assess its current environmental performance. The aim is to pinpoint the estate's strengths in terms of climate protection, identify areas where improvements should be made and use resources even more efficiently.

The survey assessed estate data for feed crop production, dairy farming, biogas production and emissions related to production. A simplified presentation of the Hülseberg estate's production system examined by the survey is shown in figure 1. The production cycle is almost entirely closed, which produces environmental and economic benefits.

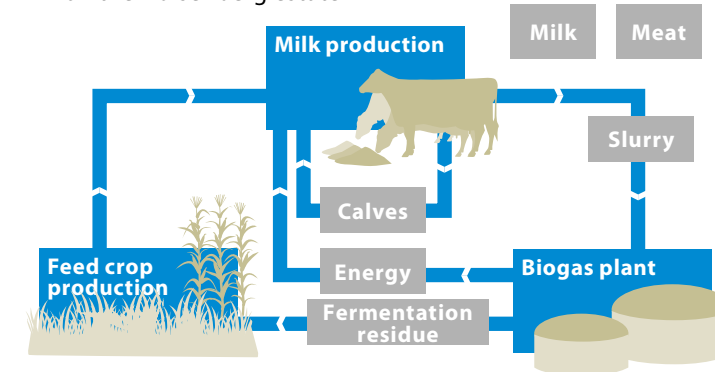
Climate-friendly milk production

The production of 1 kg of energy-corrected milk on the Hülseberg estate produces 649 g of CO₂-equivalents. The main causes were identified as the production of feed and its consumption by animals (see figure 2). The production of feed crops can be made less environmentally damaging by changing the use of nitrogen fertiliser and by working the land in such a way as to encourage the formation of humus. As the estate produces its own basic animal feed, these key factors can easily be adjusted to the production technical parameters.

The use of slurry in the estate's biogas plant also has several positive effects. Some of the slurry is kept in gas-tight storage facilities, which avoids significant emissions into the air. The anaerobic fermentation of the slurry in the biogas plant generates energy which is used throughout the estate and fed into the public network. The improved availability of nutrients in the fermented slurry means that it can be used as an organic fertiliser in feed crop production, and it is fed back into the system.

A comparison of the values obtained with those of other dairy farms with high and low emissions (based on the standard value for contribution margins of farms) showed that the milk produced on the Hülseberg estate is produced under more climate-friendly conditions and that greenhouse gas emissions are 28 and 7% lower. These particular values are the result of very good livestock farming conditions and outstanding feeding management. The Hülseberg estate was recently recognised for the excellent life-

1 Simplified presentation of the production cycle on the Hülseberg estate



time performance of its dairy herd. The main strengths of the estate, located in Wahlstedt, are:

- a large proportion of the slurry produced is stored under gas-tight conditions
- the herd's milk production is well above average (11,028 kg of milk per cow per year)
- the basic feed has a high energy content
- climate-efficient grass production

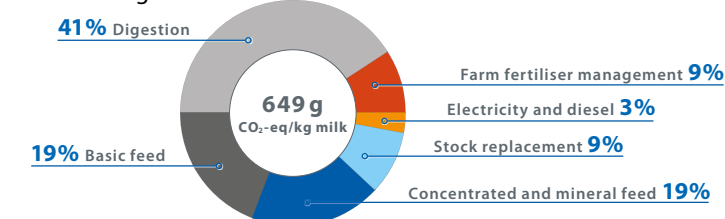
Electricity production from biogas

Figure 3 shows the results of the greenhouse gas balance of biogas production on the Hülseberg estate. The production of fermentation substrate was identified as the main cause of emissions. The following universal factors affecting climate-friendly biogas production were highlighted:

