International Journal of Pharmaceutical Science and Research
www.pharmacyjournal.net
ISSN: 2455-4685
Received: 15-03-2022, Accepted: 01-04-2022, Published: 16-04-2022
Volume 7, Issue 2, 2022, Page No. 6-10

Pharmaceutical applications colostrums as review

Apeksha V Masal*, Dnyaneshwari Kadam, Amit Pawar, Dipali Narawde, Jyoti More
Agriculture Development Trust's Shardabai Pawar Institute of Pharmaceutical Science and Research, Shardanagar, Baramati, Maharashtra, India

Abstract
Colostrum is initial milk, highly nutritive secreted by mammals following parturition. The physiochemical property of colostrum is highly dynamic and variable. It is recommended to neonates must ingest colostrum for developing the passive immunity. The placental structure and transfer of immunity in utero, ingestion of colostrum after birth also confers provide additional protection by binding to the intestinal receptor which could otherwise be bound by the bacteria moreover, the adequate quantity colostrums can be reduce the neonatal death mortality the strong strength then immunity and increase animal life span but the delaying intake of colostrum in dairy calves can causes decreased transport of both immunoglobulin's and fat soluble vitamins. In this article understanding the composition of colostrums, i.e. fat, proteins, lactose oligosaccharide, vitamins, minerals, growth factor, and nucleotide and its benefits to health of animals.

Keywords: immunoglobulin's, colostrum, health

Introduction
Milk is fluid from which secrete by the different type species of the mammals it use to provide all nutritional value to the new born animals, colostrum also have number of physiological importance and function. After the parturition, mammary gland starts to produce the colostrum. Colostrum is the first feed to new born which is reach in immunoglobulin and many other nutritional substances. In case of dairy calves born with out any acquired immunity, so there is no transfer of immunoglobulin through the placenta, that means for the new born calves, acquired immunity passively by consuming the colostrum IgG. In the initial days of neonates required energy and protein, fats and some growth factor it also confers additional protection by binding to intestinal receptors.
It reduces neonatal mortality strength immunity and increases a animal life period. Declined intake of the colostrum in a dairy calves causes decrease transportation of both immunoglobulin's as well as fat soluble vitamins. Colostrum helps to human being in two main ways
1. Its multiple immune factor and natural antibiotics.
2. Its many growth factor, to improve health and healing

Historically colostrum used to treat various illnesses in India as well as abroad. Ayurvedic physician of India use bovine colostrum for both medicinal and religious purpose. In 20th century it was noted that level of antibody in first milk produce after birth higher than milk that was produce 72 hours later. colostrum contain within 24 fats, and micronutrient like vitamins and minerals. Both human and bovine colostrum a complete healthy diet gives us all essential nutrients to the new born during initial phase of life.

Composition of Colostrum [1, 18]
Colostrum have the most importance natural substances help to athletes. Achieves their expected results. This reviews concluded that many research shows that colostrum. Can helps to increases body strength and capacity to build lean muscle mass, burn body fat and boost immune function. Also colostrum have many more importance regarding health colostrum contains the growth factors that help builds lean muscle that including insulin like growth factors (IGF-1& IGF-2) And growth hormone (GH). IGF1 which is found naturally in colostrum is the only natural hormone capable of promoting muscle growth by itself.
The IGF in humans and cows are identical but bovine colostrum actually contains greater concentration of IGF-I than human colostrum. The growth factors in colostrum ''shift fuel utilization from carbohydrate to fat that including fat made from the carbohydrate and protein that are consumed producing fuel for body more efficiently.

