

ACCELERATED REARING OF DAIRY HEIFERS PRE-WEANING WITH CALF GAINER ELITE



INTRODUCTION

Unlike other divisions of livestock production, the dairy cow is the direct generator of her own income, through milk production. It is in sharp contrast to most breeds, where the female animals are mainly a means to reproduction with money earned from the growth of their offspring. In the process, the concept of inexpensive mother's milk disappears in dairy. Heifers are therefore unique in the sense that they are taken away from their mothers at an early stage and then intensively raised. Dairy heifers are, therefore, the only young animals that are limited with regards to milk intake during the pre-weaning period.

“Heifers are therefore unique in the sense that they are taken away from their mothers at an early stage and then intensively raised”.

The current way of heifer rearing is essentially based on two arguments, namely:

- Milk is too expensive to feed ad lib to heifers
- Concentrate is cheaper than milk

Heifers are, therefore, stimulated to start eating concentrate as early as possible in an attempt to partly replace milk, as well as to simultaneously stimulate gastrointestinal tract development. Furthermore, the availability of milk is limited to stimulate concentrate intake. Although heifers grow slower until weaning, they adapt more rapidly to function on solid feeds alone, rendering early weaning possible (dairy heifers are weaned at about 1.5 to 2 months, whereas beef calves are weaned at 6 to 8 months of age). The growth that is initially lost is theoretically made up by compensatory growth later on in the heifer's life. If the economy of the standard system is compared with the ad lib milk system, one can see that it is considerably cheaper. Until recently, it was generally accepted that the current approach is effective, and most dairy farmers are quite comfortable with it.

EPIGENETICS – A TWIST IN THE TAIL!

Epigenetics is the study of external factors and environmental influences that switch genes on and off, thus determining how the animal interprets and expresses its genes. A simple example is where a lamb's DNA sequence (genetics) determines that a lamb will be a very good wool producer, but for some reason turns out not to be. In many cases, the pre-birth environment of the lamb is the cause. Malnutrition of late pregnant ewes results in the development of a reduced amount of secondary wool follicles in the lambs. Consequently, their lifetime wool production can decrease by up to 20%. A poor environment, therefore, reduces the genome expression of potential good wool production irreversibly, due to malnutrition of the mother.

A lot of attention is currently allotted to factors that can affect epigenetics during the period before and after birth (peri-natal) and the influence that it has on the expression of the heifer's future physiology. It is strongly suggested that the period from birth to weaning has a very big influence on the future milk production of the heifer.

THE IMPACT OF ADG BEFORE WEANING ON FUTURE MILK PRODUCTION

Research has shown that the development of udder tissue is sensitive to the level of nutrition during the first eight weeks of a heifer's life. After eight weeks the epigenetic effect of nutrition expires and udder tissue development is insensitive to the level of nutrition. The genome that determines the heifer's milk production potential is irreversibly secured by this stage.

For every extra 100g average daily weight gained (ADG) before weaning, the total first lactation milk production rises by 155 kg. The average outcome from trials where heifers were fed ad lib milk for the first eight weeks of their lives was that 435 litres more milk was produced during their first lactations.

INCREASED ADG UP TO WEANING

In general, milk is fed at about 10% of the calf's birth weight. For a Holstein heifer, for example, it means between 4 and 5 litres per day, resulting in about 500g ADG per day. Heifer rearing programs that provide more milk are typically referred to as "intensive feeding" or "feeding for accelerated growth" programs. These programs provide volumes of milk that are closer to intake levels of naturally-suckling calves, thus resulting in ADG's between 750 g and 1000 g per day.

