SPRAYFO

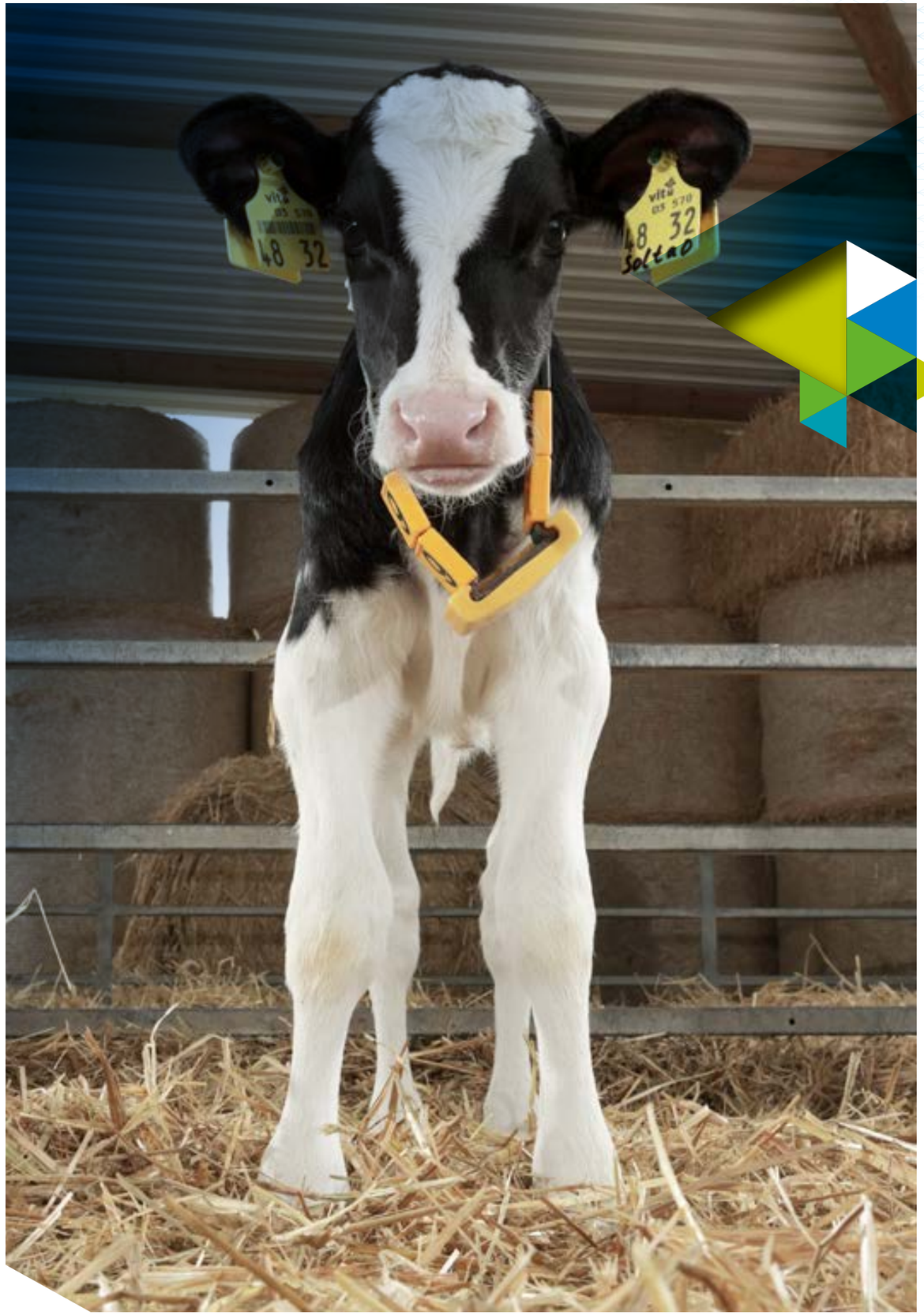
LifeStart programme for calves

Increasing average lifetime daily production



LIFESTART
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LifeStart for sustainable milk production

Feeding the ever-increasing world population in a sustainable way means that scarce resources like arable land should be used efficiently. Utilising the full potential of each dairy cow means maximising the average lifetime daily production of the animal by:

- Reducing the age at first calving
- Increasing the milk production per lactation
- Increasing the number of lactations per cow

LifeStart research has shown that a LifeStart feeding schedule with elevated planes of nutrition during the first weeks of life has a big impact on future growth and organ development of a calf. This will result in a better performance later in life. LifeStart feeding schedules initiate the **following 5 benefits**:

- **Higher average daily weight gain**
- **Better udder development**
- **Earlier breeding**
- **Higher milk production**
- **A lower culling rate**

With the LifeStart programme, it becomes possible to meet the following rearing objectives (see table 1).