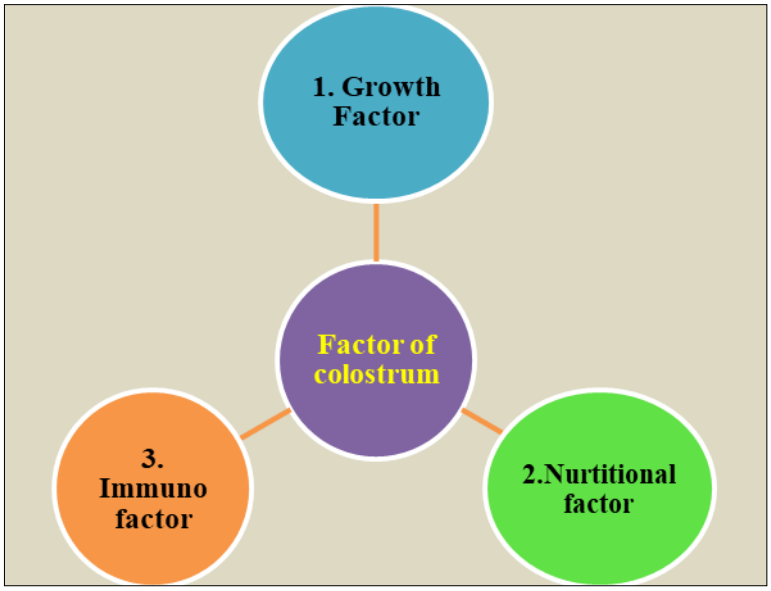

Fig 1: Factors of Colostrum

Physical properties of Colostrum [5, 7, 8, 9, 12, 13, 15, 16, 17, 21]

1. PH and buffering

The pH of colostrum is less than that the normal lactations milk, pH of colostrum at parturition ranged from 6.0 to 6.67 average PH 6.32 pH of colostrum is less initially and increased with time post-partum. less PH of colostrum increases concentration of protein, citrate, carbon dioxide. The buffering capacity of colostrum was greater than that the milk and decreased during the first for milking. milk are soluble with phosphate, colloidal calcium phosphate, citrate carbonate proteins. Colostrum has a reddish yellow color due to presence of carotenoids.red color of colostrum is due to the RBC blood of colostrum affected its color, hence the sample to the darker less yellow and more red. Color of colostrum change with after calving it become lighter less red and less yellow.

2. Properties of casein micelles

Colostrum and early lactation milk contain very large micells in diameter of 600nm the average diameter of casein micelles was constant within the first 90 days of lactation.The increase size of casein in colostrum due to high protein (casein) Ca (especially Ca2+) concentration. Percentage of individual casein in a colostrum the period of first eight milking post-partum, percentage of alpha-s increase percentage if beta-s beta casein remains stable and percentage of K-casein decrease over after calving. The proportion of alpha-s and beta casein decrease with decreasing micelle size while that of K-casein increase because K-casein is inversely proportional micelle size. Beta-casein percentage increase during first two month of lactation. K-casein was unaffected at stage of lactation.

3. Rennet coagulation properties

Two milk coagulation parameters rennet coagulation time (RCT-time in minutes)and crud firmness (E30 t= diagram width in mm, 30 minutes after rennnet addition. RCT of colostrum from days 2to 7was shorter than on Subsequent day. A modification of reserved phase high performance liquid chromatography are a method used to separate and qualify the major milk proteins.

4. Somatic cell count

Somatic cell count of colostrum is higher then that milk. The somatic cell was higher during first 2 weeks after calving. somatic cell count raise in early lactation. somatic cell count of colostrums on day 2 was 1,479,000 cells ml -1.somatic cell count of colostrums was high at begain and decreased gently over the first 132 h after parturition.

5. Thermal processing of colostrum

Heart treatment and irradiation reduce anti-bacterial growth or kill microorganism. Thermal processing decrease endogenous bacteria and IgG levels. Thermal processing reduced bioactive and combined gentle pasteurization and gamma-irradiation improved BC sterility and bioactive, relative to standard pasteurization of colostrums used for milk reduces native Ig concentration and increase viscosity. Pasteurization of bovine colostrums with gamma- irradiation 63 degree calsius for 3 min heating of colostrums to 60 degree Celsius for 120 min was enough to decrease the level of viable mycoplasma bovis, *Mycoplasma bovis, Listeria monocytogenes, Escherichia cili, Salmonella enteritidis, mycoplasma avium.*

6. FTIR of Colostrum

IR absorption spectrum of Colostrumwas recorded by potassium bromide dispersion. Where in 1-2 mg of sample and potassium bromide was mixed uniformly and powder blend in sample holder, comprising into discs by applying a pressure of tone for 5 minutes in a hydraulic press and an IR spectrum was recorded.

