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A1 and A2 Type Milk A scientific Review

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Introduction

Milk is complete food as it provides almost all the need of our body. It has high nutritive value as it supplies body building proteins, bone forming minerals and health-giving vitamins and furnishes energy giving lactose and milk fat. Besides supplying certain essential fatty acids, it contains the above nutrients in an easily digestible and assimilable form. All these properties make milk an important food for pregnant mothers, growing children, adolescence, adults, invalids, convalescents and patient alike. But today if we buy milk from big market and shops the milk is mainly divided into two categories A1 type milk and A2 type milk. At the same time A2 type milk is considered more superior than the A1 type milk and also claimed that A1 type milk is harmful to our health.

What is A1 and A2 type milk?

Milk is good source of protein and there are mainly two types of protein found in milk that are casein and whey protein, which contains about 80% of the casein protein and the casein is further divided into four categories Alpha S1 (□ S1), Alpha S2(□ S2), Beta (□) and Kappa(k) casein. In which Beta casein is the second most common found casein protein after Alpha S1 casein and about 15-18 genetic variants are found in Beta casein which are allele (Genetic material). In which A1 and A2 are major allele. A1 type milk is milk in which A1 Beta casein allele are present whereas A2 type milk is milk which contains A2 Beta casein allele.

Beta casein protein is formed by joining 209 amino acids. DNA makes these amino acids. A1 Beta casein protein contains an amino acid called histidine at 67th position in 209 amino acid chain whereas A2 type Beta casein protein has amino acid called proline at 67th position. This is the important difference between these milks.

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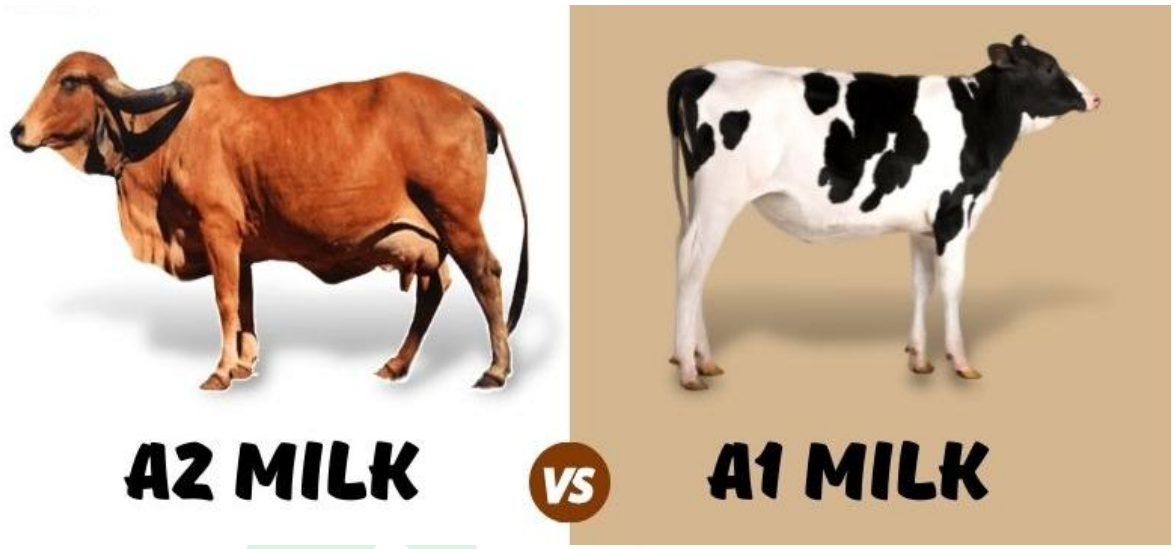

Which animal produces which type of milk?

According to International Journal of Livestock Research it has been found that Indian Desi Zebu cattle breeds and buffalo breeds has A2 type milk. While A1 type milk (in some quantity) is found in European cattle breeds like HF, Jersey, Ayrshire etc. About 15 Indian Desi Zebu cattle (Sahiwal, Red Sindhi, Gir, Tharparkar, Red kandhar, kherigarh, Kangayaon, Amritmaha, Malvi, Mewati, Kankrej,Hariana, Rathi, MalnadGirdda, Nimari) and 8 Indian buffalo (Murrah, Manipuri, Mehsana, Marthwada, Nili-Ravi, South Kanara, Assamese Swamp, pandharpuri) breeds were examined in the research and it was found that all produces A2 type milk. According to some research sheep, goat, yak, donkey (mare) and camel milk also comes under A2 type milk. Apart from this human milk also comes in A2 type milk. Thousands of years ago all cattle breeds had A2 Beta casein protein but about 10000 years ago the proline amino acid of Beta casein protein of European cow's milk changed from single point mutation to histidine and started being called A1 genetic variant.

Research also explains how crossbreeding leads to change in genetic variants. According to this research, if a native of Zebu bull crossing/ meeting an Indian cow creates A1A2 homogeneous genotype and in this same way of foreign European cattle crossing/ meeting with European bull then creates A1A1 homogeneous genotype. But if Indian Desi Zebu cattle crosses with European bull, then A1A2 heterogeneous genotype formed and if you keep this crossing for long term, then A2 can also be converted to purely A1. A similar attempt was made in India during operation flood in 1970. In which to increase milk production European bull breed (like HF, Jersey etc.) which gave more milk was crossed with Indian cattle breeds

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(Gir, Sahiwal etc.) due to which milk production was increased but due to genetic variation pure A2 milk is started converting to A1A2 regular milk. A1A2 type genetic variants contains approximately the same amount of A1 and A2 type Beta casein proteins.

Why A1 milk considered as harmful?