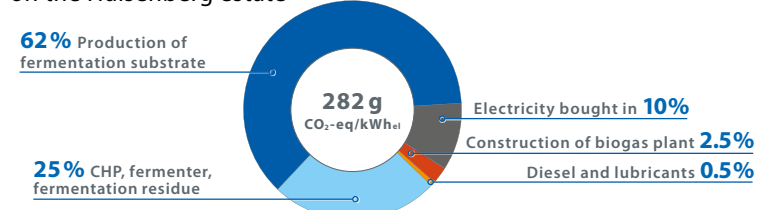
- productive use of heat energy generated
- high-yield substrate production, high nitrogen efficiency and humus-friendly cultivation
- low fermentation substrate losses and high gas yield
- low gas and electricity losses with efficient energy consumption for plant operation
- gas-tight fermentation residue storage and appropriate use of fermentation residue as fertiliser, applied immediately

A comparison of the emissions caused here with those caused by fossil-fuel electricity sources showed that the electricity produced by the biogas plant on the Hülseberg estate had the lowest greenhouse gas emissions. The emissions saved in comparison with electricity from petroleum are the equivalent to those produced by 2,170 cars a year (assuming that each car covers 15,000 km). To sum up, the Hülseberg estate is a model of resource-efficient agriculture. Make use of this expertise for your farm too! ■

2 Greenhouse gas emissions produced by milk production on the Hülseberg estate



3 Greenhouse gas emissions produced by biogas production on the Hülseberg estate





bonvital



The future of pig feeding is probiotic

A small additive with a big impact: Bonvital is the true probiotic alternative to ensuring good pig farming yields - sows, piglets and fattening pigs. For over ten years, Schaumann has been using Bonvital exclusively as an additive in mineral and active ingredient concentrates.

Dr. Martin Rimbach

➤ Antibiotic growth promoters have been banned since 2006. Consumer awareness is also increasing: the demand for meat produced under healthy conditions has never been so high. This is why Schaumann needed to find a "natural solution". Specialist probiotic feeds open up new prospects for ensuring good performance in livestock farming.

Probiotic bacterial cultures are intended to have a beneficial regulatory effect on the intestinal flora of the host. Research into probiotics soon found that the beneficial effects are connected to choosing and selecting the right bacterial strain.

Bonvital's excellent efficacy is based on strict selection of the lactic acid bacterium *Enterococcus faecium*, which has a regulatory and stabilising function in pig intestines. The company also found that it had to develop a special manufacturing and preservation process for the use of this substance in feed. In Bonvital, Schaumann offers the market a probiotic that is precisely tailored to the requirements of pig nutrition.

Innovative active ingredient

The lactic acid bacteria in Bonvital have a direct effect on pig intestinal flora, actively and naturally altering them to the host's advantage. It is vital that the probiotic active ingredients are given regularly in order to maintain intestinal colonisation.

1 Better yields thanks to BONVITAL

What effects does BONVITAL have in sow feeding?

Larger litters

- 5% increase in suckling piglet live weight

Milk composition

- Significant increase in milk fat content
- 0.7 MJ ME more energy per kg of milk
- Milk protein content significantly higher

Sows in better condition

- Live weight loss during lactation up to 5 kg lower

Positive intestinal flora

- Stimulates beneficial lactobacillae
- Suppresses harmful clostridia
- Reduces *E. coli* levels tenfold

The animal health benefits of Bonvital are:

- Positive change to the intestinal environment thanks to the formation of short-chain fatty acids and fall in the pH level in the intestine.
- Stimulation and stabilisation of the local immune system in the intestine.
- Improvement of intestinal absorption capacity.
- Positive effect on intestinal mucosa.
- Pathogenic germs are repelled and are unable to adhere to the intestinal mucosa.