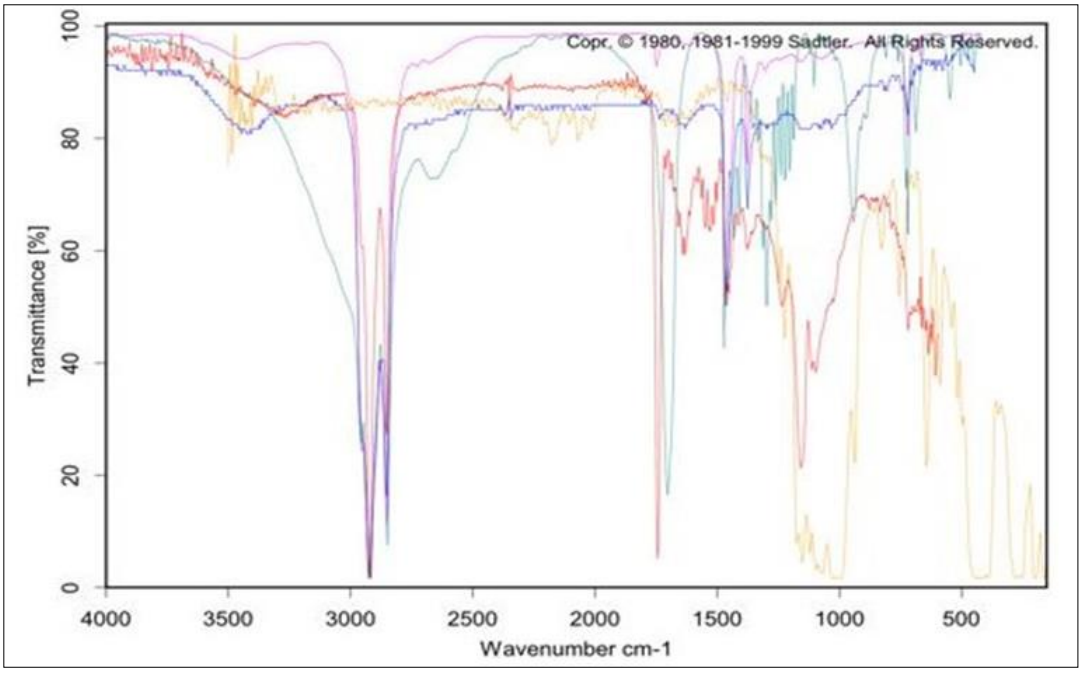

Fig 2: FTIR of Colostrum

Composition of Colostrum [1, 14, 18]

1. Nutritional Factor in Human Colostrum & Bovine Colostrum

Per100ML of colostrum

Table 1: Nutritional Factor in Human Colostrum & Bovine Colostrum

Nutritional Factors	Human colostrums	Bovine Colostrum
Energy (KCL)	58	-130
Protein (g)	3.7	-14.9
Lactose (g)	5.3	-2.9
Fat (g)	2.9	-6.7

2. Growth factors in human colostrum and bovine colostrum

Table 2: Growth Factor In Human Colostrum & Bovine Colostrum

Growth factors	Human colostrum	Bovine colostrum
Epidermal growth factors (EGF)	200mcg/l	30-50mcg/l
Transforming growth factor alpha(TGF)	2.2-7.2mcg/l	2-7.2mcg/l
Transforming growth factor beta (TGF)	20-40mg/l	1 -2 mcg/l
Insuline like growth factor (IGF)	18mg/l	10mg/l
Vascular endothelial growth factors(VEGF)	75mcg/l	NA

1. Immune factors in human colostrum and bovine colostrum:

Table 3: Immune Factor In Human Colostrum & Bovine Colostrum

Immune factor	Human colostrum	Bovine colostrum
Lactoferrin	700	100
IgA	17.35	3.9
IgG	0.43	47.6
IgG2	-	2.9
IgM	1.59	4.2

2. Marketed Bovine Colostrum Supplements/ (Pharmaceutical Products)

Table 4: Marketed Bovine Colostrum Supplements/ (Pharmaceutical Products)