In the year 1990 research by the New Zealand scientist that North European cattle produces A1 type milk which is responsible for causes fatal diseases like type-1 diabetes, coronary heart disease, schizophrenia, autism, arteriosclerosis and sudden infant death syndrome etc. Whereas A2 milk which is majorly produced by the Indian cattle, Guernsey and African cattle is safe for consumption. According to research Guernsey cattle contains 90% A2 and 10%A1 type milk whereas Jersey cow contains 1/3 A1 and 2/3 A2 milk and HF cattle contains approximately same amount of A1 and A2 type milk. In this way, the percentage of A1 and A2 genetic variants in the foreign and Indian breeds varies. In 2007A1 milk was highlighted and published in book "Devil in the milk " (written by Keith Woodford) due to A1 type milk harmful health effect.

Consumption of A1 type milk is much less than A1 type milk and regular milk market share of A1 type milk is very lager than A2 type milk but after research by New Zealand scientists A1 type milk started coming on the backfoot. Whose directly benefits started to A2 type milk company (2000) /A2 Corporation Ltd (New Zealand). A2milk company started selling A2 type milk by the name of "pure A2 milk" or A1 protein free milk". Due to which both demand and price of A2 type milk increased at a very fast rate. Meanwhile Australia,

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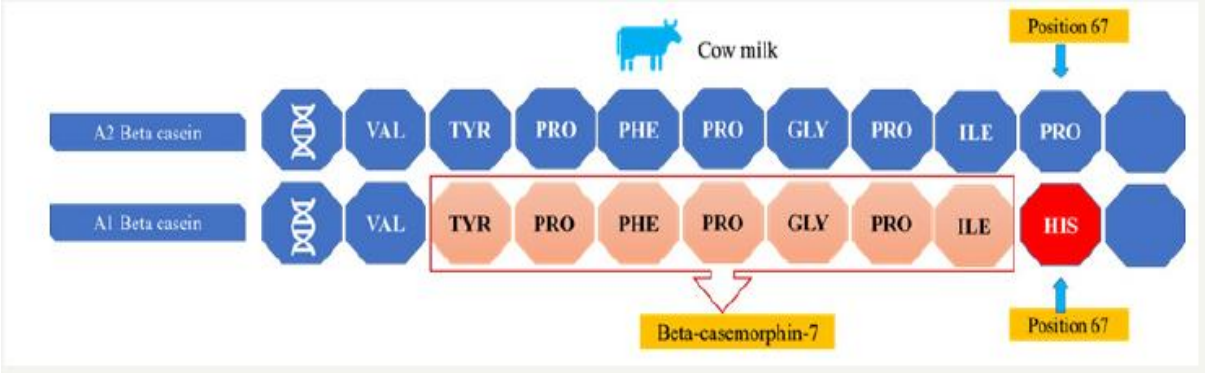
New Zealand and other European countries started doing long term crossing of Indian Desi Zebu cattle with European cattle. This leads to transition of A1 type milk of European cattle to A1A2 regular milk and finally A2 type milk. This effort was completely opposite to Operation Flood's attempt. However, in view of this serious health concern in New Zealand and Australia the European Food Safety Authority (EFSA) made scientific review in 2009 and declared that A1 type milk has no cause-and-effect relationship and A1 type milk not cause any serious diseases. However, it was reported that consumption of A1 type milk can cause some gastrointestinal or digestive problems.

According to Indian Journal of Livestock Endocrinology and Metabolism the connection with type-1 diabetes (which is due to insulin deficiency in children) and milk allergy with A1 type milk has been described. In A1 type milk at 67th position Beta casein Histidine amino acid is present and it has low enzymatic resistance. It means when A1 type milk is digested the histidine-isoleucine amino acid peptide bond is broken at 67th position due to gastrointestinal enzymes like pancreatin, pepsin, elastase etc. Action and a small protein fragment of 7 amino acid also called BCM7 goes into our body. Due to BCM7 (also called risk factor) A1 type milk declared as a harmful milk.

What is BCM7 and why it is a risk factor

BCM7 is opioid protein its full name is Beta Casomorphin-7. This protein made up of 7 amino acids and attack the receptors of brain opioid. So, it belongs to morphin. BCM7 is produced by A1 type Beta casein protein because histidine amino acid in A1 type milk is resistant gastrointestinal enzymes whereas proline in A2 type milk is more enzymatic resistant and does not allow cleavage of proline – isoleucine bond and does not allow BCM7 into body. For this reason, BCM7 is found in urine and blood of type A1 cattle and while the urine and blood of A2 type cattle is BCM7 free.



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According to research BCM7 is narcotic which acts like oxidant. BCM7 oxidizes low density lipoprotein (LDL) and produces free radicals. These free radicals have harmful effects on our immune and gastrointestinal system. According to research in Russia, BCM7 goes into blood and then it stops the development of brain and muscles in children thus BCM7 is also considered to be the cause of mental disorder and autism. In other research A1 type milk contains calcium and magnesium ratio 10:1, whereas in human milk it is 2:1. That is why magnesium is deficient in people who drink A1 type milk. Magnesium gives our body relaxation and comfort. It produces and store energy as well as improve our digestion. Due to lack of Magnesium A1 type milk became difficult to digest, whereas A2 type milk does not have any such imbalance. Hence A2 type milk more digestible. Apart from this A2 type milk which protects our body from harmful diseases. A research gas revealed that countries with A1 type milk consumption more people suffer from diabetes and heart problems at the same time pharmaceutical market in these countries also large.

Conclusion

These two categories A1 type milk and A2 type milk are only in big market and shop. Though A2 type milk is considered more superior than the A1 type milk and also claimed that A1 type milk is harmful to our health. So far there has been no such outbreak cause or any convincing evidence to prove that A1 type milk is the cause of serious diseases. Still more research needs to be done on this health issue. So that the truth behind A1 and A2 type milk can revealed.