

Factors affecting colostrum quality

Calves are born with a poorly developed immune system and until it is fully functional at around two months of age they are dependent on passive immunity provided through the absorption of antibodies in colostrum from the cow. Calves that don't receive enough colostrum when they are born are more susceptible to disease.

A recent study carried out in Ireland investigated the factors which affect the quality of suckler cow colostrum, including cow age and nutrition. The study also investigated the method of colostrum administration (stomach tube versus assisted suckling) on calf immune status and determined the variation in colostrum quality within and between quarters of the udder.



Methods

A total of 83 spring-calving Limousin cross Holstein Friesian cows and heifers were used in the study. The heifers were bred to calve at two years old. The animals were split and fed on the following diets plus 60g/head/day of a mineral and vitamin supplement:

- Cows fed grass silage *ad libitum* pre-calving
- Cows fed straw only *ad libitum* for the last 15 days before calving
- Heifers fed grass silage *ad libitum* pre-calving

Results

Cow age and colostrum quality

The study found that the heifers produced less colostrum (2.5 litres) than both groups of cows fed either grass silage (4.5 litres) or straw (3.9 litres). The heifer colostrum also contained fewer antibodies, see Table 1. This finding is supported by similar research carried out in the dairy sector.

The study also assessed how effective passive transfer was between the dam and her offspring by measuring the amount of antibodies present in the calf's bloodstream, eight and 48 hours after the first feed. The blood of calves born to the cows contained more antibodies than those born to the heifers. This finding reflects the lower weight of antibodies produced by these animals, particularly attributed to the lower colostrum yield.

Diet and colostrum quality

The diet fed before calving had no effect on colostrum yield or antibody content, probably because the cows that were fed the straw diet successfully mobilised energy reserves. However, despite receiving similar amounts of colostrum, calves whose dams were fed straw pre-calving had lower concentrations of antibodies than those calves whose dams were fed grass silage (Table 1).

	Cows fed grass silage	Cows fed straw	Heifers fed silage
Colostrum yield (l)	4.5	3.9	2.5
Calf serum antibody concentration at 8 hrs (mg/ml)	53.4	46.7	45.0
Calf serum antibody concentration at 48 hrs (mg/ml)	65.1	55.2	49.9

Table 1: Cow colostrum yield & calf serum antibody concentration

Previous research has suggested that maternal protein restriction during the last trimester of pregnancy can reduce the calf's ability to digest colostrum.

Other factors determining colostrum quality and absorption

The study found similar antibody concentrations within each quarter of the udder, demonstrating that when assisting a calf to suckle or milking colostrum from a cow it does not matter which teat is suckled or milked or whether first or last milk from the first milking is used. The antibody concentrations in second milking colostrum were substantially lower than concentrations in first milking, highlighting the importance of first milking colostrum (Figure 1).

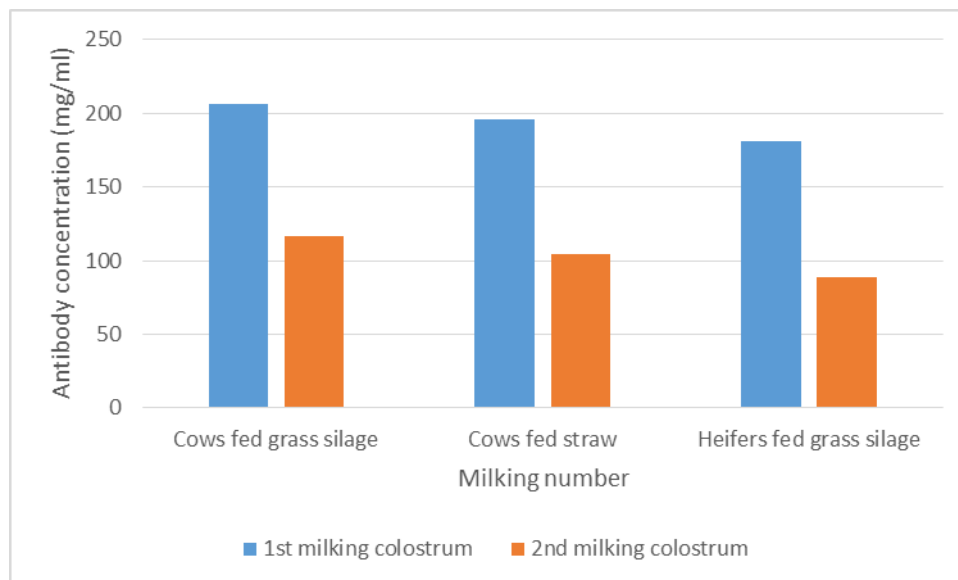


Figure 1: The effect of milking number on colostrum quality

The method of colostrum administration (stomach tube versus assisted suckling) had no effect on the success of passive transfer.

The study recommends that suckler calves receive 50 ml/kg birth weight of colostrum within the first hour of birth, this ensures successful passive transfer from mother to offspring. To ingest this amount it should take a naturally suckling calf around 20-26 minutes to consume, however this is likely to be longer in heifers who often have a poorer mothering ability. The study has shown it does not matter how the colostrum is administered, as long as it is carried out as soon as possible after birth.

Source: McGee et al. 2006. Effect of age and nutrient restriction pre partum on beef suckler cow serum immunoglobulin concentrations, colostrum yield, composition and immunoglobulin concentration and immune status of their progeny. Irish Journal of Agricultural and Food Research.

For more information see the BRP manual [Feeding Suckler Cows and Calves for Better Returns](#)