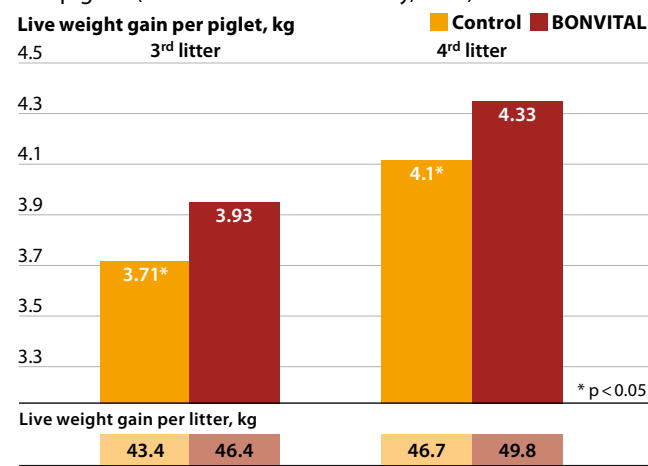
Quality - signed, sealed and delivered

Bonvital is licensed throughout the EU, and the bacterial strains have a precise microbiological definition, with high stability and guaranteed efficacy. Bonvital's licence is based among other things on the findings of precision effectiveness trials by independent institutions. These trials also investigated physicochemical properties such as stability during mixing and storage. They also examined the absolute safety of the probiotic micro-organisms to humans, animals and the environment.

Proven performance

Bonvital has proven its worth as a feed supplement especially in difficult production situations. Recent research results emphasise that

2 BONVITAL improves the live weight gain of suckling piglets (Berlin Technical University, 2012)



the use of Bonvital at all stages of sow feeding leads to excellent results. The most important effects are improved sow condition, a positive intestinal environment and a consequent rise in overall animal vitality. This is reflected in larger litters, better milk composition and lower sow live weight losses (see figure 1).

Recent trials covering several breeding cycles confirm the positive results and experience with Bonvital in sow feeding. Adding Bonvital was proven to have had a positive effect on sows' milk composition. Milk fat content in particular rose significantly, as was reflected in the rise of up to 0.7 MJ ME per kg of milk. This was also beneficial to the performance of suckling piglets. Live weight gains among piglets were studied in two lactations, and were found to be significantly better than in control animals (difference of over 6%), as shown in figure 2. Live weight gain per litter at weaning was also 3 kg higher than in the control.

Vigorous, immunostable sows

Colonisation with Bonvital improves nutrient efficiency thanks to better nutrient conversion and a healthier digestive tract. Tests have found sows' condition to improve, as is reflected in lower live weight losses during lactation (see figure 3). Sows receiving Bonvital as an additive were already performing better, and also lost around 5 kg less live weight than animals in the control group. This meant that they were more vigorous and resistant, and so ideally prepared for the next servicing and gestation. The interval between weaning and the next service is shorter.

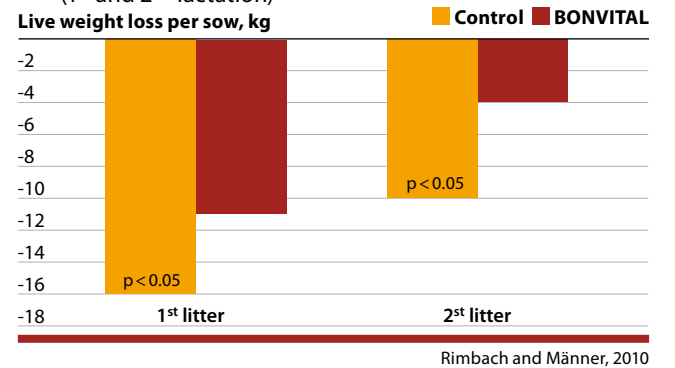
The intestinal flora of the sows also improved. Harmful germs such as *E. coli* and clostridia are significantly inhibited, while colonisation of the intestinal flora with beneficial lactobacillae is stimulated (see figure 4). Levels of *E. coli*, regarded as the main cause of MMA complex (mastitis-metritis-agalactia) in sows was reduced tenfold by the addition of Bonvital. This stimulates beneficial bacteria which stabilises the intestinal flora. The development of harmful germs is suppressed. Greater vigour and stable intestinal flora were also found to have significant effects on the somatic cell count of sow milk.