	Jersey	Cross-bred	Holstein Frisian
Fully grown body weight	450 kg	550 kg	700 kg
Weight at birth	26 kg	32 kg	40 kg
Low mortality rate	< 5%	< 5%	< 5%
Low incidence of diarrhoea	< 10%	< 10%	< 10%
Low incidence of lung problems	< 10%	< 10%	< 10%
Weaning weight at 10 weeks of age	65 kg	80 kg	100kg
Weight at 4 months of age	100 kg	125 kg	155 kg
Insemination weight	275-300 kg	325-350 kg	400-425 kg
Insemination age	From 13 months	From 13 months	From 13 months
Weight after first calving	390-415 kg	475-500 kg	600-625 kg
Calving age	From 22 months	From 22 months	From 22 months

Table 1: Rearing objectives of for a LifeStart programme in different breeds.



A LifeStart feeding schedule will result in a higher growth in the critical 1st months

Several researchers have shown that the quality of early life nutrition has a strong influence on gene expression, which in term is an important factor influencing maximum growth and future production potential of calves.[1,2,3,4,5,6,7,8,9,10] LifeStart interventions have resulted in an increase of average daily gain of up 10 300 g/day. The work of aforementioned authors formed the basis for the Kempenshof LifeStart study[11] that started in 2014 and is still continuing today.

Kempenshof trial, material and methods

A total 86 female calves were included in a longitudinal study carried out in the Kempenshof[11]. Pairs were fed the same amounts of colostrum from the same source and blocked by colostrum, parity and season. They had ad libitum access from day 4 onwards to water, starter feed and straw and were all weaned according to a standard protocol at 56 days of age. From day 70 onwards, they were moved to group housing.

The only difference between the two groups was the amount of calf milk replacer fed. The LifeStart group was fed 8 litres per day compared to 4 litres per day for the controls, both groups were fed at a concentration of 150 g/l.

Results

Calves in the LifeStart group had a higher bodyweight from day 7 onwards (see figure 1). At weaning, the difference in ADG was 155 gram/d, at day 70, the difference in ADG between the LifeStart group and the controls was 123 gram/d.

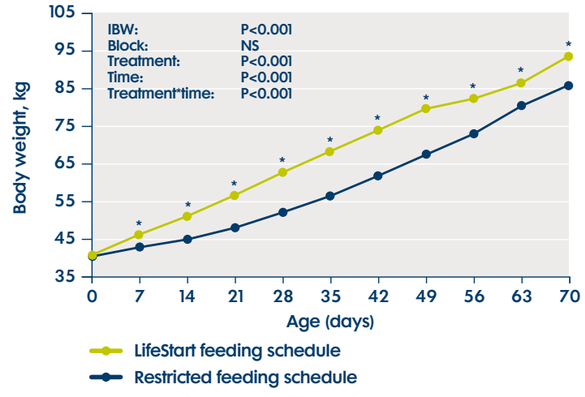


Figure 1: Body weight of calves fed a LifeStart feeding schedule compared to body weight of calves on a restricted feeding schedule.

