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Impact of A1 and A2 milk on Human Health

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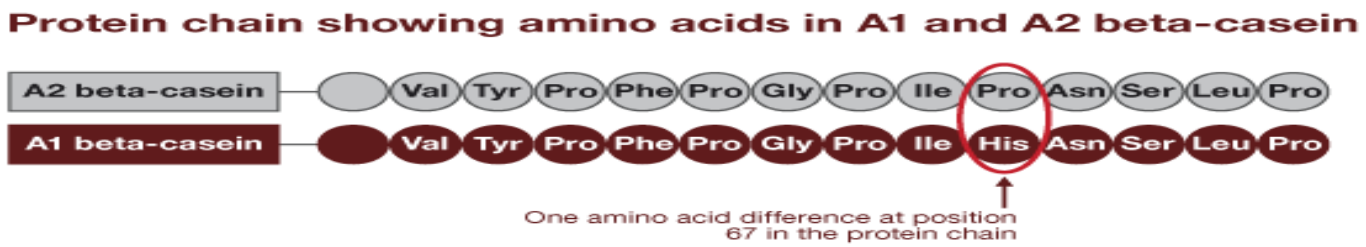
SUMMARY

Milk is an outstanding source of Nutrients and we can say that it is a complete diet Accept Iron and Vitamin C. Milk is a very good source of Calcium and Protein. Milk protein can be groped in A1 and A2. The controversy is that A1 type a cause of many health problems in human whereas other groups report beneficial effects of A1 type and declare both types of milk safe for children and adults. We all know about the present vitamins and other important nutrients in milk but the most of the people unknown about the milk protein i.e. A1 and A2. Therefore, we wanted to give focused on A1 and A2 milk in this note. The A2 is a type of protein that is present in the Indian cow and all buffalo breeds. The main purpose behind this article is to make people aware about the A2 milk and their benefits.

INTRODUCTION

Bovine milk plays a vital role in human diet and has many beneficial effects, including anticarcinogenic, immunomodulatory, antimicrobial, antihypertensive and hypo-cholesterolemic effects (Davoodi et al., 2016). Milk consists of about 87 percent water and 13 percent of milk solids constituting fat, lactose, minerals and protein (Behera et al., 2018). Proteins are important constituents of milk and account for approximately 3.5 per cent of milk components (Mishra et al., 2009). Milk proteins can be categorized into two major groups, i.e. casein and whey proteins, which account for 80 per cent and 20 per cent of milk proteins, respectively (Hoffman and Falvo, 2004). These milk proteins are products of the transcription and translation of host genes. The genes CSN1S1, CSN1S2, CSN2, and CSN3 are located on chromosome 6 of the bovine genome encode casein alpha s1, alpha s2, beta, and kappa, respectively (Rijnkels, 2002). Beta-casein a chief protein is the second most abundant protein of bovine milk that contain 229 amino acids and exhibits 12 genetic variants (A1, A2, A3, B, C, D, E, F, G, H1, H2 and I). The variants A1 and A2 are most common worldwide, followed by variant B; the remaining variants are rare (Farrell et al., 2004). The A1 and A2 varients differ only at amino acids position 67 (figure 1), which is histidine in A1 or Proline in A2 milk. Cows producing A2 milk are known as A2 cows while those producing A1 milk are called A1 cows. Cows like Jerseys, Guernsey, Asian and African cows produce A2 milk while Holstein and Ayrshire cattle breeds predominantly produce A1 milk (Woodford, 2007; www.snowvillecreamery.com). Sheep, goat, yaks, buffalo, camels, donkeys and Asian cows naturally contain more A2 beta casein protein (Briden, 2013).

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

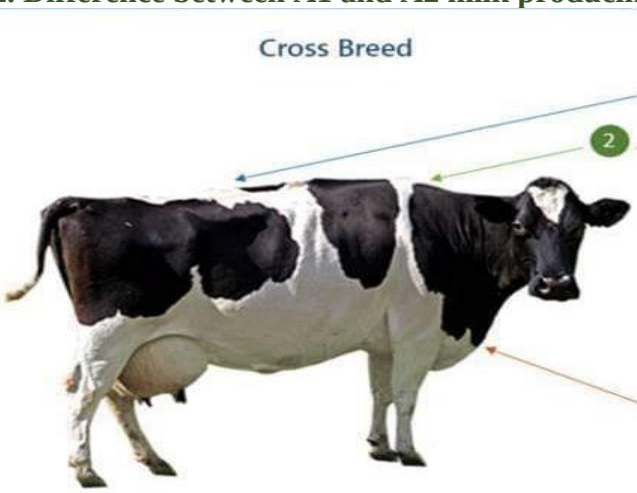


(www.drjockers.com)

