

Nutritional strategies for optimising colostrum quality



Colostrum is the ‘first milk’ produced by the mare post-foaling

As all breeders know, providing optimal nutrition for their broodmare is vital throughout the entire pregnancy to support her wellbeing and the growth and development of the foetus. A mare’s nutritional requirements increase during the third trimester and as she approaches the final weeks of gestation the diet provided will be fundamental in determining the quality of the mare’s colostrum.

Colostrum is the ‘first milk’ produced by the mare immediately post-foaling; this generally tends to be a thick, sticky, yellowish liquid. The quality of colostrum generally refers to the amount of infection fighting immunoglobulins or antibodies present.

Foals are born with a functioning immune system but it is considered naïve, as it is not equipped with a ready-to-go supply of antibodies. The nature of the equine placenta is such that transfer of antibodies in-utero is inhibited, therefore the foal requires an immediate supply from the mare in the form of colostrum post-foaling.

The antibodies received through the colostrum will provide protection until the foal is producing its own antibody supply a few weeks later. It is crucial that the mare’s colostrum is of a high enough quality to provide the foal with adequate protection from invading pathogens. High quality colostrum, assuming it is ingested by the foal ideally within eight hours of birth, is positively correlated with the circulating level of immunoglobulins, in particular Immunoglobulin G (IgG) in the neonatal foal.

It is important for breeders to consider how IgG levels produced in the mare’s colostrum and ingested by the neonatal foal can be manipulated and optimised through nutrient and non-nutrient factors. We will now take a look at a few of the key factors currently proven to benefit colostrum quality.

Yeast probiotic supplementation

Yeasts are a single-celled microorganism, and are part of the Fungi kingdom. There are many

types of yeast, but generally within equine nutrition we are talking about *Saccharomyces cerevisiae* (SC). To confuse matters further there are various strains of SC and only a few are permitted in the UK and Europe for use in equine feeds.

Yeasts function as a probiotic due to a few key capabilities:

- (1) Live yeasts are oxygen scavengers, they therefore promote the growth of desirable anaerobic bacteria (those that do not like oxygen).
- (2) They produce metabolites that promote the growth of lactic acid utilising bacteria, leading to a consistent pH, less likely to be acidic.
- (3) Yeast competes with the lactic acid producing streptococci bacteria for sugar, therefore limiting its growth.

As a result of these capabilities, when present in the hind gut, live yeast can be very beneficial to the equine microbiome and therefore gastrointestinal health. Specific research looking at live yeast supplementation in mares and how this could potentially improve colostrum quality has provided

some interesting results. The exact mechanism by which feeding live yeast increases colostrum quality, and specifically IgG concentrations, is not yet fully understood. However, its ability to act as an immunostimulant resulting in higher concentrations of immunoglobulins in the mare that cascade down to the foal via colostrum is clearly evident.

Clinical trials and potential benefits for the foal

Several studies have been carried out in farm animals and horses looking into the different effects of live yeast supplementation on both mother and offspring. Microbiome health, immune health, and weight gain are common factors being researched.

One study used a group of 40 pregnant mares (Study 1) that were divided equally into a supplemented group and a non-supplemented group (control). Live yeast in the form of SC was added at a rate of 10g/mare/day to the basal diet from day 300 of gestation to 180 days post-foaling. The results showed mares supplemented with live yeast probiotic had significantly higher colostrum quality, with increased IgG concentrations both in colostrum (pre suckling) and in the foal’s serum 24-48 hours after the first colostrum intake, compared to the control group.

This shows that supplementing the mares provided the foal with an improved level of circulating IgG, giving it a better defence to disease in those

early days of life.

Looking beyond colostrum composition, Study 1 actually followed foals for up to six months post-partum in order to monitor weight gain. It found that foals from supplemented mares had significantly higher body weights at six months compared to foals from non-supplemented mares. Foals were given access to mares’ concentrate feed, and therefore live yeast, from 14 days of age and the improved weight gain was attributed to improved nutrient absorption and optimisation of the foals’ gastrointestinal microflora, compared to the non-supplemented group.

In a smaller study (Study 2) consisting of 11 pregnant mares, five supplemented and six control, there was also a positive effect on colostrum quality from providing live yeast supplementation to mares at a slightly higher intake over a shorter period of time. As with Study 1, the colostrum quality was improved with a higher concentration of IgG. Interestingly, this study found a positive effect after only eight days of supplementation. Although foal serum IgG wasn’t measured in this study, it is a reasonable assumption that the colostrum quality would be positively correlated with circulating IgG in the foal.

Other research has shown that when supplementing mares with live yeast, it can induce significant positive changes to the microbiome of the young foal, including better-shaped droppings during the first 20 days of life. Research

has shown that when foals themselves were supplemented with live yeast in the first 20 days of life, they showed an improved microbiome profile with less harmful bacteria and toxins. Weight gain was also shown to be greater in the supplemented group compared to the control.

These clinical trials show that supplementing mares with a live yeast probiotic during late pregnancy has multiple benefits, including improved colostrum quality, resulting in a foal that is better equipped with infection fighting IgG, improved gastrointestinal health, weight gain, and overall development.

What else can we do to improve colostrum quality?

As we have already discussed, feeding live yeast probiotics have been shown as beneficial for mares and foals. Now let’s take a look at what other additions to the diet we can make to benefit broodmare and foal health, and specifically colostrum quality.

Similarly to yeast probiotics, prebiotics are also well understood for their gastrointestinal health-boosting capabilities and specifically Mannan Oligosaccharide (MOS), and are often added to feeds. A recent review of hundreds of MOS research papers concluded that when MOS is fed to mares their blood shows increased levels of immunoglobulins, and as a result they produced colostrum with higher levels of immunoglobulins, which in turn are



Live yeast probiotics have been shown as beneficial for mares and foals



The author with a foal
at Oakgrove Stud

» transferred to the foal, bolstering a foal's ability to fight infection in the postnatal period.

Another important dietary factor is the addition of Vitamin E, as it is a powerful antioxidant (particularly in combination with selenium), which has been shown to improve IgG levels when fed to mares at an appropriate level in late pregnancy. Vitamin E is generally quite low in most conserved forages and therefore owners and breeders should check that their hard feed is providing adequate levels to ensure the mare's overall dietary intake is meeting the demands of pregnancy and early lactation.

Providing Omega 3 fatty acids in the diet has been shown to improve IgG levels in colostrum, as well as the transfer of IgG and other immune defences through the colostrum to the suckling foal. Good grazing is an excellent source of Omega 3, but as most thoroughbred mares will be predominantly fed conserved forage in the later stages of pregnancy, the most practical way to supplement the diet with Omega 3 is via an oil rich in Omega 3 fatty acids, like flaxseed or linseed oil.

When it comes to maximising broodmare health and colostrum quality there will always be many factors to consider such as the quality of the basal diet, condition of your mare, her age, and any other health complications she may have.

However, emerging research has demonstrated that feeding live yeast, prebiotics and specific nutrients can positively impact colostrum quality and therefore the immune status of the foal. This is of course of critical importance in order to give the foal the best start in life, minimising the risk of disease, and maximising potential future performance.

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