A LifeStart feeding schedule will result in an earlier age at 1st breeding

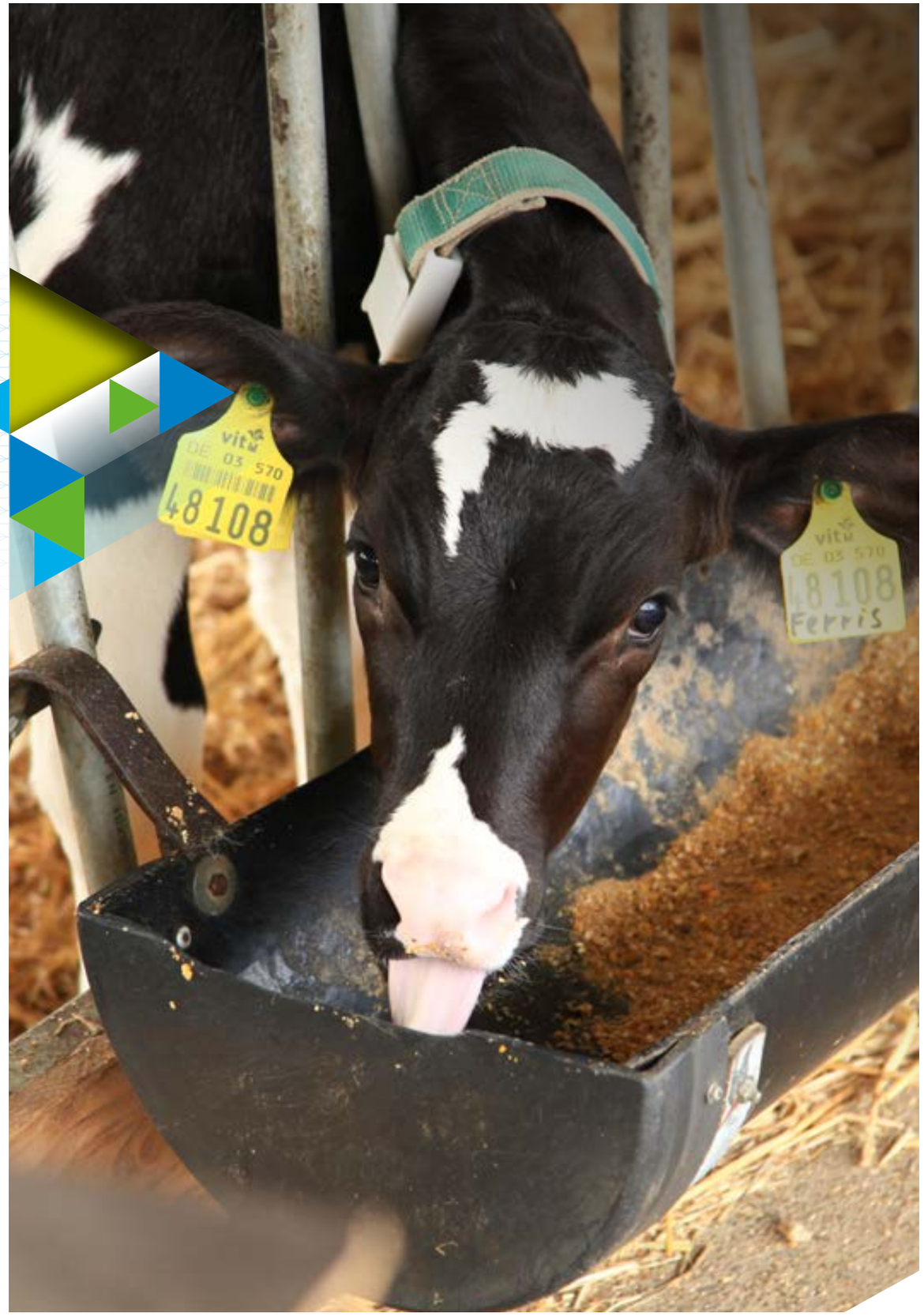
Bruinje et al[12] found that calves fed elevated planes of nutrition reach puberty earlier. Several authors have shown that as a result of this, calves on a LifeStart feeding schedule can be inseminated at an earlier age [6,10,13].

Findings in the Kempenshof trial

In the Kempenshof trial, the LifeStart feeding schedule resulted in an improvement of fertility, leading to a reduction of the age at 1st insemination, age at conception and age at 1st calving. The increased difference in age at conception is the result of an improved conception rate (see table 2).

	Conventional (n=39)	LifeStart (n=42)	Difference	p-value
1st insemination	398 days	390 days	8	0.05
Age at conception	428 days	405 days	23	0.01
Age at 1st calving	699 days	683 days	16	0.03

Table 2: Fertility parameters in heifers reared according to LifeStart principles compared to heifers reared on a restricted feeding schedule.





A LifeStart feeding schedule can double the amount of udder tissue

The development of mammary tissue is essential for future productivity of the cow. Several authors found compelling evidence that growth in the first eight weeks of life is a key factor in the optimal development of udder parenchyma that forms the milk producing glands.[14,15,16]

In one of these studies[14], 4 groups of calves were fed at a high or low level of nutrition between weeks 2 and 8 followed by feeding at a high or low level at weeks 9-14. It was shown that higher energy and protein intake from 2 to 8 weeks of age increased parenchymal mass in mammary glands of heifer calves (see table 3).

Feeding level week 2-8	Low		High	
Feeding level week 9-14	Low	High	Low	High
ADG week 2-8 (g/day)	400	400	670	670
ADG week 9-14 (g/day)	470	1060	400	1130
Final bodyweight week 14 (kg)	80 kg	106 kg	90 kg	121 kg
Parenchyma weight (mg/100 kg BW)	16	15	24	23

Table 3: Amount of udder parenchyma expressed in mg/100 kg body weight in calves on high planes of pre and post-weaning nutrition compared to calves on restricted feeding schedules.

Findings in the TN Kempenshof trial

A total 11 calves were included in this study[17]. Six calves in the LifeStart group were fed 8.4 litres per day compared to 4 litres per day for the five controls, both for 53 days. After weaning, samples of the udder parenchyma were taken and parenchymal mRNA was analysed.

The LifeStart feeding schedule altered the mammary transcriptome, influencing cell functions involved in development of the mammary gland. This resulted in metabolic programming, preparing the calves for better udder development.

A LifeStart feeding schedule results in a higher milk production

Several authors have shown that elevated planes of nutrition in dairy calves during the pre-weaning phase increase future milk production.[1,2,,4,5,6,7,8,9,10] The protocols of these studies varied considerably which explains the variation on subsequent milk production of the animals included in these studies. So, to better understand LifeStart effects on cows kept in different production systems and different climates, a meta-analysis was undertaken [18] that included studies done on three different continents.

It was found that for every gram of additional pre-weaning growth, a heifer will produce 1.5 kg of extra milk in her 1st lactation. A LifeStart feeding schedule will therefore result in an additional milk production during the first lactation of at least 300 litres, but often much more.

What did we find in the TN Kempenshof trial?

The LifeStart feeding schedule applied in the Kempenshof trial resulted in an extra average daily gain of 150 g/day. This difference in growth resulted in an average increase in production of fat corrected milk that was 400 litres above the production of the controls (see figure 2).

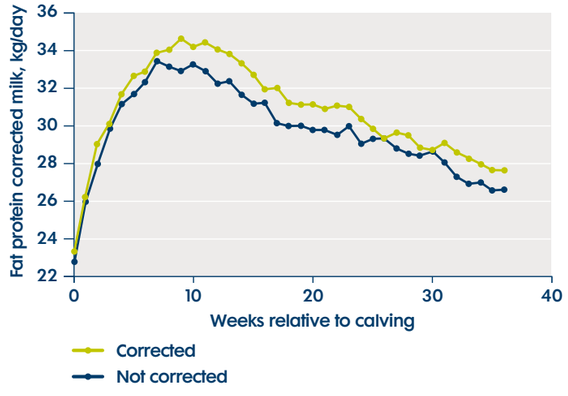


Figure 2. Fat and protein corrected milk yiled in kg/day in heifers fed according to a LifeStart feeding schedule compared to heifers fed a restricted feeding schedule.



Reducing the culling rate by half, with a LifeStart feeding schedule

Several authors have found that increasing the quality of early life nutrition can potentially reduce the culling rate in 1st lactation by up to 50%[2,10].

What did we find in the TN Kempenshof trial?

During the TN Kempenshof trial, culling rates up to 45 DIM in the 3rd lactation were recorded. Dairy heifers in the group fed the conventional feeding schedule had a higher culling rate during the rearing phase, but this difference was only numerical. At 45 DIM in the 3rd lactation however, there was a significantly higher percentage of heifers culled in the group fed the conventional schedule compared to the heifers fed a LifeStart feeding schedule (see table 4).

	Conventional feeding schedule	LifeStart feeding schedule	Difference in number of drop-outs	p-value
Calves included per group	n=43	n=43		
Number of calves weaned	42/43 (97.7%)	43/43 (100%)	1	0.24
Number reaching age of 1st breeding	39/43 (90.1%)	41/43 (95.3%)	2	0.39
Number of heifers that calved	38/43 (88.4%)	40/43 (93.0%)	2	0.46
Number of heifers that reached 180 DIM	31/43 (72.1%)	37/43 (86%)	6	0.02
Number of cows reaching > 45 DIM in 3rd lactation	11/43 (25.6%)	20/43 (46.5%)	9	0.04

Table 4: Culling rates in heifers fed according to LifeStart principles compared to heifers reared on a restricted feeding schedule.





