PRODUCTION TRAITS IN JAPANESE BLACK

The genetic ability of Wagyu cattle to transmit important economic traits has traditionally been evaluated by the means of selecting potential animals based on pedigree information and estimated capabilities and subjecting them to progeny testing. However, in spite of the high cost and lengthy time spent in this evaluation process, cases are often found where candidate bulls and cows do not possess the genetic ability sufficient for the application.

The purpose of the development of genetic tests relevant to economically important carcass characteristics is not to dispense with progeny testing at this time, as it remains the most accurate means currently available to assess the genetic potential of breeding cattle to pass on advantageous economic characteristics to their offspring, but as a preliminary procedure in the process of selecting breeding cattle or feeder cattle.

STEAROYL COA DESATURASE (SCD)
This test is designed to assist in the selection of cattle that show a genotype that produces a superior fat composition.

Stearoyl CA desaturase (SCD) is the enzyme which changes stearic acid into oleic acid. The fat of cattle is composed of 6 main fatty acids. Within these fatty acids one of the saturated fatty acids is stearic acid. Stearic acid makes deposited fat harder and increases the melting point. Conversely oleic acid makes the fat soft with a low melting point. Olive oil is an example of a product that has abundant oleic acid.

There is an opinion in the Japanese market that the percentage of beef that is “not delicious” has increased recently even though marbling has been abundant. Fat of a high melting point is not as palatable to the Japanese consumer as the low melting point fats that have been traditionally associated with Wagyu beef.

Let us imagine we are cooking a piece of beef loin that has a high melting point fat composition in a frying pan. The fat will melt during the cooking process however when we put it in our mouth and it cools to near our body temperature it will become solid. We may feel we are eating butter containing grains of sand and it certainly will not be delicious. I believe that the common incidence of such higher melting point fat in these days has come from a biased view of marbling. We, the Japanese market, have placed too much emphasis on visible marbling and disregarded the type of fat represented. Fat containing high levels of stearic acid is like wax in appearance when the carcass is in the cool room and so it is easier to assess than the soft fats.

Consumers all over the world are becoming more selective and prefer foods that are good for their health. Japanese Black cattle that have a genotype for a soft fat profile are better tasting and healthier when eaten than cattle that have high melting point fat.

There are several different DNA sequences of the SCD gene in Japanese Black cattle. These are categorized into 2 groups, A & V. Some Japanese Black cattle carry a special mutation that changes the corresponding amino acid from Valine (V) to Alanine (A), which has a significant relationship to the melting point of fat. Alanine type has a lower melting point than valine type.

Therefore the preferred type is AA
By using the SCD gene we can select the cattle that can deposit a soft and oleic acid rich fat that is delicious and healthy.

At this time **no** gene tests should be used as the single selection criteria that a cattle farmer would use. Rather they should be seen as part of the selection process when choosing cattle for breeding.

Information kindly sourced from;

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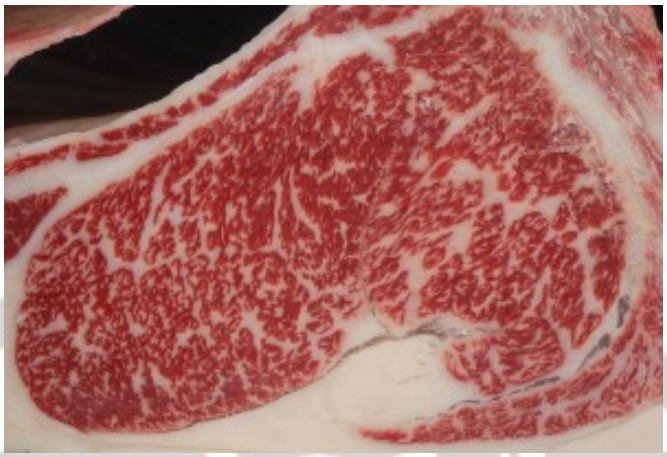
A Genetic Consideration – The SCD Factor

Composition of Fatty Acids in Beef determine the Desired "Umami" of Wagyu Beef



Ribeye Photo of Lone Mountain Wagyu 9236W – 43.86% IMF

According to this research paper out of Australia, the "luster, texture and properties" that are so desired by those consumers purchasing Wagyu beef across the world come from the beef's specific fat composition. (https://www.ncbi.nlm.nih.gov/pubmed/22061530)

The Japanese fat had considerably less saturated and more unsaturated fatty acids resulting in much higher unsaturated/saturated ratios (1.9) compared with the Australian samples (1.0). This resulted primarily from the high contents of oleic and palmitoleic acids and the low content of stearic acid of the Japanese samples. The triacylglycerols from the Japanese fat had considerably less tri-saturated and di-saturated fatty acids and more di-monounsaturated and tri-monounsaturated fatty acids in their structure.

In our breedings we aim to produce offspring with increased intramuscular fat percentages (IMF%) because that's what our customers desire and are willing to pay for. While that objective is clear, breeding towards that goal is complicated, as any seasoned producer can attest. The SCD genetic test is a step towards simplifying and systematizing this breeding goal – another tool in the breeding toolbox. As written by Dr. Tadayoshi Mitsuhashi, "By using the SCD gene we can select the cattle which can deposit a soft and oleic acid rich fat that is delicious and healthy."

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“This enzyme converts saturated fatty acids into Monounsaturated Fatty Acids (MUFA).” Further, studies by Kim and Ntambi in 1999 and Yang et al (1999) “reported interesting correlations between SCD enzyme and fatty acid composition.” Study by Taniguchi et al in 2004, “showed the MUFA percentage differed significantly among the genotypes (high in AA, medium in VA and low in VV). The melting point was also significantly different between the genotypes (high in VV, medium in VA and low in AA)… The genetic effects on fatty acid composition have been confirmed by subsequent studies (Ohsaki et al, 2009; Ishii et al, 2013; Kelly et al, 2014).”