A choice between A1 and A2 milk type: A health concern?

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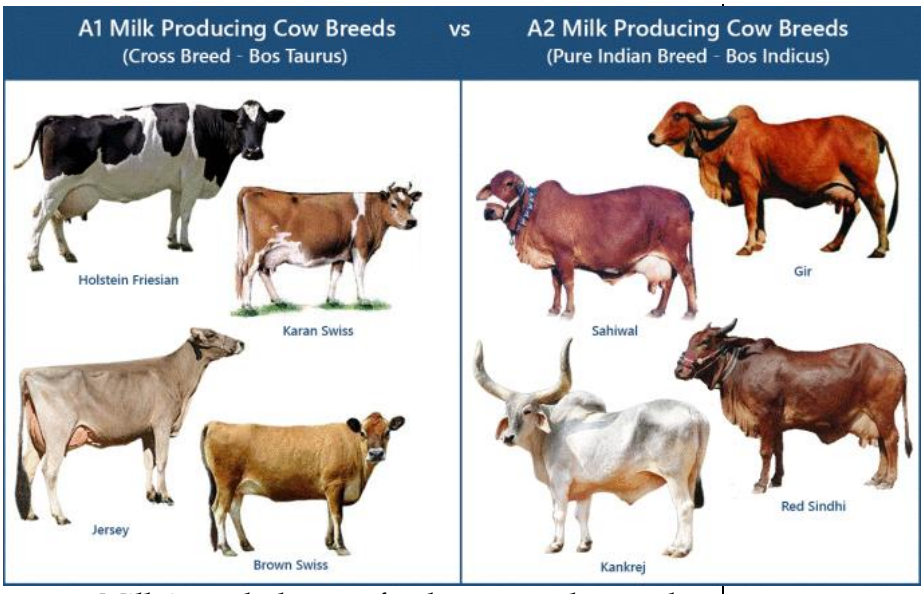
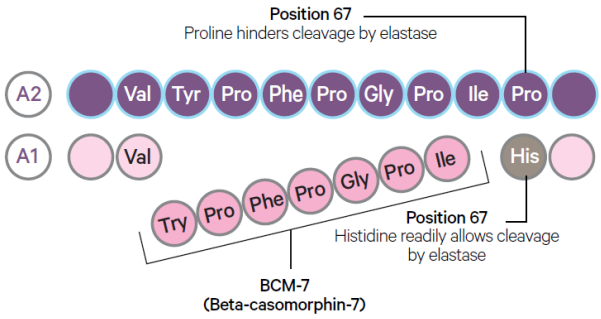


Milk is a wholesome food consumed everyday by large population irrespective of age. Throughout the world, more than six billion people consume milk and milk products. Carbohydrate, protein, fat, vitamins and minerals are important nutrients in milk. Two different types of protein in milk are whey protein and casein protein. Casein constitutes 80 per cent of the total protein present in milk and exists mainly in two forms: alpha-casein and beta-casein. Among the milk casein, beta casein holds special significance. It is reported that beta-casein protein variants not only result in generation of different group of bioactive peptides, but also has an influence on milk protein composition and milk production traits. The most common forms of beta casein in dairy cattle breeds are A1 and A2, while B is less common and A3, C are rare. The recent health concerns rising with respect to choose of milk between conventional and organic milk is related to this A1 and A2 forms of beta-casein.

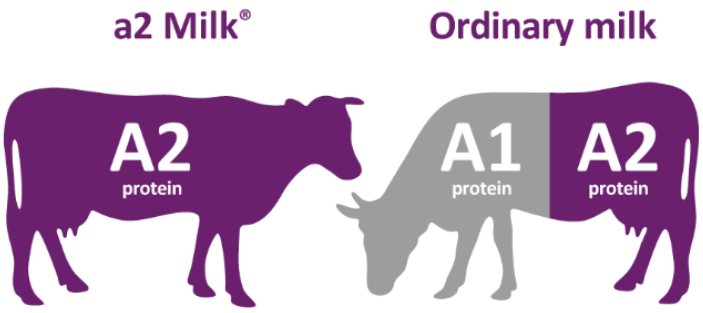
During digestion of milk, A1 milk releases a 7 amino acid bioactive peptide called beta-casomorphin 7 (BCM-7) in small intestine, while proline (type of amino acid) in A2 milk at 67 position of polypeptide chain prevents the split at this particular site and generates nine amino acid peptide BCM-9. The BCM-7 generated from A1 type milk is further broken down to BCM-5 and BCM-3 by dipeptidyl peptidase IV (DPP IV) enzyme present on surface of enterocytes or in blood. If not degraded, this peptidecross the epithelial layer and then free to exert their physiological effects on various



tissue types and cells by participating in cellular pathway.

There are literatures, which supports positive associations between A1 beta-casein to different

diseases such as type I diabetes, cardiovascular diseases, arteriosclerosis, schizophrenia and autism. But there are very less *in vivo* and *in vitro* data supporting the same. There is a need for deep investigations through human and animal trials to arrive conclusions on possible and confirmed effects of BCM-7 or A1 milk on human health. Further



* A1 and A2 proteins refer to A1 and A2 beta-casein protein types

extensive comparative research on the effects of consuming A1 and A2 milk are essential to guide the general public in making best choice between these two types of milk. However, till date there are no guidelines suggested by regulatory bodies to differentiate between A1 and A2 type milk.

Milk produced from foreign breed cow or from the mixed-race cow contains only A1 or mixture of A1 and A2 beta-casein. The percentage of modern European cattle producing A1 beta-casein varies from breed to breed. Asian and African cattle, goats, sheep, yaks and camels all produce A2 milk. Majority of the Indian native cattle produce A2 milk. Most of the crossbred cattle population in India are abundant in A2 variant. This scenario is health supportive, even if the adverse effects of A1 are authenticated.

Recently there is increase in number of dairy processing industries which are marketing organic milk or A2 milk. Though this is the promotional step towards popularizing *desi* cow breeds, the cost of A2 milk is double the price of A1 milk. Facts about possible health effects of A1 milk are unclear.As mentioned earlier, according to the studies, majority of the milk produced in India is from A2 or mixed A1 and A2 genotype cattle, hence instead of debating on A1 or A2,milk safety must be focused, which otherwise a serious health concern.

There are several factors that contribute to the type I diabetes, heart diseases, immune dysfunction and digestive issues, whereas role of consuming milk in occurrence of these diseases is still debatable. Thus, is it necessary for health-conscious consumer to give importance to the selection of A1 or A2 is of concern? or to focus on wide health promoting foods available in Indian culinary and to practice lifestyle modifications for making future days to be healthier.

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