Name / brand name	Form	Contents	Serving size
B-colostrum biostrum nutritech private limited	Capsule	IgA, IgD, IgE, IgG	4-6Capsule
Symbiotics colostrum plus powder	Powder	Bovine colostrum phospholipids	3g
Zenith nutritation colostrum 300mg	Capsule	IgA,IgD,IgG,IgM	2capsule

Pharmaceutical Application of Colostrums [2, 4, 20, 22]

- **Importance of Igf-I In Lean Muscle Growth:** Colostrum is the most important natural substance which helps the body builders and athletes to reach their desired action. Various studies proves that colostrum helps in increase strength and tolerance, build lean muscle, burn body fats. Colostrum consist of the growth factors that helps in build lean muscle, mainly includes insulin like growth factors [IGF-I, IGF-II and growth hormones (GH)]. IGF-I is present in bovine colostrum is higher than the human colostrum.

- **Role of Igf-I In Lean Muscle Growth:** Due to its role in stimulating and increase in muscle volume and mass (Hypertrophy), IGF-I is important in building muscle and improving overall body composition. Mainly two mechanism involve in muscle mass increasing hypertropy or increase in myofibre number. Generally number of fibre in muscle is fixed. New myofibres may also form as a result of fusion of satellite cell and small myotubules and myofibres. IGF-I stimulating the proliferation and differentiation of muscles steam cell. Hence no of fibles in muscles increases and size of lean muscle also increases.

- **Role of Colostrum in Treatment Cancer:** Cancer is a second leading cause of death in the world after cardiovascular disease. Cancer is a disease in which bodies cells divide in uncontrolled manner, resulting in a tumor or carcinoma. Mainly two types of cancer; benign tumor and malignant tumor. Malignant cancer cells spread nearby tissue or organs and can travel to various places in the body part through blood. Millions of people suffering from this diseases. In present time cancer is treated by chemotherapy, radiotherapy, bone marrow transplantation and surgery. But this treatment methods have an limitations and drawbacks like radiation therapy causes indirect damage of surrounding tissue and chemotherapy results in vital organ toxicity and also these therapies are very costly hence there is a need of cost-effective and safe treatment against the cancer. In the clinical trials of colostrum, is was found that colostrum contains an anticancer agents. Colostrum contains the lactoferrin, proline rich polypeptides, conjugated linolenic acid (CLA) and alpha-lactalbumin. Which shows, antibacterial, antiviral, antitumor activity, so now a days the use of colostrum in cancer treatment is increased because colostrum is naturally occurring substance and it is nontoxic and chemical free substance and also it is easily available and cost is also less.

Uses of Colostrum in Treatment of Inflammatory Bowel Disease (Ibd)

- Inflammatory bowel disease (IBD) is a group of disorders that causes chronic inflammation (pain and swelling) in intestine. IBD includes mainly two diseases, first one is crohn's disease and second is ulcerative colitis both disease affect the digestive system.
- Crohn's disease – Mainly cause the swelling and pain in the digestive tract. It can affect any part from the mouth to anus.
- Ulcerative colitis – Causes swelling and sores (ulcers) in the large intestine (colon and rectum). These diseases mainly causes due to immune system response to fight with infection, whenever immune system fights off with infection then this diseases occurs.
- Current medical therapy is not the complete effective in treatment of IBD the BC contains number of bioactive molecules and immune factors. Immune factors present in the colostrum which boost the immune system and help the immune system to fighting against the infection.

Effects of Colostrum in Helicobacter Pylori Infection Treatment

- Helicobacter pylori is the bacteria that causes infection in stomach. It is the main cause of peptic ulcer and it can also cause gastric and stomach cancer.
- H. Pylori bacteria needs lipid to attach with gastric mucosa of the gastrointestinal tract,Various studies shows that the colostrum has an ability to stop the infection of the H.Pylori bacterial infection by stopping the attachment of bacteria with the mucosa of the gastrointestinal tract,hence colostrum is also useful in the H.Pylori bacterial infection.

Conclusion

The composition of the colostrum is different than the milk. Milk increase the interest of colostrum to health, which contains higher level of immunoglobulin. The immunoglobulin which provides passive immunity to the young born calf, and improve their health. This review paper has collected the published literature on the composition, physical properties and pharmaceutical application of colostrums.

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