Genetic Control for Beef Flavor

The beef industry has recognized that consumer acceptability drives consumer demand and market share. As a result, the beef industry began monitoring consumer acceptability in the 1980s with the Retail Beef Consumer Study and again in the 1990s with Beef Customer Satisfaction. While the industry has emphasized the relationship between beef tenderness and consumer acceptability, Beef Customer Satisfaction showed that beef flavor and beef tenderness are of equal importance in driving overall consumer acceptability. The beef industry has emphasized improvements in beef tenderness over the past 17 years, and the Agricultural Marketing Service (AMS) of USDA is actively pursuing the implementation of labeling requirements for tenderness claims by beef merchandisers. Instrumentation for automatic grading devices for beef tenderness assessment is now being implemented. The National Cattlemen’s Beef Association has funded beef tenderness assessment devices and is currently moving forward to assist in bringing this technology to practical application. Additionally, genetic markers for beef tenderness have been extensively researched, and genetic tools are being merchandized for use by the industry.

However, the area of beef flavor is not being addressed. Initial work in the Angelton Genetic Merit project conducted at Texas A&M University in the 1990s included beef flavor as a palatability trait. Initial results indicated that beef flavor has a genetic component. Work by Steve Smith with Wagyu versus Angus cattle has shown a genetic effect on fatty-acid profile and a subsequent beef flavor effect. Past beef flavor research has mainly examined the effect of diet on beef flavor; the genetic effect on beef flavor has largely been ignored due to the complexity of the issue. Beef flavor is not a single attribute, and many researchers do not have the tools to measure all aspects of beef flavor. The many facets of beef flavor include fatty-acid composition and volatile flavor components found in the lean tissue and in the water-soluble component of adipose tissue. Each of these facets is influenced by environment and diet; however, the genetic influence has not been fully examined. Most research has not had the key component for measuring beef flavor: use of an expert, descriptive attribute flavor panel that can identify and quantitate individual aspects of beef flavor. Texas A&M University is uniquely positioned to address the issue of genetic control of beef flavor as its research team is composed of genetics, lipid biochemistry, beef cattle nutrition, and meat science/sensory science, with 20 years’ experience in measuring beef flavor.

Objectives

- Examine genetic effect on fatty acid composition of beef.
- Determine genetic effects on volatile flavor attributes of beef, mainly beefy/brothy, beef fat, and livery flavor attributes.

Outcomes

- Genetic markers or industry-based genetic tools for selection of cattle based on differences in fatty acid composition
- Genetic markers or industry-based genetic tools for selection of cattle based on differences in volatile beef flavor compounds to improve the consistency of beef flavor and allow beef producers to make beef flavor claims

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