The Benefits of Growth-Promoting Implants for Beef Cattle

Caleb Reichhardt, Reganne Briggs, Laura Motsinger, Kara Thornton, Matthew Garcia

A valuable tool for beef producers, growth-promoting implants are regularly used to improve the beef industry's environmental and economic sustainability by increasing the efficiency and growth rate of beef cattle (Duckett et al., 1997; Duckett & Andrae, 2001; Duckett & Pratt, 2014). Implants increase economically viable traits such as average daily gain (ADG) by 18%, feed intake and efficiency by 6%, and carcass weight and ribeye area (Duckett & Pratt, 2014), ultimately increasing economic return to producers. Depending on cattle prices and anabolic implant protocol used, economic returns for producers can be anywhere from $15 to $163 per head, depending on production practices and the type of implant used (Donovan et al., 1983; Duckett & Pratt, 2014).

Environmental sustainability also improves with use of growth-promoting implants because there is a positive correlation between improved production and environmental sustainability (Capper & Hayes, 2012). Current research shows that implanted cattle decrease:

- Land usage by 7.8% to 9.1% (Basarab et al., 2012; Capper & Hayes, 2012).
- Water usage by 5.5% (Webb et al., 2020).
- Greenhouse gas emissions by 5.1% to 8.9% within the beef industry (Basarab et al., 2012; Capper & Hayes, 2012).

Overall, growth-promoting implants help producers by increasing production and environmental sustainability.

History of Implants

In the U.S., over 40 commercially available growth-promoting implants are approved by the Food and Drug Administration (FDA). These implants are approved for all stages of cattle production, from suckling calves to finishing beef cattle, with different implants having different hormonal payout periods (Duckett & Andrae, 2001). As such, over 90% of cattle on feed receive implants during production, with 80% receiving two or more (Animal and Plant Health Inspection Service [APHIS, 2013]). These implants are administered as pellets in the middle-third section of the ear under the skin as a fail-safe, as the ear is rarely consumed.

Growth-promoting implants have routinely been used in the U.S. since the late 1950s (Smith & Johnson, 2020). The hormones currently used in beef cattle production have routinely been proven safe by the U.S. Food and Drug Administration (FDA) (Smith & Johnson, 2020); however, the FDA is currently reviewing re-implanting protocols (FDA, 2021).

Live Animal Performance

One of the benefits of using implants in production is the increase in live animal performance. Implants have been found to increase ADG by 18%, feed efficiency by 6%, and feed intake by 6%, on average (Duckett & Pratt, 2014). **Table 1** highlights the improved performance observed in cattle that receive an implant. It is important to note that when producers use implants, performance can vary greatly from one operation to another (Jones et al., 2016). This variable response to implants can come from the animals being in different stages of production and their nutritional status, breed, and the different types of implants used (Jones et al., 2016).

Table 1
Benefits of Implanting Cattle

Trait	INCREASE (↑) or DECREASE (↓)	Advantage
Performance		
Average daily gain	↑	18%
Feed intake	↑	6%
Feed efficiency	↑	6%
Carcass weight	↑	5%
Ribeye area	↑	4%
Economic		
Return	↑	$15–$163*
Environmental		
Greenhouse gas emissions	↓	5.1%–8.9%
Water usage	↓	5.5%
Land usage	↓	7.8%–9.1%

*Varies depending on the year.
Adapted from Duckett & Pratt (2014) and Capper & Hayes (2012).

One major concern producers have when using growth-promoting implants is a possible decrease in carcass quality grade (Bruns, Pritchard, & Boggs, 2005), despite increases in hot carcass weight and ribeye area (Montgomery, Dew, & Brown, 2001). Quality grade is a component of the grid system, from which producers are primarily paid (Schroeder, Hogan, & Anderson, 2009), with the marbling score mainly determining quality grade (Schroeder, Hogan, & Anderson, 2009). It has been shown that a single growth-promoting implant reduces marbling compared to non-implanted cattle (Ducket et al., 1997; Smith et al., 2018).

Marbling contributes to beef juiciness, flavor, and tenderness (McBee & Wiles, 1967), with

tenderness often described as one of the more influential factors overall in consumer acceptance of cooked beef (Van Wezemael et al., 2014). Steaks from cattle that received an implant are consistently less tender compared to those from cattle that never received an implant (Platter et al., 2003). However, 60%–74% of all consumers were satisfied with steaks from cattle receiving various implant protocols (Platter et al., 2003). Taken together, growth-promoting implants do not appear to have a negative influence on fresh meat quality when managed correctly.

Conclusion

Growth-promoting implants have been used frequently in the beef industry for several decades. They have proven to be a great tool to increase the performance traits of cattle and environmental sustainability. Although meat quality may be slightly decreased when growth-promoting implants are used, consumers are largely satisfied with steaks from cattle receiving implants. When managed correctly, producers can use growth-promoting implants to improve their operation's profitability.

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