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Advances in the beef industry from 1990 to 2020: Enhanced growth and lower carbon footprint

Changes in feedlot diets and use of growth-enhancing technologies to improve cattle performance and lower carbon footprint are reported in a recent article in Applied Animal Science

Champaign, IL, February 14, 2022—Over the last 30 years, the beef industry has evolved in response to a growing global population and demand for beef and increasing concern about greenhouse gases. A new article in *Applied Animal Science* looks closely at changes that have occurred in feedlot diets and availability and use of growth-enhancing technologies. In the article, a team of researchers from Texas including David Crawford, PhD; Kristin Hales, PhD; Taylor Smock, MS; Andy Cole, PhD; and Kendall Samuelson, PhD, presents how these changes have affected animal growth performance and emissions from 1990 to 2020.

“By using modeling techniques, this research examined how these changes affected growth performance and the carbon footprint,” said David K. Beede, PhD, Editor in Chief of *Applied Animal Science*. For comparison, the researchers created models that represented typical feedlot finishing diets from 1990 and 2020 using ingredients that had reported carbon footprints.

Many dietary changes were noted by the researchers. One of the biggest changes reported reflected the significant increase in the availability of grain-milling byproducts, which were scarce in 1990. The researchers found that in 2020, byproducts such as corn gluten feed and distillers grains, from the ethanol, artificial sweetener, and oil industries, often replaced steam-flaked corn and soybean meal in finishing feedlot diets. The article explains how this increased use of byproducts resulted in 2020 diets with increased crude protein and fat and decreased starch compared with 1990 diets.

The use of growth-enhancing technologies also changed in the beef industry over the last 30 years. “Estradiol-only implants and monensin were the available technologies in 1990, whereas in 2020 use of implants with combinations of trenbolone acetate and estradiol, monensin, and ractopamine

hydrochloride (in the final 28 to 42 days) were common," said lead author Kendall L. Samuelson, Department of Agricultural Sciences, West Texas A&M University, Canyon, TX, USA.

Caption: Present day feedlot cattle are fed diets containing byproduct feeds from the grain-milling industry used to produce human food. This practice reduces the overall carbon footprint of cattle feeding and also that of the milling industry. (Credit: iStock.com/DarcyMaulsby).

The research team details how these changes have affected growth performance and carbon emissions. They observed an increase in final body weight, average daily gain, and dry matter intake, which resulted in an 8.2% increase in the ratio of gain to feed, in 2020 compared with 1990. In addition to this increase in efficiency, the scientists also observed decreased greenhouse gas emissions. "The disproportionate increase in body weight gain compared with carbon dioxide equivalent emissions indicates that feedlots are decreasing the environmental impact intensity and improving efficiency," said Samuelson. She added, "Changes in available technologies and diet formulations have improved efficiency and reduced the carbon footprint of feedlot cattle production in the past 30 years."

The article appears in the February issue of *Applied Animal Science*.

Notes for editors

"Effects of changes in finishing diets and growth technologies on animal growth performance and the carbon footprint of cattle feeding: 1990 to 2020," by D. M. Crawford, K. E. Hales, T. M. Smock, N. A. Cole, and K. L. Samuelson (https://doi.org/10.15232/aas.2021-02199), *Applied Animal Science*, volume 38, issue 1 (February 2022), published by Fass Inc. and Elsevier.

This article is openly available at https://doi.org/10.15232/aas.2021-02199.

Full text of the article is also available to credentialed journalists upon request; contact Brittany Morstatter at +1-217-356-3182 ext. 143 or ARPAS@assochq.org to obtain copies. To schedule an interview with the author(s), please contact K. L. Samuelson at ksamuelson@wtamu.edu.

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