

Cow Milk and Human Health-A Review

*Sanjiv Kumar**, *Kaushal Kumar*, *Sushma Suman*, *Pankaj Kumar*¹

Department of Pathology, Bihar Veterinary College, Patna, Bihar-800014, India

¹ICAR-RCER, Patna, Bihar-800014, India

Abstract

The milk of every species of mammal is unique and specifically tailored to the requirements of that animal. For example, cows' milk is three to four times richer in protein than human milk. It has five to seven times the mineral content. However, it is markedly deficient in essential fatty acids when compared to human mothers' milk. Mothers' milk has six to ten times as much of the essential fatty acids, especially linoleic acid (incidentally, skimmed cow's milk has no linoleic acid). It simply is not designed for humans. Except for domesticated animals to which we feed milk, humans are the only species that drinks the breast milk of another species, and the only species that continues to drink breast milk into adulthood. Today the top producers give ten times more milk. How was this accomplished? Drugs, antibiotics, hormones, forced feeding plans and specialized breeding; that's how.

Keywords: Cow's milk, linoleic acid, lactose

***Author for Correspondence** E-mail: mrsanvet@rediffmail.com

INTRODUCTION

Composition of milk of every mammalian species is unique in its sense and specifically designed in order to meet the requirements of that particular mammal species. It is very likely that the milk of one species may not suit the requirements of another species and even be harmful to them. Humans, not only the infants but also the adults, are the only species that drink the milk of another species, particularly cow's milk. But it should be noted that cows' milk has a different composition than human milk. For example, it contains three to four times more protein and five to seven times high mineral content than human milk. This excess of nutrients is useless and even proves harmful to humans if consumed.

Furthermore, it is strikingly deficient in essential fatty acids when compared to human milk. Human milk has six to ten times as much of the essential fatty acids, especially linoleic acid. Thus, cow milk is not designed for humans. Apart from this, to feed the increasing requirement and make profitable business today some progressive farmers are indiscriminately using the drugs, antibiotics, hormones, forced feeding plans and specialized breeding plan to enhance milk

production. This all further aggravates the condition as many of these additives are having serious adverse effects on both animals and consumers. The contamination in milk due to mismanagement or so further deteriorates the quality of milk.

Contaminants in Milk

Contaminants in milk are a serious worry. Bovine growth hormone or *BGH* [1], a genetically engineered drug is being administered to cows by some progressive farmers to enhance milk production. Use of *rBGH* has shown to increase the milk production by even 20%. But it adversely affect human health by stimulating more production of Insulin-like Growth Factor-1 (*IGF-1*) which is responsible for breast cancer by transformation of normal breast cells into tumorous one.

These breast tumors are very serious for life as they are of malignant i.e. they have the ability to metastasize at remote organs and also invade into surrounding tissues to further grow and increase in number. As it is well-known that the malignant tumors are dangerous for life in comparison to benign tumors, which are usually non-fatal. *rBGH* is also found to

increase susceptibility in cows for clinical mastitis by about 50–70%. These animals further require antibiotics treatment to treat mastitis. Antibiotics cause side effects to the different body organs and also damage the immune system making animal more prone to infection and further more antibiotics administration as remedy. This overuse of antibiotics causes secretion of antibiotic residues in the cow milk. Similarly other hormones like oxytocin are indiscriminately being used by the farmers for increasing let down of milk. Consumption of raw milk having oxytocin residues have been found to create hormonal imbalance and thus reproductive disorders and gynaecomastia in humans. Apart from these organo-chlorine pesticides like *pp'*-DDT and *pp'*-DDE are being used in the agriculture as seed dresser, in sanitation, against parasites etc. in the agriculture and livestock industry [2, 3]. These pesticides accumulate in the surroundings and finally reach the animal body through contaminated water and feed. After circulating in the blood they finally deposits in the adipose tissues of the body as lipid rich tissues are good for their chemical stability and persistence. From there they are finally secreted as toxins in the milk [4]. β -HCH is one of the main contaminants followed by *pp'*-DDT and *pp'*-DDE. A level of PCB several times higher is noted in cow's milk.

Along with this milk from infected cows may contain pus and blood. Milk also gets contaminated during milking with dirty hands of milkers and faecal material from the tail and perineum leading to heavy bacterial contaminations [5]. *Salmonella*, *E. coli*, and *Staphylococcus* infections can be traced easily in milk. After milking the milk is kept for long time before being distributed and utilized by consumers. At this room temperature the number of bacteria in milk multiply rapidly, increase in number and the milk quickly rots. Few of them even survive pasteurization. Example being the *Mycobacterium paratuberculosis avium* (etiological agent for Johne's diseases in animals) can cause Crohn's disease in humans (needs further study for its establishment) and *Mycobacterium tuberculosis* which cause tuberculosis in humans.

Other than bacteria, Prions, an infectious protein without any genetic apparatus which is very similar to virus and responsible for bovine spongiform encephalopathy (*BSE*) and result in *Mad cow disease* [6] have also been traced in milk. Several farmers have developed a fatal disease syndrome that resembles both *BSE* and *CJD* (Creutzfeldt-Jakob-Disease). The immuno-deficiency virus seen in cattle is closely related in structure to that of the human *AIDS* virus. Other than this few infected cow milk is also a source of bovine leukemia virus which causes blood cancers in individuals consuming this.

