Colostrum is undoubtedly one of the most important factors associated with raising a healthy calf. Colostrum contains valuable immunoglobulins (Ig), or globulin proteins that must be absorbed by the calf within the first 24 hours of life to assure transfer of passive immunity from the cow to the calf. The calf relies on this passive immunity to protect itself from infectious disease for the first few months of life. These valuable globulin proteins can be provided by feeding maternal colostrum direct from the cow or by feeding a colostrum replacer product containing concentrated dried bovine colostrum.

How Much Globulin Protein Should Be Fed?

Failure of passive transfer (FPT) of immunity is defined as serum IgG concentrations of less than 10 mg/ml determined 24 hours after colostrum feeding to a calf. A colostrum management program is considered successful when 90% of calves in a given population achieve passive transfer. Godden et al. (2009) at the University of Minnesota conducted a study where calves were fed either 100 grams of globulin protein from a colostrum replacer, 200 grams of globulin protein from a colostrum replacer, or 4 quarts of maternal colostrum. All treatments were fed within 2 hours of birth. Results of this study are detailed in Table 1.

These results indicate that a standard feeding of 100 gm of globulin proteins from colostrum replacer was not enough to provide adequate protection and that more globulin proteins need to be fed. This can be accomplished by feeding more than one dose of a 100 gram/dose colostrum replacer or by selecting a colostrum replacer with a higher globulin protein concentration.

Hubbard OptiPrime™ Supplies 150 gm of Globulin Protein

Hubbard OptiPrime is a colostrum replacer containing 150 grams of globulin protein per 500 gram package dose. OptiPrime is derived from a concentrated form of 100% pure, natural bovine colostrum and is manufactured from high quality first and second milkings from selected Grade A dairies. OptiPrime is guaranteed free of major colostrum transmissible diseases including Johne’s. A field trial was conducted at a large dairy where 10 Holstein bull calves were fed 150 gm of globulin protein within 2 hours of birth from the dried bovine colostrum product contained in OptiPrime. Blood samples were obtained 24 hours after colostrum replacer feeding and analyzed for serum IgG concentration. Figure 1 shows that all of the calves fed the 150 gm of globulin protein contained in OptiPrime colostrum replacer had serum IgG levels greater than 10 mg/ml and the group average was 14.6 mg/ml.
Why Feed a Colostrum Replacer in the First Place?
Colostrum replacers are designed to be alternatives to feeding maternal colostrum as a means to provide globulin proteins to the newborn calf. Instances where a colostrum replacer is logical to use are numerous, and include:

**Biosecurity** – prevent transmission of diseases such as Johne’s and Mycoplasma  
**Quantity** – minimize inventory concerns when maternal colostrum supplies are short  
**Quality** – reduce cow-to-cow variation in immunoglobulin (Ig) concentration associated with maternal colostrum  
**Convenience** – minimize hassles with night calvings and thawing frozen colostrum  
**Cleanliness** – eliminate potential bacterial contamination issues with maternal colostrum

### Variation in Colostrum Quality
Current recommendations state that clean, disease-free, high-quality colostrum be fed within 3 hours of birth at a total volume intake equivalent to 10% of birth weight, which is approximately 3 quarts for small breed calves and 4 quarts for large breed calves. While colostrum cleanliness, quickness of feeding, and disease-free status can be controlled with strict adherence to proper protocols, one of the most inherently variable components of a colostrum program is colostrum quantity (volume) and quality (Ig concentration). The current benchmark for acceptable colostral immunoglobulin concentration is 50 g/L (breakpoint between yellow and green zones on a colostrometer), which results in a total Ig intake of 190 g if 4 quarts of colostrum is fed. A survey conducted with 55 Pennsylvania dairy farms concluded that although colostral IgG concentration averaged 41 g/L, samples varied from 14.5 to 94.8 g/L (Kehoe et al., 2007). Likewise, Godden et al. (2009) reported that samples obtained from one dairy had an average IgG concentration of 71.3 g/L, but concentrations ranged from 14.5 to 132.2 g/L. Unless colostrum quality is routinely monitored, it is likely that some calves are not receiving adequate immunoglobulins at birth.

### How Do Colostrum Replacers Differ?
There are several colostrum replacers available on the market, and the primary differences existing between them include the source and the concentration of globulin proteins delivered per dose or feeding.

**Source** – There are two primary sources of globulin proteins in colostrum replacers;
1) dried bovine colostrum derived from maternal cow colostrum.  
2) dried bovine serum derived from meat processing plants.

**Concentration** – Among colostrum replacers, globulin protein levels vary from 100 g/dose up to 150 g/dose with levels in between (~125-130 g/dose).

### Conclusions
- University research has shown that feeding the standard 100 grams of globulin protein from a colostrum replacer may not provide enough protection against failure of passive transfer.  
- OptiPrime colostrum replacer contains 150 grams of globulin proteins per 500 gram dose and is derived from a concentrated form of 100% pure, natural bovine colostrum. A feeding trial has shown that serum IgG levels in calves are greater than 10 mg/ml when fed OptiPrime.  
- There are several instances where a colostrum replacer should be used – biosecurity, quantity and quality concerns, convenience, and cleanliness.  
- Colostrum replacers should be evaluated by the presence of data showing effectiveness, total globulin proteins provided per dose, and the total investment per calf required to achieve desired globulin protein intake.

### References