The recent results described here show that Bonvital improves the intestinal health of sows and ensures an outstanding performance throughout the breeding cycle. The very good condition, increased vigour and improved milk composition offer an ideal base for lasting positive results in sow-keeping and subsequent piglet-rearing. These are the properties which make Bonvital an integral part of Schaumann's products in all phases of sow feeding. ■

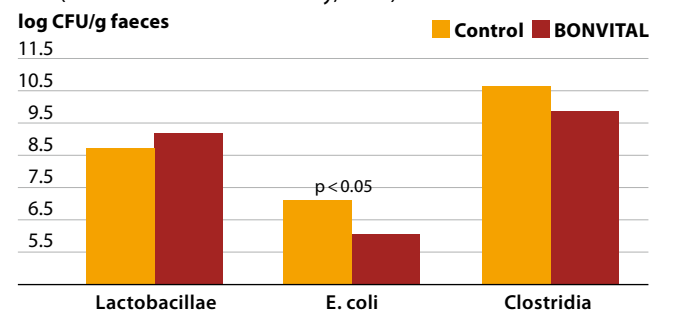
In brief

Schaumann's product Bonvital is the probiotic alternative for ensuring good pig yields. It is made of live lactic acid bacteria which establish a biological protective shield in pig intestines. Recent research results emphasise that the use of Bonvital at all stages of sow feeding leads to excellent results. This means: better digestion, more effective feed conversion and higher feed intake, healthier and more vigorous animals, higher yields and greater profits. Bonvital is licensed throughout the EU, and the bacterial strains have a precise microbiological definition, with high stability and guaranteed efficacy.

3 BONVITAL reduces sow weight loss during lactation (1st and 2nd lactation)



4 BONVITAL supports the intestinal flora of lactating sows (Berlin Technical University, 2013)



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Schauma AktiMag Top

For peaceful pens

In some pig herds, some animals occasionally become hyperactive and aggressive. This behaviour can lead to tail, ear and flank biting. A new source of magnesium stops aggression in the pen.

M. Sc. agr. Sabine Gabel

► Many factors trigger tail, ear and flank biting. The resulting wounds are painful for the animal and also act as an entry point for germs that cause disease. This leads to lower yields, poorer quality and losses.

Animal behaviour is affected by pen environment, husbandry styles, feeding systems and hygiene conditions. The danger and likelihood of tail, ear and flank biting is higher whenever these parameters are less than ideal.

In addition to management measures, other factors involved in aggressive behaviour are genetics, gender and performance level.

Feeding is a not insignificant factor in behavioural abnormalities, especially in stressful periods. Matters can be improved by increasing the sodium chloride and raw fibre content, providing coarser feed, and reducing the energy density of feed mixes.

But in some herds these steps do not eliminate the problems. The use of high-availability magnesium sources is an alternative for stressed pigs. Schaumann's new product, AktiMag Top, is a very good way of preventing stress and its effects in pig herds.

Optimising magnesium supply

Magnesium is a mineral that is essential to life and a valuable nutrient for the body. It plays an important role in energy metabolism, and supports the functions of the muscles, nerves and brain. Inadequate magnesium intake can cause aggression and cannibalism.

The different extents to which individual magnesium sources can actually be used has a significant impact on their effect in feed and in animals. Organically bound bulk elements are more bioavailable than inorganic compounds, and are more stable in the digestive tract.

Some studies with pigs showed that administration of organically bound magnesium sources led to better stress compensation, less agitation and lower transport losses.

New magnesium source

ISF Schaumann Research has developed a new way of binding magnesium. Binding magnesium to amino acids leads to faster and more efficient absorption of the mineral. Higher biological availability was also demonstrated. The difference in availability compared to magnesium oxide is shown in figure 1.

