



## **A Review on Antibacterial Activity of Human Lactating Milk**

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### **ABSTRACT**

*Human Milk has been used to feed preterm newborn and has evidence of having many beneficial effects. Despite of this, human milk has also been associated with transmission of number of infections. Antibacterial activities handle the protection of newborn against extensive variety diseases. Along with these, there are other possible factors within breast milk which support or act in concert with the infant's innate immune system including bifidus factor, lysozyme, Lactoperoxidase, lactoferrin, lipoprotein lipase and even epidermal growth factors, that may stimulate the maturation of the gastrointestinal epithelium as a barrier. Breast feeding from mother can reduce the incidence but also the severity of respiratory infections gastrointestinal in the suckling neonate by supplying more protective factors to the infant's mucosal surfaces.*

*Keywords: Human Lactating Milk, bifidus factor, lysozyme, Lactoperoxidase, lactoferrin*

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### **INTRODUCTION**

Breast milk, often known as human lactating milk, is generated by mamilla in the female breast. It is the newborn's principal source of nutrition. Breast Milk has Protein, Carbohydrate fat, as well as a variety of minerals and vitamins. It also contains important elements for infection and inflammation protection, as well as contributing to the immune system and gut microbiome's healthy development [1].

The milk composition changes with time, both during a single meal and over lactation. After delivery, the mammary gland generates colostrum for the first several days. It's a thin yellowish fluid that's similar to what comes out of the breasts during pregnancy. Colostrum is high in antibodies giving the baby immunity [2][3].

From day ten today seven, the amount of immune globulin protein in human breast milk is still high, after giving birth. Human milk has a protein content of 0.8 to 0.9 percent, a fat content of 4.5 percent, a carbohydrate content of 7.1 percent, and an ash content of 0.2 percent (minerals) [4]. Lactose is the most common carbohydrate; numerous lactose-based oligosaccharides are insignificant components. The fragments of fat contains particular palmitic and monounsaturated fatty acid triglycerides, as well as lipids containing trans links [5].

Breast milk is fertile. It contains up to six hundred different species of bacteria including the beneficial *Bifidobacterium spp.*, which help the child's gut settle. It is labelled as a probiotic food, hang on how "probiotic" is defined. Breast lactating milk also contains a different body cells and stem cells, therefore the quantity of each cell type varies from one person to the next [6][7][8].

Human lactating milk has been shown in several studies to have good effects on newborns. The benefits of mother's breastmilk exceed providing a steady supply of nutrients that match the child's dietary demands [12]. It also contains substances with bioactive properties that protect the kid against infections and disease through a variety of processes, which include promoting immune system development, pharmacological and antibiotic action, and tissue growth and development [13][14].

Evidence both high- and low income individuals nations shows that raw milk consumption protects against a large variety of infectious diseases illnesses, including otitis, diarrhoea, NEC and tract

infections[15][16].The evidence regarding milk's health advantages is minimal, but studies have demonstrated that Donor milk is beneficial to premature newborns since it minimises the risk of infection. developing inflammatory disease when compared to formula milk[17].

#### **Lactating Milk and Antibacterial Activity**

Antibacterial action in human lactating milk or breast milk is due to protective components that work together additively and synergistically. Oligosaccharides and milk glycoproteins like lactoferrin can also inhibit this from attaching to cellular receptors and coreceptors[20][22]. When it comes to reducing morbidity and mortality from infectious diseases, breast feeding has a larger impact. Diarrhea is one of the most infectious diseases, resulting in an estimated fifty lakh Children's deaths per year under the age of five, with 80% of deaths occurring in the first two years of life[10]. Lactating milk has been found to suppress enteropathogenic bacteria when examined in vitro assay methods[14][15][16].

Isolates of *Escherichia coli* also show a significant decrease in growth with breast milk. Breast milk inhibits the growth of enteric pathogens, demonstrating Humans play a protective function breast milk against gastrointestinal infections, which is supported by WHO (World Health Organization) records of lower Diarrheal illness prevalence and severity in breast-fed infants set against artificially fed newborn in the 1<sup>st</sup> six months of life.

It has recently been postulated that immunological factors in It's possible that breast milk takes a part in one of human lactating milk's most essential and unique qualities, namely the dynamic diversity of its nutritional, bioactive, and functional components[9].

Human milk colostrums contain a large amount of IgA[11].IgA, which is created when bacteria, food, and other antigenic substances pass through the stomach by the mother and prevents bacteria ,viruses from attaching to the mucosal epithelial cells and causing infection[16]. Furthermore, being the major protein in human milk , lactoferrin is an necessary element of breast milk. It serves as a microbicidal agent, destroying bacteria and viruses, and so contributes to the protective aspect of breast milk[12].

In general, two methods have been proposed to explain the inhibiting effect of human milk, one in which certain components may protect the newborn against infection, and the other, It has ingredients that may protect the newborn from illness. The first proposed mechanism is the combination of several factors constituents in drain with epithelial surfaces or particular elements within thegastrointestinal lumen amid drain integration, whereas the moment proposed component is the conceivable tweak of the infant's resistant framework by defensive components in drain, coming about in particular production of resistant components within the newborn child[13].

#### **Lactating Milk and Glycerol monolaurate(GML)**

Researchers from National Jewish Health and the Iowa University discovered a component in human breast milk which protects against dangerous germs while enabling healthy bacteria to grow.GML is a low-cost material to produce.Antibiotics can help newborns with bacterial illnesses, but they can kill the good bacteria along with the bad.GML mainly prevents harmful bacteria, allowing beneficial species to survive. Human breast milk lost its antibacterial property against *S. aureus* after GML was removed. GML became antibacterial when it was added to cow's milk[18].

The researchers discovered that human lactating milk has a greater amount of GML than cow's milk, and that it inhibits the growth of harmful microorganisms *Bacillus subtilis*, *Staphylococcus aureus*, and *Clostridium perfringens*, but neither cow's milk nor infant formula had any impact. The beneficial bacterium *Enterococcus faecilis* was not eliminated by human lactating milk.Babies who are fed human breast milk have higher quantities of beneficial bacteria such as *bifidobacteria*, *lactobacilli*, and *enterococci*.

#### **Lactating Milk and Pasteurization**

Preterm newborns' brain adolescence and respiratory trouble avoid them from feeding at their mothers' breasts in the early neonatal period, thus they are given human milk throughgastric feeding tube.Mother's milk was purified before use due to the well-researched dangers of bacterial defilement of communicated human drain and the visit release of cytomegalovirus amid breastfeeding [19][20].

The pasteurization procedure isn't optimal for breast milk, and it's still a heated issue in NICUs all over the world. The heat disable of bacteria invariably effects in a large loss of valuable proteins in breast milk. Despite the fact that various studies have revealed lower amounts of lysozyme[22], secretory IgA, lactoferrin, lactoperoxidase [18], and CD14 after pasteurization, further research is needed to determine how much large antibacterial ability of human lactating milk is conserved after pasteurization. In addition to the work by Silvestre et al., who found that fresh human milk that hasn't been fortified showed inhibitory effect against *E. coli* growth that is lost following pasteurization [14].Pasteurization's influence on breast milk's antibacterial capabilities against Gram +ve and Gram -ve bacteria is being investigated[15].

## CONCLUSION

Breast milk is effective against various pathogenic microorganisms. It protects the neonatal against *Pseudomonas aeruginosa*, *E. coli* and many other potent microbes. It is evidence that breast milk can help to care conjunctivitis or can potentially combat some of the bacteria causes neonatal eye infection. The preventive function of breast milk opposed to urinary tract infections (UTI). Also, it is having a deleterious effect against *Klebsiella pneumoniae*. The human breast milk increases the immunological responses in the infants and highly potent to kill the gastrointestinal pathogens. Therefore, the highlights of review suggest the high use of lactating milk to the infants instead of posturized milk.

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