Joosten
young animal nutrition

We care for the little ones

Watch out for deficiencies when feeding whole milk

Rearing calves is making choices. Concerning milk feeding, there are basically two options; feed the calves with a calf milk replacer or with whole milk. We, as Joosten – young animal nutrition talk extensively about calf milk replacer, but what if a dairy farmer really insists in feeding its own whole milk[1]? For example, 44% of the farmers in The Netherlands feed calves with whole milk[2].

There are numerous reasons[3] to feed whole milk:

1. "Mother nature knows best"
2. "It comes without a bill"
3. "Easy to use"
4. "Easiest way to get rid of waste milk"
5. "Calves look shinny"
6. "I've just invested in a $15.000,- pasteurizer"

All valid reasons, but I think most of our readers can disprove those arguments (and if not, read page 3). But for whatever reason a dairy farmer wants to feed whole milk to its heifer calves, it is a valid reason for him. I would like to highlight one quote -in my opinion the most important- "*Mother nature knows best*". Yes, it does, however in modern dairy farming mother nature is not the boss anymore.

Breeding goals in dairy cows target high lactation levels with high levels of protein and fat. Over the last decades, milk composition has changed. Due to the high milk production, levels of vitamins and trace minerals are diluted. As a result, whole milk no longer fulfils the nutritional requirements of the young calf. In whole milk, the level of essential vitamins and minerals is too low. Deficiencies in these vitamins and minerals lead to a lower immunity[4], weaker bones[5] and possibly anaemia[6]. Adequate levels are necessary to ensure all metabolic systems are functioning properly and needed for an optimal immunity build-up. In particular in the first month of life, the disposal of sufficient vitamins and minerals is very important, since active immunity development takes place in that time and calves are most susceptible for diseases (Figure 1).

[1] *Whole milk = saleable cow milk, colostrum milk, antibiotic milk*
[2] *Mohd Nor et al., 2013. First-calving age and first-lactation milk production on Dutch dairy farms. J. Dairy Sci. 96*
[3] *Based on the input gathered during Joosten Calf Rearing Seminar Budapest, 2017*
[4] *Wintergerst et al., 2007. Contribution of selected vitamins and trace elements to immune function. Ann Nutr Metab 2007; 51:301-323*
[5] *Asling et al., 1963. The influence of Trace Elements on the Skeleton. CORR: vol 27: 213-264*
[6] *Blaxter et al., 1956. Iron-deficiency aneamia in calves. Scotland. Cambridge University. Volume 11.*

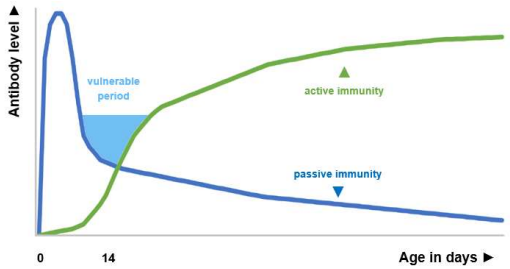

Figure 1. Immunity development in calves over time. Calf active immunity development accelerates with extra vitamins and minerals.

Extensive research bundled in the book Nutrient Requirements of Dairy Cattle[7] concluded that whole milk is deficient in the vitamins D3, A and E, at least 7 essential trace minerals and 6 out of 8 essential B-vitamins.

In the graph below is visualized how many percent of the calf micronutrient requirements is delivered by whole milk. Especially iron and selenium are very low, being the reason why many farmers give additional iron en selenium shots to the calves. Zinc, manganese, copper and magnesium are crucial to strong leg development and help to prevent lameness in later life. All vitamins and most of these minerals are directly influencing immunity development, they are basically the building blocks for a strong defence. If nutrition is delivering insufficient levels logically the calf's immunity is weak, but did you know that also vaccinations are less effective?[8]