1 Biological availability of magnesium glycinate compared to magnesium oxide

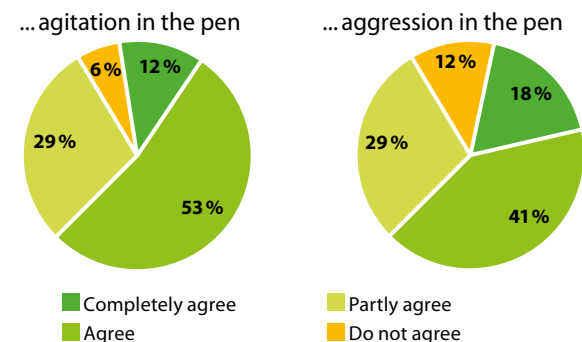
| | |
|--------------|-------|
| Mg oxide | 21 % |
| Mg glycinate | 100 % |

The product Schauma AktiMag Top contains this new organic magnesium source combined with the active ingredients betaine, vitamin C and essential oils. This specific combination calms pigs rapidly. Vitamin C strengthens the antioxidative protective walls of cells. Betaine helps to improve the electrolyte balance. The combination of various essential oils energises and boosts metabolism.

Schauma AktiMag Top is applied continuously to reduce stress at a rate of 0.15% in complete pig feed. In the case of extreme behavioural abnormality, farmers are advised to administer Schauma AktiMag Top at a rate of 0.5% for at least five days and then to reduce the application rate to 0.25%.

Field trials found that Schauma AktiMag Top has a beneficial effect on behaviour and agitation in pig herds. The effect of the product was considered and assessed in seventeen farms, with the subjective observations being recorded on a questionnaire. The effect on selected behaviour parameters was very positive. As figure 2 shows, significantly positive effects were seen for the main parameters (agitation and aggression) in particular. The new Schauma AktiMag Top can be used in conjunction with Schaumann's existing mineral feeds.

2 SCHAUMA AKTIMAG TOP reduces...



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NEW

aktiMag

Organically bound magnesium

Monoglycerides

Not all acids are the same

The mineral range SchaumaLac Protect now contains monoglycerides (MCM) instead of free medium-chain fatty acids (MCFA). This means that Schaumann can offer an innovative, forward-looking solution to improve animal vitality.

Dr. Karoline Reckmann

► Organic acids have become an important part of animal nutrition in recent years. Free medium-chain fatty acids (MCFA) have proven their worth within the SchaumaLac Protect range especially in the critical phases of pig-rearing, and stabilised animal health and performance.

The monoglycerides (MCM) that will be used in future are created when an MCFA is bound to glycerin via esterification (see figure 1). A compound of the esterified medium-chain fatty acids caprylic acid (C8), capric acid (C10) and lauric acid (C12) is used. They have a broad spectrum of action and have been shown to help regulate and inhibit gram-positive and gram-negative bacteria in the digestive tracts of animals. The effects of individual MCMs can be controlled and even enhanced by targeted selection and combination.

MCMs inhibit germs

MCMs act via a proven inhibition of the reproduction of unwanted micro-organisms (see figure 2). Gram-positive bacteria such as clostridia, streptococci and staphylococci in particular are very robust and resistant thanks to the stable, thick murine layer in their cell walls, but are effectively controlled by MCMs.

MCM action is based on the physicochemical properties of the molecule, which make it easier to absorb. This enables the bound fatty acids to penetrate the cell. At the same time they make the cell wall more permeable and change its structure. Enzymes then break the bond between glycerin and the fatty acid within the cell. This leads to a fall in the pH level and the germ-inhibiting effect starts. The fatty acid which has been released now destroys the metabolic balance and DNA of the cell. It becomes almost impossible for pathogenic bacteria to reproduce, as MCMs inhibit many mechanisms that are relevant to reproduction.

In this way, MCMs attack the protective coating (cell membrane) of the bacteria and at the same time interfere with metabolic processes and the cell defence system inside the cell. This suppression of harmful bacteria promotes the development of beneficial bacteria in the intestinal flora.

