A2A2: IS THERE A FUTURE FOR IT IN CANADA?

	A1	A2
A1	A1A1	A1A2
A1	A1A1	A1A2

50% A1 Homozygous
50% Heterozygous

	A1	A2
A1	A1A1	A1A2
A2	A1A2	A2A2

25% A1 Homozygous
50% Heterozygous
25% A1 Homozygous

	A2	A2
A1	A1A2	A1A2
A2	A2A2	A2A2

50% A2 Homozygous
50% Heterozygous

	A2	A2
A2	A2A2	A2A2
A2	A2A2	A2A2

100% A2 Homozygous

A2 has become a rising topic of conversation in the Canadian dairy industry over the last few years. Looking towards niche market growth and the suggestion that A2 milk positively impacts digestion of lactose, producers are consistently asking Holstein Canada field staff what A2 means and if they should consider transitioning their herd to be an A2A2 herd.

What is A2?

Milk protein is made up of about 30% beta casein. There are two different types of beta casein that can be found in milk: A1 and A2. These proteins are almost identical with the exception of one amino acid, but this simple amino acid difference changes how the human body digests the beta casein protein.

This difference in digestibility is what has caused the rise in popularity of A2A2 milk (simply called A2 milk). Some researchers believe that people who suffer from a sensitivity to milk proteins (about 25% of the population) would have less of an intolerance to the A2 protein. At this point, more human trials are needed to confirm that this is the case; however, trials in which rodents are used have shown promising results.

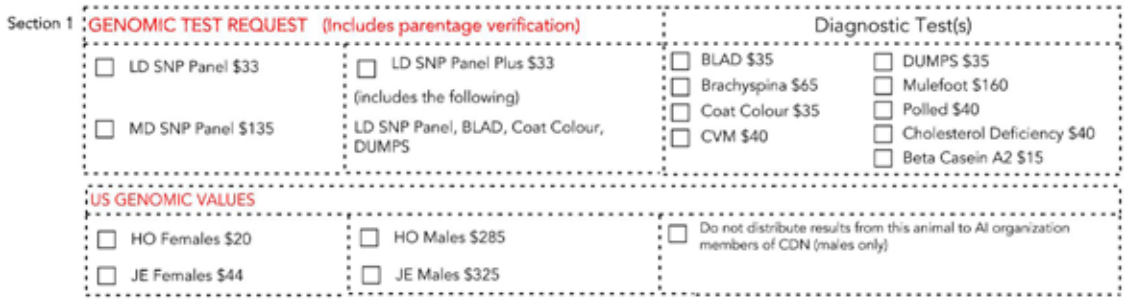
Breeding for A2 Milk

In order to have milk that would fit the A2 milk guidelines, an animal must be "homozygous" for the A2 protein. Homozygous means that the animal carries two copies of the same "allele", a variant on the given gene. An animal that is homozygous and that will produce A2 milk will have both A2 alleles, and it must be born of parents that are either A2 homozygous or carry the gene. Several breeds demonstrate more frequency to homozygous A2 than Holsteins, including Jersey, Guernsey and Brown Swiss. Like all genetic progress, breeding for A2 homozygous animals can take time. There are a few breeding combinations which will result in A2 homozygous in the first generation of offspring. However, for most animals it can take several generations to get an A2A2 animal, as the probability of having an A2 homozygous offspring varies greatly with the dam and sire.

Though many producers are moving towards an A2 herd through the use of A2 sires, it is important to consider the current sire population. Only an estimated 35% of Holstein sires are A2 homozygous, and selecting for these bulls can result in a significant genetic cost. Limiting your sire selection to only 35% of the population will lower the genetic diversity and increase the inbreeding value within your herd, which can lead to negative impacts on production, fertility, and conformation. Staying informed while mating your herd is a best practice to ensuring you accomplish your breeding goals while maintaining herd health.

My A2 Status

A2 is a protein in the milk, meaning the naked eye cannot identify which animals within the herd are A2 homozygous or A2 carriers. To determine whether your animals are A2 homozygous or carriers of the gene, you can have a specific form of genetic testing done to determine the beta caseins in an animal. Similar to a genomic test, a hair or tissue sample is needed, and the lab looks at a specific section of the DNA to determine which genes are present. The test costs $15, and can be done in addition to a genomic test or as a singular test on its own. Similar to a genomic test, a genotyping request form needs to be completed and sent with a sample to Holstein Canada.



Section 1 GENOMIC TEST REQUEST (Includes parentage verification)

- ☐ LD SNP Panel $33
- ☐ MD SNP Panel $135
- ☐ LD SNP Panel Plus $33 (includes the following) LD SNP Panel, BLAD, Coat Colour, DUMPS

Diagnostic Test(s)

- ☐ BLAD $35
- ☐ Brachyspina $65
- ☐ Coat Colour $35
- ☐ CVM $40
- ☐ DUMPS $35
- ☐ Mulefoot $160
- ☐ Polled $40
- ☐ Cholesterol Deficiency $40
- ☐ Beta Casein A2 $15

US GENOMIC VALUES

- ☐ HO Females $20
- ☐ JE Females $44
- ☐ HO Males $285
- ☐ JE Males $325
- ☐ Do not distribute results from this animal to AI organization members of CDN (males only)

A2: A Niche Market

A2 milk has become a large market in Australia and New Zealand, especially as brands like The a2 Milk Company become more highly distributed. The a2 Milk Company is currently the largest distributor of A2 milk in the world; currently in Australia, the company makes up 10% of the fresh milk market share and 32% market share of infant formula*! The a2 Milk Company now distributes to New Zealand, China, the United Kingdom and the United States. Since the introduction of A2 milk in the American market, all milk that is marketed by The a2 Milk Company is also certified with Validus Certification, requiring it to maintain several animal welfare standards. Some areas of the U.S. are starting to pay farmers premiums for A2 milk.

In Canada, all milk from all breeds is combined at the major processors, ensuring consistency in the quality of the milk sold from coast to coast. Currently there are only a few places where people can find A2A2 milk in Canada, as there are no large-scale processors strictly for A2A2. Canadian A2 milk comes from smaller, typically family-run processing facilities. A select group of private processors are distributing through niche grocery stores.

Sheldon Creek Dairy in Loretto, Ontario was the first farm in Canada to produce 100% A2 milk. As certified A2 milk cannot contain any A1 protein, the robot milkers divert the A2 milk to a separate milk line and holding tank, ensuring that the A2 milk does not come into contact with the A1 protein. Sheldon Creek Dairy has been joined by a few other producers of A2 milk in Canada, including D Dutchman Dairy Ltd. in Sicamous, B.C. This company started A2 milk distribution in Western Canada back in February of this year and has recently launched an A2 cheese line.

A2 – The Future of Milk?

There is still a great amount of research taking place to determine if the health benefits of A2 milk are as advertised. Conversations about the A2 milk market in Canada have become more widespread as this product becomes more readily accessible in other parts of the world. Several AI companies are now using the A2 gene to market animals. If you are interested in testing your herd for A2, visit the genotyping section of our website at www.holstein.ca/public/en/services/genotyping.

*according to The a2 Milk Company business page: https://thea2milkcompany.com/about-us/our-businesses/