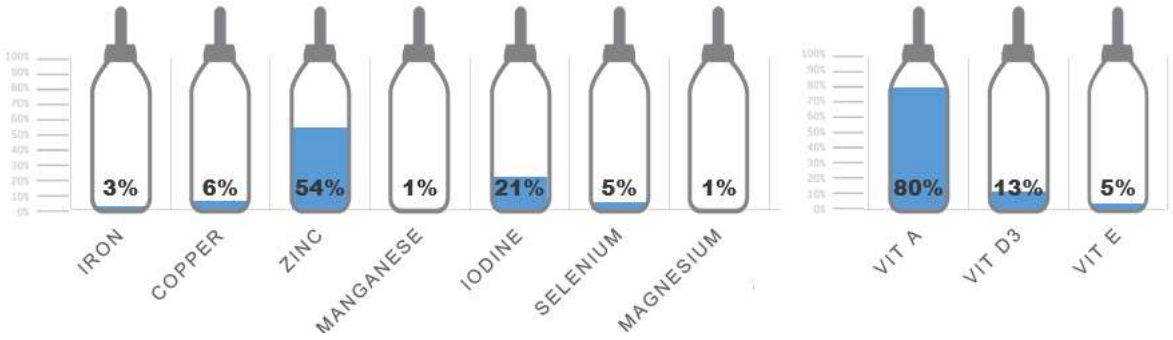

Figure 2. Percentage of calf requirements in essential vitamins A, D, E and minerals iron, copper, zinc, manganese, iodine, selenium and magnesium delivered by feeding whole milk alone.

As a nutritionist for young animals, I know how important good nutrition is for the development of these youngsters and their performance in later life. Consider that heifer calves are the future of your dairy farm and that they rely for almost 100% on the milk you are feeding them in early life.

[7] *NRC, 2001. Nutrient requirements of dairy cattle. 7th Revised Edition, Washington, D.C.*

[8] *Spears, 2000. Micronutrients and immune function in cattle. The Nutrition Society, Vol 59-4: 587-594*

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REASONS TO FEED WHOLE MILK

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REASONS TO RECONSIDER FEEDING WHOLE MILK

× **Whole milk can transmit diseases.**
Whole milk can be a source of Johne's bacteria, E. coli, salmonella, and mycoplasma, which are health threats for calves as well as people. Milk is an ideal bacterial culture (10,000 to more than 5,000,000 cfu/ml. Even when pasteurizing whole milk, not all bacteria are killed (not below 20,000 bacteria/ml). Also pasteurization does not eliminates spores, most viruses, toxins produced by bacteria and protozoa. So feeding whole milk is always a rick for transmitting diseases. (counter reason 1, 4, 6)

× **Whole milk is too fat.**
Due to the high fat content feeding whole milk often gives a shiny hair coat and a full belly. However, shiny coats does not automatically want to say healthy calves. The high level of fat in cow's milk causes satiety in the calf. As a result the calf will decrease intake of starter feed, which negatively impacts rumen development. This is especially from 4 weeks of life until weaning, where starter feed intake should increase dramatically. (counter reason 1, 4, 5)

× **Whole milk can be a source of antimicrobials.**
Never ever feed residue milk -whole milk with antibiotic residues- to your heifer calves. Even feeding small amounts of antibiotics to the future heifers can accelerate resistance for antibiotics like for instead used to cure mastitis. And these residues are not eliminated by pasteurization. Feed waste milk to the bull calves. For more information read the article *Never ever feed residue milk to your female calves! Here's why.* (counter reason 4, 6)

× **With moderate milk prices, it is cheaper to feed a calf milk replacer.**
Yes, calf milk replacer needs to be paid, however when milk prices are moderate or high, a liter calf milk replacer is cheaper compared to one liter of whole milk which you can sell and take the benefit off. Saleable milk prices have varied from $0,26 to $0,53/liter in the last year, so on a dry powder basis, whole milk would cost $2,08 to $4,24 per kg! (counter reason 2)

× **Whole milk is not easier to use.**
If you want to do it right… Feeding whole milk straight from the cow is undesired, since this is a serious risk for transmitting diseases like TBC, Salmonella and BVD. Also unpasteurized whole milk is full with bacteria, causing infectious diarrhoea. Moreover, milk from the milking shed is often too cold, causing nutritional diarrhoea. So, when feeding whole milk, it should be pasteurized and heated, and that also gives work. And, to feed 1 calf you need to transport 400 liters whole milk, that is equal to 4 bathtubs! (counter reason 3)