BACKGROUND

Over time, the cow has developed from an animal supplying her own young with milk, to one who feeds a family of humans, to the high producing dairy cow we know today. Improved herd genetics have led to a change in how we think about calf feeding and management, in order to make full use of the genetic potential of the calf as a future milking cow.

In practice, different calf rearing methods are used all with the same goal: to rear a healthy and well-developed heifer in two years. Calves are mono-gastric animals and only later on start developing the rumen to become ruminants. To grow and develop in the first period of their lives, calves are mainly dependent on the nutrients provided through milk or CMR feeding, while the rumen development is stimulated by gradually increasing levels of concentrate feed intake.

The digestibility, and thereby the feed efficiency, of milk and milk replacers is very high, resulting in fast growth in the first period of life. The growth rate can further be enhanced by the level of nutrients fed. In this respect, a trend has arisen towards more intensive feeding of milk. This implies milk replacers with higher (high quality) protein levels (24–28%) than the 21% protein commonly found in most of the whey based CMRs. Protein is a major component needed for the growth and carcass development of calves. Besides that, the concentration of the milk replacer and/or the amount of milk fed to the calves is more elevated, feeding more nutrients and ultimately leading to an accelerated growth.

Why should we focus on accelerated growth for calves and use these intensive feeding programs? Already, in the late 1950s and early 1960s, studies by Reid et al. (1957), and Swanson and Hinton (1964) reported a reduction in milk production when heifers were fed below their nutritional requirements and an increase in milk production when they were fed above requirements. Moreover, recent research has shown additional evidence that the factors influencing the development of the calf and its subsequent milk production as a heifer are interrelated. This interrelationship is explained by epigenetics, a field of study of genetics. Various factors can, through multiple epigenetical pathways influence the expression of the genome of a calf by turning a gene ‘on’ (activate the gene) or ‘off’ (silence the gene) without altering the DNA of the calf’s genome. Examples of such factors are in utero nutrient supply, colostrum intake and quality (lactoferrine), early life nutrition (milk or CMR feeding) and early life non-nutritional nurturing, affecting the development of tissues, including mammary tissue, which play an important role in milk production later in life (Soberon 2012; Sobernon and Van Amburgh 2012). Adapted feeding practices allow in this way to fully exploiting the calf’s genetic potential.

One of the advantages of intensive milk feeding programs is a direct positive effect on young calves’ health, growth and development Longterm consequences for these programs have also been found (Drackley, 2008). First of all, accelerated growth programs assist in reducing the age to breeding (Raeth-Knight, 2009), reducing the age of first calving to 22–24 months. For the farmer this is of course economically very interesting, since in most countries the average calving age today is still above 26–30 months.
Second, the programs encourage a significant increase in milk production. Numerous studies report an increase in milk production of 450 kg to 1300 kg in the first lactation, compared to calves of restricted pre-weaning feeding schedules. (Foldager and Krohn, 1994; Bar-Peled et al., 1997; Shamay et al., 2005; Terré et al., 2009; Moallem et al., 2010 in Sobernon 2012). This higher milk production is related to an improved pre-weaning average daily gain (ADG). On average, 100g of extra pre-weaning ADG results in an increase of 500 kg milk yield in the first lactation.

Nukamel supports this approach of intensive calf rearing by offering a high quality milk replacer: Nukamel Yellow, which has high nutrient levels (24% protein and 20% fat). Nukamel Yellow is a product based on a unique combination of strictly selected whey powder and 10–15% of milk powder, improving taste and thereby intake. The inclusion of a small amount of milk powder reduces the level of clot forming in the stomach, when compared with milk or milk replacers with higher levels of milk powder. This favours efficient and fast digestion like is known from a whey based milk powder. Due to the use of high quality, carefully selected whey powder and whey protein concentrates, highly digestible whey proteins are provided to the calves to optimize growth. Fat digestion is also boosted by the use of a nutritional emulsifier and a unique spray-cooling process. The powder formed by spray cooling is different from a common spray-dried product. The matrix structure of fat and proteins makes them simultaneously available to the digestive enzymes in the gastro-intestinal tract.

Making use of the full genetic potential means starting in the very first period of life, so administering an intensive feeding program should been seen as an investment in the future!

LITERATURE

Drackley, J.K., 2008, Accelerated growth programs for milk-fed calves
Sobernin F. 2012. A DissertationPresented to the Faculty of the Graduate School of Cornell University In Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy.