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COMPARISON OF GREENHOUSE GAS EMISSIONS FROM CATTLE INTESTINAL FERMENTATION AND CATTLE MANURE (REVIEW)

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ABSTRACT

It is estimated that beef feedlots account for 26% of greenhouse gas (GHG) emissions from US agriculture, and future climate change policies may be focused on reducing these emissions. A life cycle assessment (LCA) of greenhouse gas emissions from grain-fed beef cattle in the United States was carried out by using industry statistics and previous research to identify the main sources of uncertainty in these estimates. Uncertainty related to greenhouse gas emissions from indirect land use change to emissions from grazing land (e.g. carbon sequestration in soil), to enteric fermentation of cattle on grazing land and to methane emissions from manure in feedlots, respectively, contribute the most to greenhouse gas emissions throughout the life cycle of beef production. Feeding with ethanol by-products was estimated to have reduced life-cycle emissions by 1.7%, but it can increase emissions by 0.6–2.0% at higher feeding rates. Simulations according to Monte Carlo methods have found a range of life cycle emissions from 2.52 to 9.58 kg CO_2 per 1 kg of live weight, with an estimated average of 8.14, which is between recent estimates. It has been found that current methods used by the United States Environmental Protection Agency (EPA) associated with feedlot beef production account for only 3–20% of greenhouse gas emissions during their life cycle.

Key words: cattle, beef, greenhouse gas emissions, manure, intestinal fermentation.