Proteins in Milk

Cow's milk naturally contains the large amount of protein needed for her calf. That amount of protein is not only unnecessary but unhealthy for humans. Excess protein in our diets causes calcium to leach out of our bones. This can be a cause of osteoporosis. Studies have also shown that there are certain proteins in cow's milk which acts as allergen particularly to breast fed infants. These allergens cause hypersensitivity reactions, lymphadenopathy and hepato-splenomegaly. Studies have revealed that more than 100 distinct antigens are released by digestion of cows' milk which stimulates humoral responses and formation of different antibodies.

The common problems in children are GIT disorders, acute gastrointestinal blood loss, milk borne infections, lack of minerals, abdominal pain, bedwetting, asthma, intestinal bleeding, colic and diabetes [7]. Adults can be affected with coronary deaths, hardened and narrowed arteries, kidney disorders, arthritis and the more serious questions of leukemia, lymphoma and cancer of different organs particularly genital organs. Some specific proteins in the milk may be responsible for insulin-dependent diabetes which usually begins in childhood [8]. It is probably because the cow's milk proteins stimulate the production of the antibodies which can destroy the β - cells of pancreas. When 80 to 90 percent of the insulin-producing beta cells are destroyed manifestation of diabetes starts. The number of cases is also influenced by genetic predisposition.

Sugar and Fat in Milk

Milk sugar, lactose is not easily digestible by humans and can cause GIT disorders like gas and dysentery. If digested the end products of lactose are simple sugars like glucose and galactose. Galactose is a disaccharide which needs to be broken down into monosaccharides, namely glucose. Galactose as such has been implicated in genital cancers [9] and eye problem [10].

Milk and its products except skimmed milk and non-fat products contain high amount of saturated fat and cholesterol which contribute to cardiovascular problems. It should be noted that there is no nutritional requirement for cow's milk fat to the children. Also, the cow milk is lacking in essential fatty acid like linoleic and linolenic acid.

Others

Cow's milk is a good source of calcium. Researchers from the Harvard School of Public Health revealed that more consumption of milk and other calcium-rich foods appears to be a myth to prevent the chances of osteoporosis and easy bone fractures in adult humans. Milk consumption causes more health risks to young ones, to whom whole cow's milk can contribute to deficiencies in several nutrients, including iron, essential fatty acids and vitamin E. But it is very high in vitamin D and may result in hypervitaminosis [11].

Cow's milk products are very low in iron (one-tenth of a milligram (mg) per eight-ounce) which do not meet the recommended daily allowance. In addition GIT disorders further reduces iron absorption which can be linked with anemia and intestinal bleeding in young's. There are various pediatric literature articles which showed erosions and inflammations in intestinal mucosa, bleeding and abdominal pain, diarrhea and vomiting in infants which are sensitive to cows' milk [12].

REFERENCES

1. Sudith C Juskerich, Grey Guyer C. "Bovine Growth Hormone: Human Food Safety Evaluation" *Science*. 1990; 249: 875–884p.
2. Decouring E.P., Karanaus W. PCB Exposure *in utero* and *via* Breast Milk. A Review. *J. Exp. Anal. Environ. Epidemiol.* 2000; 10: 285p.
3. Waliszewski SM, Villalobos-Pietrini R, Gómez-Arroyo S, *et al.* Persistent Organochlorine Pesticide Levels in Cow's Milk Samples from Tropical Regions of Mexico. *Food Addit Contam.* Mar 2003; 20(3): 270–5p.
4. Clark Grosvenor. Hormones and Growth Factors in Milk. *Endocrine Review*. 1992; 14: 6.
5. American Journal of Epidemiology. Diseases by Cow Milk. *Am J Epidemiol.* 1989; 130(5): 904–10p.
6. The British Medical Journal. "How Now Mad Cow?" *BMJ*. 1992; 304: 929–30p.
7. Ziegler EE, Fomon SJ, Nelson SE, *et al.* Cow Milk Feeding in Infancy: Further Observations on Blood Loss from the Gastrointestinal Tract. *J. Pediatr.* 1990; 116: 11–8p.
8. Scott FW. Cow Milk and Insulin-Dependent Diabetes Mellitus: is There a Relationship? *Am J CL in Nutr.* (1990; 51: 489–91p.
9. Cramer DW, Willett WC, Bell DA, *et al.* Galactose Consumption and Metabolism in Relation to the Risk of Ovarian Cancer. *Lancet.* (1989); 2: 66–71p.
10. Couet C., Jan P., Debry G. Lactose and Cataract in Human. A review. *J. Am. Coll. Nutr.* 1991; 10: 79–86p.
11. Jacobus CH, Holick MF, Shao Q, *et al.* Hypervitaminosis D Associated with Drinking Milk. *New Engl J Med.* 1992; 326: 1173–7p.
12. American Academy of Pediatrics, Committee on Nutrition. The Use of Whole Milk in Infancy. *Pediatrics.* (1992); 89: 1105–09p.