There are currently two approaches to try to increase ADG of heifers within the first eight weeks:

Feed

Calves' feeds are made available to them on an ad lib basis in the current system. This means that they are eating the maximum amount of feed they possibly can. Therefore, if ADG is to be increased by the feed, it is logical that the energy and protein levels of the feed should also be increased. Research, however, shows that it has minimal impact on ADG. Because it is still not optimally functional, the developing rumen does not allow ADG to be significantly increased by this approach. Especially in the first month, the heifer's entire digestive tract is still geared for digestion of milk. Ruminants exist because they have evolved the ability to develop from a monogastric animal (which can't digest fibre) into a ruminant (which can digest fibre) within the first segment of their lives. This is a systematic process, which in heifers, takes six months to accomplish.

Higher energy also causes acidosis, which neutralizes all possible growth benefits. Research also shows (with a few exceptions) that better ADG's are not achieved when the protein levels of the feed rise above 18% DM. However, the quality of the protein sources in the feed can have a major impact on growth, meaning there is no place for poor quality protein sources in calf starter feeds. Therefore, there is basically nothing that can be changed in current rations to achieve better growth, except to stimulate digestive tract development with additives, thereby improving the utilization and efficiency of use of the feed.



Milk

In contrast to the limited amounts of milk that is fed in standard feeding programs (10% of birth weight, i.e. 4 to 5 litres a day), calves can double their nutrient intake if they receive more milk. In the process, they can consume 8 to 16 litres of milk a day when supplied ad lib.

In practical accelerated feeding programs, milk is fed to calves at 20% to 30% of their birth weight. Accelerated programs have a remarkable impact on calf performance early on in their lives, with improved ADG, structural growth and efficiency of feed conversion. Where standard programs produce ADG's from 0.3 to 0.6 kg/day, intensive programs lead to ADG's of 0.6 to 1.0 kg/day. For calves receiving ad lib milk, ADG's are typically 0.6 to 1.2 kg per day.

ACCELERATED GROWTH FEEDING PROGRAM

The disadvantage of ad lib milk feeding is that calves consume very little concentrate. Initial rumen development, however, is driven by butyric acid formed from starch in the calf feed. If these calves are weaned at 2 months of age, they go into weaning shock because they do not yet have the digestive capability to survive on calf feed alone. These calves are, therefore, exposed to tremendous stress and lose all the extra weight they might have gained up to that point. Accelerated feeding programs, therefore, try to balance the rapid growth and rumen development.

Calves on an intensive program consume about half the concentrate compared to those in standard programs. Nevertheless, they have a need for concentrate from 14 days of age, even though they consume only small quantities as they are saturated with milk. Therefore, milk volume must be reduced during the second month in order to stimulate intake of calf feed. If a calf consumes enough calf feed, the rumen can develop to such a degree in 3 weeks that the heifer won't get weaning shock. Therefore, a lot of attention should be given to stimulating feed intake during the second month. This is where Calf Gainer Elite plays a major role, as the Elite feeds are developed to maximize rumen development, using a combination of the most current technologies available. However, the aim is still to achieve calf feed intakes of 1.0 kg per day for Holsteins and 750g for Jerseys pre-weaning. It is also advisable to keep calves in their pens for a week or two after weaning. This reduces the stress of environmental changes, as well as the adaptation to a new social structure. Digestive tract development can then be completed in a less stressful transition environment.

Proposed Accelerated Heifer Growth Program			
Phase	Week	Holstein (L milk / day)	Jersey (L milk / day)
Growth	1	4	3
Growth	2	6	5
Growth	3	8	7
Growth	4	10	8
Growth / Wean	5	10	8
Wean	6	8	7
Wean	7	6	5
Wean	8	4	3
Post-Weaning	9	2	1
Post-Weaning	10	0	0
Provide Elite Starter Feed ad lib from week 2. However, make sure that the feed in the troughs stays fresh. Initial intake will be very low.			
Make sure that heifers have ad lib access to water from week 2. Water is very important for rumen development.			
Transition onto a standard grower feed can be done within the first month after weaning.			

