

Research shows impact of production practices on nutrient density of beef

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What makes one cut of beef more nutritious than another? A new landmark study may finally offer some insights. In a first-of-its-kind collaboration, the Bionutrient Institute, Utah State University, and Edacious, an agri-food technology company, have released early findings from an ambitious research initiative exploring the nutrient density of beef and the many factors that influence it.

This multi-year effort provides compelling evidence that beef's nutritional composition is not fixed but highly variable—driven by differences in feed and pasture quality, genetics, and animal management systems.

"We're witnessing the beginnings of a paradigm shift in how we evaluate food quality," said Eric Smith, CEO of Edacious. "This project moves us closer to answering the fundamental question of whether we are getting enough and the right kind of nutrition from the food we eat. By making nutrient density measurable, comparable, and transparent, we can unlock better outcomes for human health and the environment."

The Bionutrient Institute, a grassroots nonprofit focused on improving food quality through citizen science, spearheaded the study and oversaw the global effort of sample collection and community engagement. Participating farmers, researchers, and land stewards contributed beef, forage, soil, and stool samples, along with detailed records of their management practices. This collaborative model enabled the creation of a rich, multi-dimensional dataset that bridges the gap between how food is produced and what it delivers nutritionally.

At the scientific core of the study is the lab of Dr Stephan van Vliet, a leading metabolomics researcher at Utah State University, who directed the analytical work. His team used a combination of untargeted and targeted metabolomics techniques to measure a wide range of compounds in beef—from macronutrients and fatty acids to phytochemicals and essential minerals.