Colostrum

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Colostrum (known colloquially as **beestings**, **bisnings** or **first milk**) is a form of milk produced by the mammary glands of mammals (including humans) in late pregnancy. Most species will generate colostrum just prior to giving birth. Colostrum contains antibodies to protect the newborn against disease. In general, protein concentration in colostrum is substantially higher than in milk. Fat concentration is substantially higher in colostrum than in milk in some species, e.g. sheep and horses, but lower in colostrum than in milk in some other species, e.g. camels[and humans. In swine, fat concentration of milk at 48 to 72 hours after parturition may be higher than in colostrum or in late-lactation milk.Fat concentration in bovine colostrum is extremely variable.[

Contents:

Human colostrum

Newborns have very immature and large digestive systems, and colostrum delivers its nutrients in a very concentrated low-volume form. It has a mild laxative effect, encouraging the passing of the baby's first stool, which is called meconium. This clears excess bilirubin, a waste-product of dead red blood cells, which is produced in large quantities at birth due to blood volume reduction from the infant's body and helps prevent jaundice. Colostrum is known to contain immune cells (as lymphocytes)[and many antibodies such as IgA, IgG, and IgM. These are some of the components of the adaptive immune system. In preterm infants some IgA may be absorbed through the intestinal epithelium and enter the blood stream though there is very little uptake in full term babies.[13] This is due to the early "closure" of the intestinal epithelium to large molecule uptake in humans unlike the case in cattle which continue to uptake immunoglobulin from milk shortly after birth.

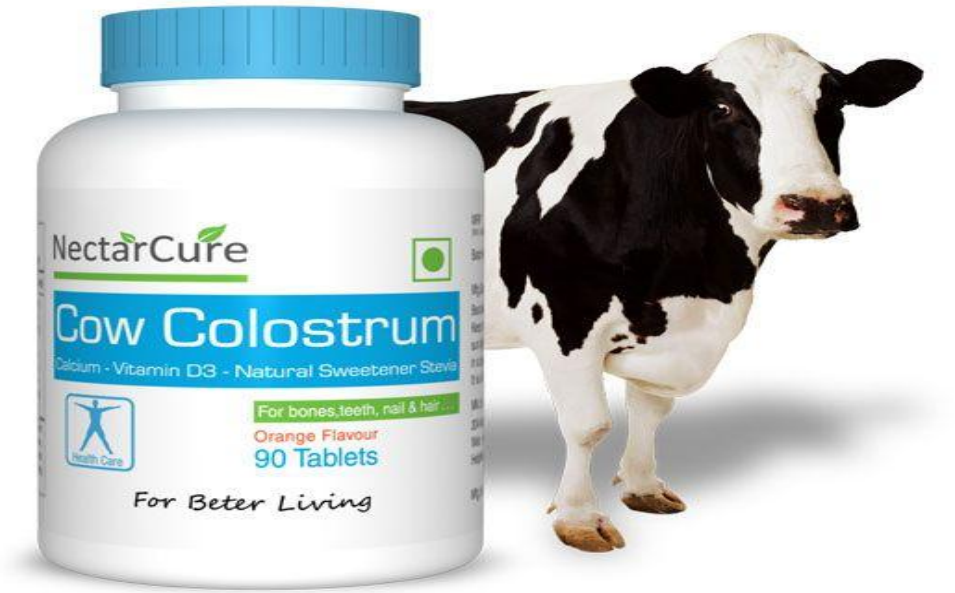
- Other immune components of colostrum include the major components of the innate immune system, such as lactoferrin,lysozyme, lactoperoxidase, complement,and proline-rich polypeptides (PRP).A number of cytokines (small messenger peptides that control the functioning of the immune system) are found in colostrum as well,including interleukins,tumor necrosis factor,[chemokines,[and others. Colostrum also contains a number of growth factors, such as insulin-like growth factors I (IGF-1), and II,transforming growth factors alpha, beta 1 and beta 2,fibroblast growth factors,[epidermal growth factor,[granulocyte-macrophage-stimulating growth factor,[platelet-derived growth factor,vascular endothelial growth factor,[and colony-stimulating factor-1.
- Colostrum is very rich in proteins, vitamin A, and sodium chloride, but contains lower amounts of carbohydrates, lipids, and potassium than mature milk. The most pertinent bioactive components in colostrum are growth factors and antimicrobial factors. The antibodies in colostrum provide passive immunity, while growth factors stimulate the development of the gut. They are passed to the neonate and provide the first protection against pathogens.