A2 Producing Cattle Breeds

Most of dairy animal owners have more confusion about which cattle breed producing A2 type milk. In simple language, we can say that those cattle breed have hump, big size dewlap and curved type body at near to tail part. That type cattle produced A2 type of milk (Fig. 2) i.e. Sahiwal, Gir, Tharparkar, Red sindhi etc. On the basis of morphometric condition of cattle animal owners can be easily select cattle breeds for A2 milk. When animal owner go for animal purchasing, they should be keep in mind “hump less” cattle breed cannot produced A2 type milk.

Fig. 2. Difference between A1 and A2 milk producing cattle on the basis of body condition.

	Cross Breed	Pure Indian Breed
		
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.

Why A2 Milk is Better?

A2 milk have beta casein. The ordinary milk have BCM 7 that is Beta Casomorphin-7. BCM 7 is the peptide release by digestion of casein. Researches show that A1 milk is may be harmful. BCM 7 may affect the digestion system and BCM 7 at what extent it is absorbed is also not clear. The possibility of a very small release of BCM 7 from A2 cows cannot be totally excluded but if it occurs. The A1 cows that are found amongst herbs of European origin. In following we discuss how it effects on type 1 diabetes, heart disease, infant death and digestive problems (Kaminski et al., 2007).

Impact of A1 Milk on Health

Opioid peptides play a role in various biological processes, including respiration, analgesia, constipation and behavior in the humans. BCM-7, opioid or narcotic as well as being an oxidant it is associated with milk intolerance and play a role in development of some human diseases such as human ischemic heart disease, diabetes mellitus, atherosclerosis, schizophrenia, autism, coronary heart disease, Autistic Spectral Disorder (ASD) and Sudden Infant Death Syndrome (SIDS).

Possible Diseases (Sources: Demirel and Bahattin; 2018)

Indigestive problem, Human ischemic heart disease, Diabetes mellitus, Atherosclerosis, Schizophrenia, Coronary heart disease, Autistic spectral disorder (ASD) and Sudden infant death syndrome (SIDS)

Benefits of A2 Milk

A2 milk is free from the devil in milk BCM-7 and hence is safe for consumption (Pattanayak, 2013). The populations consuming milk having more beta-casein A2 exhibit a lower occurrence of cardiovascular disease and Type 1 diabetes (Sodhi et al., 2012). People consuming A2 milk had better stool consistency, less incidence of bloating and less abdominal pain (Ho et al., 2014).

A2 Milk Production: Indian Context

In India, most of the native cow breeds produced A2 milk which is very much safe for consumption. Several research workers have conducted study on the A1 or A2 milk status of our indigenous breeds. Mishra et al. (2009) examined 15 zebu or Indian cattle breeds namely; Kangayam, Nimari, Red Kandhari, Malnad Gidda,

Kherigarh, Malvi, Amrit Mahal, Kankrej, Gir, Sahiwal, Hariana, Tharparker, Rathi, Mewati and Red Sindhi) and 8 river buffalo breeds (Murrah, Mehsana, Marathwada, South Kanara, Manipur, Assamese Swamp, Nili Ravi and Pandharpuri) and reported the absence of A1A1 genotype. Indian cattle and buffalo breeds are reported to have 99 to 100 per cent of the A2 /A2 genotype and A1/A1 genotype is almost absent or very rare among them. A2 gene is nearly at fixation (0.987) in zebu cattle. Therefore, it can be said that our native cows and buffaloes produce safer milk than European cattle breeds (Pattanayak, 2013).

Scope for Commercialization of A2 Milk

There is vast scope for commercialization of A2 milk worldwide since demand for safe A2 milk is ever-increasing. Demand of the A2 milk and A2 producing Indian cattle breeds are rising globally in many countries like Australia, South America, Africa, Brazil and Southeast Asia (De et al., 2015). So there is an opportunity to collect A2 milk from A2 genotyped herds separately and market at premium price. A2 milk can be used to prepare baby food. Therefore, India has a prospect to become world leader in A2 infant food supply.

CONCLUSION

Milk for human health ought to be drink. But, determination of milk quality and standards to A1 and A2 milk is also required. India is fortunately bestowed with a large number of dairy cattle and buffaloes producing the healthy A2 milk. Time has come to pay attention for improvement and conservation of our indigenous germplasm. However, to establish the advantages and disadvantages of A1 vs A2 milk.

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