Proven efficacy

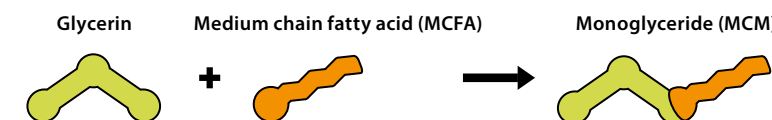
Piglet rearing tests have showed that daily liveweight gains rose when MCFAs were used, while feed costs fell. Less feed was needed to produce liveweight during the rearing phase. Considerable resources are saved, and the residual nutrient content of slurry is lower, which is good for the environment. Changes to the Fertiliser Ordinance make this aspect particularly significant. Many studies have shown MCMs to be much more effective in inhibiting bacterial growth than MCFA.

Advantages of MCMs

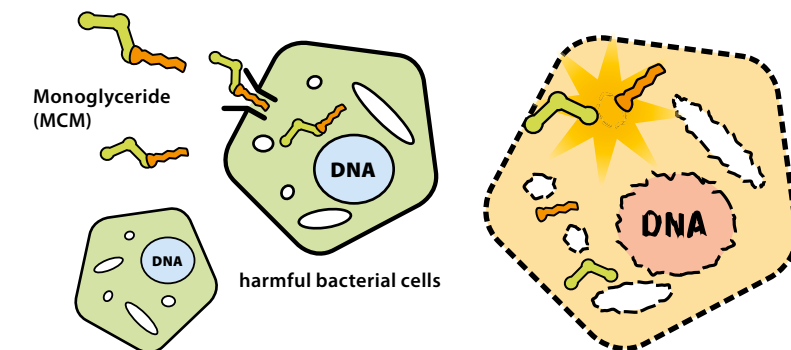
MCMs are taste- and odour-neutral, emulsifiable thanks to their polarity, and very effective even in a pH-neutral medium and when used in small amounts. Much less of the active ingredient is needed to inhibit the growth of gram-positive bacteria in particular, as can be seen from figure 3. The neutral odour means that pigs are not put off, and there is no negative impact on feed intake. This allows application and volumes to be adjusted as required.

The result: SchaumaLac Protect improves the reliability of performance and growth of pigs. Features include greater immunostability and vitality of animals and outstanding yields. The feed nutrient conversion rates are also better, which reduces the amount of feed needed and so also cuts costs.

1 Schematic presentation of the molecules of medium-chain fatty acids (MCFAs) and their monoglycerides (MCMs)



2 Schematic presentation of the mode of action of monoglycerides (MCMs)



3 Comparison of minimum inhibitory concentrations (MICs) of free capric and lauric acid and their monoglycerides (based on Kabara et al., 1972)

| | | Pneumococci | Streptococci | Staphylococci |
|---|---------|-------------|--------------|---------------|
| Medium-chain fatty acids (MCFAs) | | | | |
| Capric acid | µmol/ml | 1.45 | 2.90 | 2.90 |
| Lauric acid | µmol/ml | 0.06 | 0.25 | 2.49 |
| Monoglycerides (MCMs) | | | | |
| 1-monocaprin | µmol/ml | 0.10 | 0.20 | 1.00 |
| 1-lauric acid | µmol/ml | 0.09 | 0.09 | 0.09 |

**SchaumaCid**

Success against salmonella

The issue of salmonella in pig farming is becoming a topical question once again. Studies and practical experience have shown that special highly effective feed acids added to drinking water can achieve lasting control of salmonella.

Dr. Ewald Kramer

► Problems of salmonella on pig farms have been increasing sharply for more than a year. At least, this trend can be deduced from the rapid rise in farms classified in category III under the official German food and farming quality system.

