

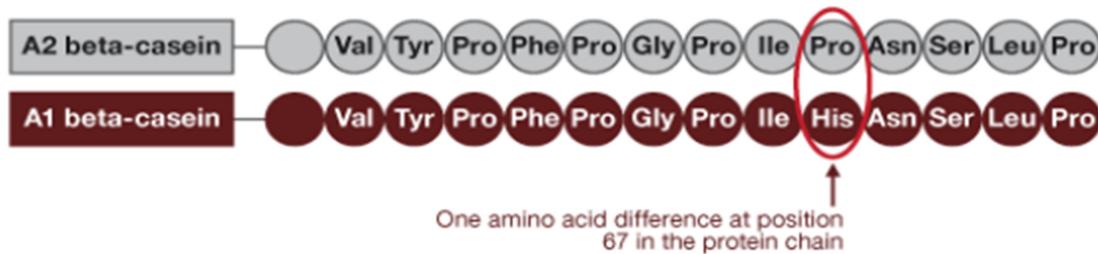


## **A2 Milk: New Perspectives for Food Technology and Human Health**

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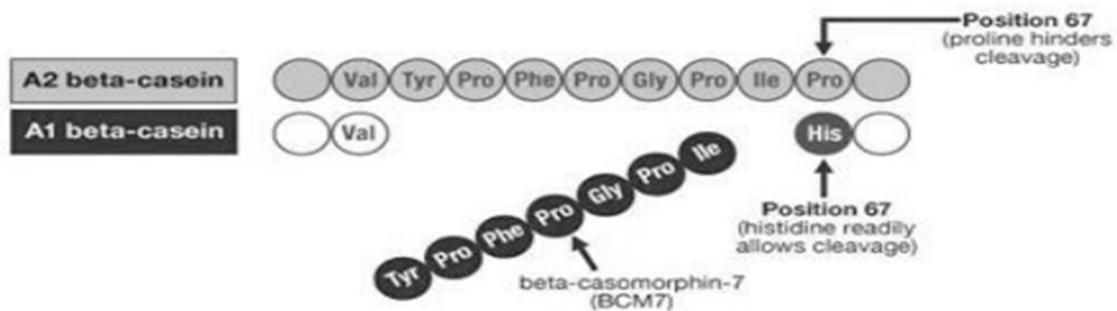
Milk has been considered as perfect food because it is an important source of nutrients and micronutrients and is the highly evolved secretion of mammary glands of mammals and is the first food in the diet of mammals, providing all the energy and nutrients necessary for growth and development in their first periods of life and it is the most perfect food for infants. India is the world's largest milk producer and consumer, yet it neither exports nor imports milk. In the recent past, there is a growing public health concern, especially regarding the food we take. Milk from dairy cows has been regarded as nature's perfect food, providing an important source of nutrients including high quality proteins, carbohydrates and selected micronutrients. More than 95% of the cow milk proteins are constituted by caseins and whey proteins. Milk has about 86% water, 4.6% lactose sugar, 3.7% triglycerides, 2.8% milk protein, 0.54% minerals and 3.36% other constituents. Milk protein constitutes of 36%  $\alpha$ -Casein, 27%  $\beta$ -Casein, 9%  $\kappa$ -casein and 27% peptides and amino acids. Among the caseins, beta casein is the second most abundant protein and has excellent nutritional balance of amino acids. Different mutations in bovine beta casein gene have led to 12 genetic variants (A1, A2, A3, B, C, D, E, F, H1, H2, I, G) and out of these A1 and A2 are the two variants of beta-casein. Beta-casein consist a chain of 229 amino acids. Milk having proline at 67th position of beta- casein amino acid chain is regarded as A2 milk and with histidine amino acid at this position is A1 milk.

**Protein chain showing amino acids in A1 and A2 beta-casein**



**Fig. 1: A1 and A2 beta casein differ only by one amino acid at 67<sup>th</sup> position in 229 amino acid chain**

The status of A1 or A2 beta casein variants from different countries have shown that the presence of A1 variant in European cattle has been linked to a range of illnesses. India is endowed with A2 rich dairy animals and since then our civilizations, have been protecting the masses from ill effects of A1 milk.



**Fig. 2: Release of BCM 7 from A1 beta casein during digestion**

Currently, A2 milk is being marketed as a healthier choice than regular milk. It is claimed to have several health benefits, and is easier to be digested for people who are lactose intolerant. **Beta-casomorphin7 (BCM7)** is the reason why regular milk is believed to be less healthy than A1 milk.

Cows producing A2 milk are known as A2 cows while those producing A1 milk are called A1 cows. The two most common forms of  $\beta$ -casein are:

**A1 $\beta$ -casein:** Milk from breeds of cows that originated in USA, North Europe and Australia is generally high in A1  $\beta$ -casein. A1 milk comes from breeds like the Holstein, Friesian, Ayrshire and British Short horn. They also called as Hybrid cows.