Human colostrum vs breastmilk.
On the left is colostrum expressed on day 4 of lactation, and on the right is breastmilk expressed on day 8. Colostrum often has a yellow hue compared to breastmilk.

In animal husbandry

Colostrum is crucial for newborn farm animals. They receive no passive transfer of immunity via the placenta before birth, so any antibodies that they need have to be ingested (unless supplied by injection or other artificial means). The ingested antibodies are absorbed from the intestine of the neonate. The newborn animal must receive colostrum within 6 hours of being born for maximal absorption of colostral antibodies to occur. Recent studies indicate that colostrum should be fed to bovines within the first thirty minutes to maximize IgG absorption rates.

- Colostrum varies in quality and quantity. In the dairy industry, the quality of colostrum is measured as the amount of IgG (Immunoglobulin G) per liter. It is recommended that newborn calves receive at least 4 quarts (liters) of colostrum with each containing at least 50 grams of IgG/liter. Testing of colostral quality can be done by multitude of devices including colostrometer, optical refractometer or digital refractometer.
- Livestock breeders commonly bank colostrum from their animals. Colostrum can be stored frozen but it does lose some of its inherent quality. Colostrum produced on a breeder's own premises is considered to be superior to colostrum from other sources, because it is produced by animals already exposed to (and, thus, making antibodies to) pathogens occurring on the premises. A German study reported that multiparous mares produced on average a liter (quart) of colostrum containing 70 grams of IgG.[1] In most dairy cow herds, the calves are removed from their mothers soon after birth and fed colostrum from a bottle.



Human consumption of bovine colostrum

- Assertions that colostrum consumption is of adult human benefit are questionable because most components undergo digestion in the mature stomach, including antibodies and all other proteins. Despite evidence that most components are not absorbed intact, proponents claim colostrum is useful in the treatment or prevention of a variety of illnesses.

- Bovine colostrum from pasture-fed cows contains immunoglobulins specific to many human pathogens, including *Escherichia coli, Cryptosporidium parvum, Shigella flexneri, Salmonella* species*, Staphylococcus* species, and rotavirus (which causes diarrhea in infants). Before the development of antibiotics, colostrum was the main source of immunoglobulins used to fight infections. In fact, when Albert Sabin made his first oral vaccine against polio, the immunoglobulin he used came from bovine colostrum. When antibiotics began to appear, interest in colostrum waned, but, now that antibiotic-resistant strains of pathogens have developed, interest is once again returning to natural alternatives to antibiotics, namely, colostrum.

Solidified colostrum in a sweet stall, Salem, Tamil Nadu.

Molozyvo – a traditional dish of Ukrainian cuisine. It is a sweet cheese made of cow colostrum.

- Some athletes have used colostrum in an attempt to improve their performance,decrease recovery time,and prevent sickness during peak performance levels. Supplementation with bovine colostrum, 20 grams per day (g/d), in combination with exercise training for 8 wk may increase bone-free lean body mass in active men and women

Hyperimmune colostrum

- Hyperimmune colostrum was an early attempt to boost the effectiveness of natural bovine colostrum by immunizing cows with a specific pathogen and then collecting the colostrum after the cow gave birth. This initially appeared very promising as antibodies did appear towards the specific pathogens or antigens that were used in the original challenge. However, upon closer examination and comparison, it was found that IgG levels in natural colostrum towards 19 specific human pathogens were just as high as in hyperimmune colostrum, and natural colostrum nearly always had higher antibody titers than did the hyperimmune version.

Proline-rich polypeptides

- These small immune signaling peptides (PRPs) were independently discovered in colostrum and other sources, such as blood plasma, in the United States, and Poland. Hence they appear under various names in the literature, including Colostrinin, CLN, transfer factor and PRP. They function as signal transducing molecules that have the unique effect of modulating the immune system, turning it up when the body comes under attack from pathogens or other disease agents, and damping it when the danger is eliminated or neutralized. At first thought to actually transfer immunity from one immune system to another, it now appears that PRPs simply stimulate cell-mediated immunity.

Conclusion

Colostrum usually has orange or bright yellow, because in its composition contains a large amount of white blood cells and other anti-infective proteins. White blood cells are protective white cells that destroy the "evil" bacteria and viruses.