Similar developments have also been reported in the Netherlands, Denmark and the United Kingdom. The reasons for this are so far unclear. It is a fact that the causes of salmonella problems vary from farm to farm. This makes it all the more important for the farms affected to pinpoint the possible sources and deal with them effectively. It is vital that the following questions are clarified:

- Are animals kept in pens already salmonella-positive?
- Pen hygiene: are parts of pens and access routes cleaned and disinfected systematically?
- Pest control: are rats, flies, birds etc. present in certain parts of the farm?
- Presence of outsiders: who has access to the farm, and when and where?
- Logistics / transport to the slaughterhouse: how is the transport organised? Are trucks cleaned and disinfected before transporting piglets? Is the loading ramp cleaned and disinfected? Might the animals come into contact with animals from another farm while on the truck?
- Feed: what is the composition of the ration? Does it contain ingredients that are infected with salmonella? What is the structure of the feed? Are very precise acid mixtures (e.g. SchaumaCid S in the feed or SchaumaCid Drink S in the drinking water) used?

In brief

Schaumann offers acid mixtures with specific properties and fields of action. SchaumaCid S and SchaumaCid Drink S are "tailor-made" acids made up of short- and medium-chain acids to combat salmonella. One of the key features of these products is the fact that they are administered in feed or water. Feedback from farmers is overwhelmingly positive, confirming the excellent efficacy levels observed in various in-vitro tests.

Special organic acids that regulate pH levels in the stomach and form a barrier to gram-negative bacteria like salmonella and E. coli have a noticeable effect on intestinal health. The synergistic effects of the acid mixtures are also seen in later parts of the small and large intestine. This interferes with and significantly reduces the adhesion and invasion of pathogenic germs onto or into host cells. The result is healthier, more productive animals.

SchaumaCid S in dry or liquid feed

Schaumann offers acid mixtures with specific properties and fields of action. SchaumaCid S is a "tailor-made" acid made up of short- and medium-chain acids to combat salmonella. It is administered in dry or liquid feed. Feedback from farmers is overwhelmingly positive, confirming the excellent efficacy levels observed in various in-vitro tests.

SchaumaCid Drink S in drinking water

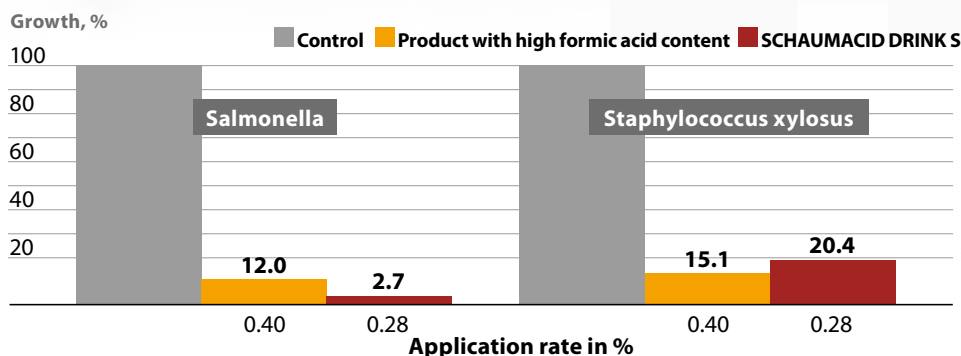
SchaumaCid Drink S is a highly effective product developed to control salmonella by application in drinking water. It contains formic acid, propionic acid, lactic acid and citric acid as well as sorbic acid and benzoic acid (these last two ingredients do not dissolve easily but are highly effective). This combination is highly effective

against salmonella and other harmful germs. SchaumaCid Drink S is also buffered so that drinking water cannot be overacidified even if the wrong amount is applied.

Recent findings of an in-vitro study carried out by Tulln technical college confirm that even low doses of SchaumaCid Drink S are very effective in inhibiting salmonella and gram-positive staphylococci (see figure).

With SchaumaCid Drink S, Schaumann has once again succeeded in transforming innovative feed acid ideas into highly effective products for practical use. Its unique features enable SchaumaCid Drink S to offer a long-term solution to the problem of salmonella on farms. ■

SCHAUMACID DRINK S inhibits the growth of harmful germs at pH 5



FH Tulln, 2011-2013