**Holstein**



**Ayrshire**



**Friesian**

**A2  $\beta$ -casein:** Milk that is high in A2  $\beta$ -casein is mainly found in breeds that originated in the Channel Islands and Southern France. A2 cows are old fashioned cows that are not genetically mutated. A2 cows are Malnad Gidda, Gir, Red Sindhi, Sahiwal, Kankrej, etc. Sheep, goat, yaks, buffalo, camels, donkeys and Asian cows naturally contain more A2 beta casein protein



**Malnad Gidda**



**Gir Cow**

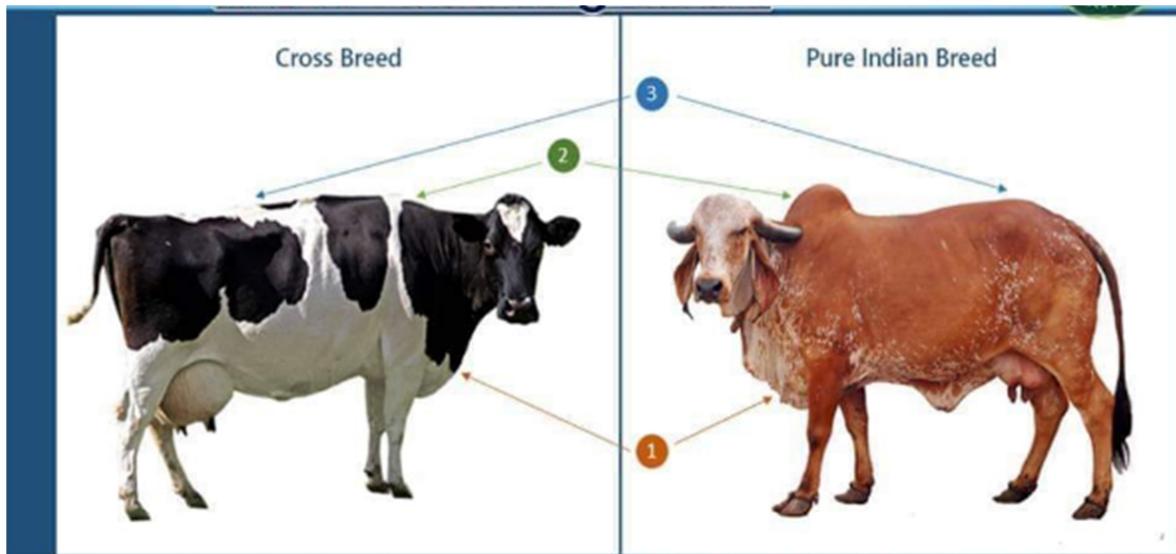


**Red Sindhi**



**Sahiwal cow**

**Difference between A1 and A2 milk producing cows**



1	This type of cows don't have flap	Indian breed of cows have flap of skin beneath their neck
2	They don't have hump	They have hump
3	Their back is straight throughout the body	Their back is curved, specially near the tail

**Difference between A1 and A2 milk**

A1 milk	A2 milk
A1 milk from foreign breeds of cow-like Jersey, Holstein	Contains A2 elements that is present only in Indian Desi cows only: Gir cow
Heavy to disease	Purest form of milk
Contains BCM-7 has been linked with	Closest to mother milk and rich in Calcium



several adverse health effects	
Causes to Diabetes	Omega 3 that cleans the cholesterol
Causes of Childhood Obesity	Protect to childhood obesity
Ghee heavy to disease	Reduce to childhood obesity
Contains A1 beta casein	Contains A2 beta casein
Genetically mutated to produce 15-20 litres of milk per day	Naturally produces 3-9 litres of milk per day
Has low nutrition Causes Bloating, Stomach Ulcer, Gas	Has Cerebrosides which increases brain power
Most people are A1 protein intolerant, not lactose intolerant	Has Strontium which enhances body immunity
Difficult to digest	Naturally easy to digest
Given growth hormone injections, antibiotics	No use of growth hormone injections, antibiotics
Have no hump that stores Vitamin D	Has hump on back which absorbs Vitamin D
Treated as Milk Making Machine	Has Colostrum like “Human Mothers milk”
Kept in unnatural and highly stressful conditions	Has Omega 3 that cleans up cholesterol deposits
Confined to small pieces	Cows, bulls and calves grow together as a family
Boosted in quantity to meet high demand of milk	Calves are fully fed first
Causes Autism, Type1 Diabetes, Sudden Infant Death Syndrome, Cardiac disease,	Cures irritable bowel symptoms



Schizophrenia	
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### **The Devil in A1 Milk**

Digestive enzymes act differently upon A1 and A2 beta-casein proteins during digestion process. Betacasomorphin-7 (BCM-7) is a bioactive seven-amino peptide is released by digestive enzymes from the A1-beta-casein protein but these enzymes cannot split the A2 protein due to presence of proline at that location. So BCM-7 is not released from A2 proteins digestion. BCM-7 interacts with the human gastrointestinal tract, internal organs, and brainstem and is regarded as the “devil” in A1 milk.