LifeStart performance with Sprayfo Delta

LifeStart science has shown that having higher energy levels in milk replacers has benefits. Sprayfo Delta is the first in a range of Energised Calf Milk products, developed with whole milk as the biological reference. It has been designed to achieve the LifeStart objectives: optimum development, robustness and longevity. Inspired by saleable milk, Sprayfo Delta is high in fat, ensuring calves get a high level of energy. In combination with a perfect balance of vitamins and minerals. This means that calves get the best possible start in life.

The effect of a LifeStart feeding schedule with Sprayfo Delta on growth and fertility was compared to a restricted feeding schedule with a traditional calf milk replacer.

Study design

A group of 60 calves were fed Sprayfo Delta from birth until they were weaned at 63 days of age. A control group was fed a traditional calf milk replacer and also weaned at 63 days of age.

Results

Average daily gain of both groups from birth to day 63 and from birth to day 91 is presented in figure 1. At day 63 calves in the Sprayfo Delta group weighed 6,7 kg more than the calves in the group fed the traditional CMR. By day 91, this difference had increased to 8.1 kg.

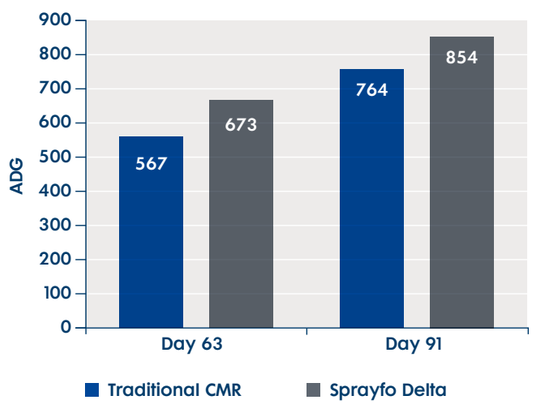
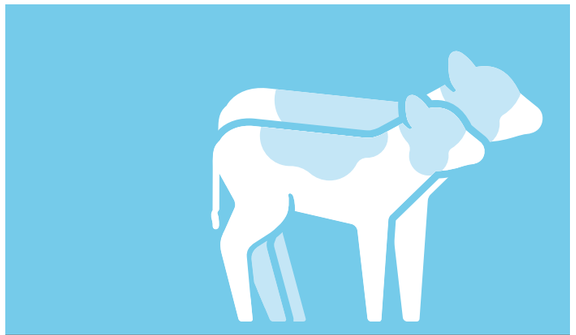


Figure 3: average daily gain at day 63 and at day 91 in calves fed Sprayfo Delta or a traditional CMR.

Fertility parameters greatly improved.

	Sprayfo Delta	Traditional CMR
Age at 1st insemination	12.4 months	13.7 months
Conception rate at 1st insemination	73.4%	62.0%

Table 5: Age at 1st insemination and conception rate at 1st insemination of calves fed according to a LifeStart schedule compared to calves on a restricted feeding schedule.



Conclusion of the trial

The amount of energy fed in a LifeStart feeding program can be elevated by increasing the level of fat in a calf milk replacer. Sprayfo Delta is a calf milk replacer with an increased level of fat. A LifeStart feeding schedule with Sprayfo Delta resulted in an increase of average daily gain which in term resulted in an improvement of fertility.

TESTIMONIAL

“Calf rearing lays the foundation for each new generation of cows”

DEN EEL FARM
Well, the Netherlands
Gerben van der Schans, owner
Johan van Herpen, manager youngstock

Farm facts
Herd size: 550 cows
Milk production: 10,000 kg
Age at first calving: 23 months
Average no. of lactations: 2.9

Produce own-branded dairy products for human consumption

Calf rearing lays the foundation for each new generation of cows. We aim to rear an animal from suckler to roughage processor within 10 weeks. We joined the trial for this new type of milk because we want to stay on top of the latest developments. That way, we get to benefit from the knowledge and experiences of leading industry stakeholders.

Our approach to calf rearing was already very good, but now we take more measurements during various life stages. Recording data helps us to steer the future. For us, calf rearing is successful when we have zero mortality and have robust heifers at 23 months of age, ready for lactation. That’s what makes us happy!





Peace of mind with Sprayfo Delta

With Sprayfo Delta, every farmer can have peace of mind that every calf is receiving the best start in life.

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TN-REF#:16|LifeStart|PROGRAMME FOR CALVES|EN|1.0|12-03-20|CEN|20200001|NL

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