CALF GAINER ELITE BASED FEEDS

Calf Gainer Elite is a speciality protein, mineral, trace mineral and vitamin macro premix developed for the convenient mixing of high quality calf feeds. By using a combination of additives, attention is paid to the following important components of calf development:

- Rumen development
- Feed conversion efficiency
- Dry matter intake
- Growth
- Immunity
- Health



“Efficient digestion and disease resistance are further enhanced by probiotics, while calves’ natural ability to fight disease is enhanced by highly effective antioxidants.”

The vitamins and minerals in Calf Gainer Elite are optimally balanced to support the development of the young calf. Essential oils help to stimulate appetite and destroy unwanted bacteria in the gastrointestinal tract. At the same time, prebiotics supply nutrients to the beneficial bacteria, which aid in effective digestion. Efficient digestion and disease resistance are further enhanced by probiotics, while calves’ natural ability to fight disease is enhanced by highly effective antioxidants. Other additives stimulate the digestion of fat and protein in milk, thus yielding more available energy and amino acids to support calf growth. Special fibres are converted to butyric acid in the rumen, which stimulate the development of rumen papillae. In addition, medicaments help in the prevention of coccidiosis as well as supporting more effective utilization of nutrients such as proteins.

The benefits Calf Gainer Elite thus offer to the calf are as follows:

- Ensures optimal, healthy gut flora
- Stimulates the development of the gastrointestinal tract, with the emphasis on the rumen
- Reduces oxidative stress
- Improves the calf’s ability to resist disease challenges

Where Calf Gainer Elite is included in calf feeds, the following can therefore be expected:

- Decreases in gastrointestinal tract disorders, such as diarrhoea
- Stimulation of dry matter intake
- Increased feed utilization
- Improved growth and development of the calf
- More effective post weaning roughage utilization
- Less negative impact on growth due to reduced weaning shock

It is expected that calves which receive Calf Gainer Elite as part of their feed will have faster and more efficient rumen development. Calf Gainer Elite is, therefore, a premier approach to calf rearing, with the goal of maximizing calves’ potential in support of accelerated calf growth programs. As part of standard calf growth programs, it is expected that calves will be healthier and grow faster. Post weaning roughage utilization will also be improved.

The use of quality raw materials, such as maize and soya oilcake is essential in the amassing of Elite feeds. Providing quality energy and protein is crucial in support of unlocking the potential of Calf Gainer Elite. Palatability of feed components is also very important in order to stimulate intake of calf feed in accelerated calf rearing systems.

VOORBEELDE VAN ELITE AANVANGSVOERE

INGREDIENTS	ELITE STARTER	ELITE STARTER	ELITE STARTER	ELITE STARTER
Maize meal	400	400	400	375
Molasses meal	80	80	80	80
Soya oilcake 47	250	200	175	150
Cotton or Sunflower oilcake 38		50		
Extrublend 36				50
Canola oilcake 33			100	100
Lucerne hay (milled)	227	227	202	202
Calf Gainer 65 Elite	37	37	37	37
Feedtek Buffer Pack	6	6	6	6
Total (kg)	1000	1000	1000	1000
Composition (%)				
Protein	18.5	18.1	17.9	18.3
Protein from NPN (% of total)	0	0	0	0
Calcium	1.3	1.3	1.3	1.3
Phosphate	0.5	0.5	0.6	0.4
TDN (energy)	70.6	70.4	70.1	70.2
A buffer is added to the feed to prevent Sub Acute Rumen Acidosis (SARA)				

FEED RECOMMENDATIONS

- Consult a Feedtek nutritionist if alternative ingredients are available
- Calf feeds should always be fed dry
- Molasses meal (or -syrup) is very important for intake stimulation because of palatability.
- Contains an ionophore – may not be fed to horses
- Calf Gainer 65 Elite comes in 18.5 kg bags to make half-ton mixes possible.

For more information contact Sjoerd ten Cate at 082 380 2334
or sjoerd@swellendam.com

Contact: 086 111 5362 | www.feedtek.co.za