### **What adverse claims about A1 milk?**

Majority of cows that are being raised in different parts of globe are A1 variety. According to many researchers it has been found that milk produced by A1 cows have opiate like effects resulting in the development of mild to serious medical conditions. Researches also claimed A1 consumption produces adverse/ harmful health effects listed below.

When A1 protein is digested in the small intestine, it produces a peptide called beta-casomorphin-7 (BCM-7). The intestines absorb BCM-7, and it then passes into the blood. Doctors have linked BCM-7 to stomach discomfort and symptoms similar to those experienced by people with lactose intolerance. BCM-7 can affect many opioid receptors in the nervous, endocrine and immune system. Infants are more vulnerable because they have more chance of absorption of BCM-7 because of comparatively less developed gastro-intestinal tract than the adults. BCM-7 may act as an immunosuppressant and may increase the risk of Type 1 Diabetes, Coronary Heart Disease, Arteriosclerosis, and Sudden Infant Death Syndrome. It is also related



with some neurological disorders like Autism or Schizophrenia

- **Sudden Infant Death Syndrome (SIDS):** Infants death in early days is identified as sudden infant death syndrome. Instead of breastfeeding, some mothers opt for instant milk formulations to their newborns. In a study, it is claimed that high level of BCM-7 penetrates into blood causing breathing problem and reason of death in infants.
- **Type1 Diabetes:** Among children, consumption of A1 milk is the factor for development diabetes Type-1 disease. This is autoimmune disease that is characterized by inability of the body to produce insulin.
- **Autism:** Autism is a developmental disorder in children caused due to BCM-7 element in A1 milk. A study carried out on Autism victims found enormous amount of BCM-7 in urine similar to milk they consumed. Breastfed children had no such element and hence were fully developed child.
- **Heart Disease:** Regular intake of A1 milk causes coronary heart disease. The study also shows large accumulation of fats that clog and block the blood vessels resulting into heart disease.
- **Digestive Problems:** BCM-7 is an opioid peptide; protein element that does not digest in our body. This can lead to indigestion and many researches have shown that it may lead to various other problems like stomach upsets, diarrhea, flatulence, etc.

### **Benefits of A2 Milk**

A2 milk is free from the devil in milk BCM-7 and hence is safe for consumption. The populations consuming milk having more beta-casein A2 exhibit a lower occurrence of cardiovascular disease and Type 1 diabetes. People consuming A2 milk had better stool consistency, less incidence of bloating and less abdominal pain. A2 milk, sourced from indigenous Indian cows,



has been gaining popularity for its numerous health benefits over A1 milk.

- **During Pregnancy:** A2 milk contains prolin element that prevents BCM-7 to reach our body. In regular milk, prolin element is absent thereby causing health issue during pregnancy to pregnant women and also affect the child in womb. Digestion can be big problem during pregnancy and can have adverse effect on your child. In research, it has been found out that A1 or regular milk is lactose intolerant resulting in the development of unpleasant symptoms such as stomach upsets, diarrhea, flatulence like digestive problem that no one will like during pregnancy stage. Consuming A2 milk during pregnancy doesn't affect your health and child during pregnancy.

After delivery, there can be situation that mother cannot produce the milk that child requires. To produce more milk naturally, the mother can consume A2 milk as it increases breast milk production in feeding mothers.

- **Obesity Problem:** Body fats and large cholesterol deposits are root cause of Obesity. A2 milk is rich in Vitamin D and Omega 3 that removes extra body fats and cholesterol deposits.
- A2 milk has **Colostrum** has same nourishment value as **Mother's milk** required for child growth. Hence if after delivery, if mother is unable to produce milk or want alternative option to breastfeed her child, she can use A2 milk.
- A2 milk also contains **Cerebrosides** that enhances the brain power and strontium that enhances body immunity.
- Apart from this, one can also prevent migraine headaches, asthma, joint pain, thyroid, acidity, cancer by consuming A2 milk rather than A1 milk.

**Conclusion:**



A2 milk (Desi cow's milk) should only be recommended as it prevents the human beings from milk related health complications, which are due to A1 milk (Exotic cattle's milk). A2 cow milk is a healthier and more easily digestible alternative to A1 milk. Its numerous health benefits, coupled with its low allergy risk, make it a preferred choice for individuals of all ages. On the other hand, A1 milk has been associated with potential health risks, making A2 cow milk a better option for those seeking a nourishing and safe dairy option. Embracing the goodness of A2 cow milk supports our well-being and encourages sustainable and ethical dairy farming practices, ensuring the preservation of indigenous cow breeds for generations to come.

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