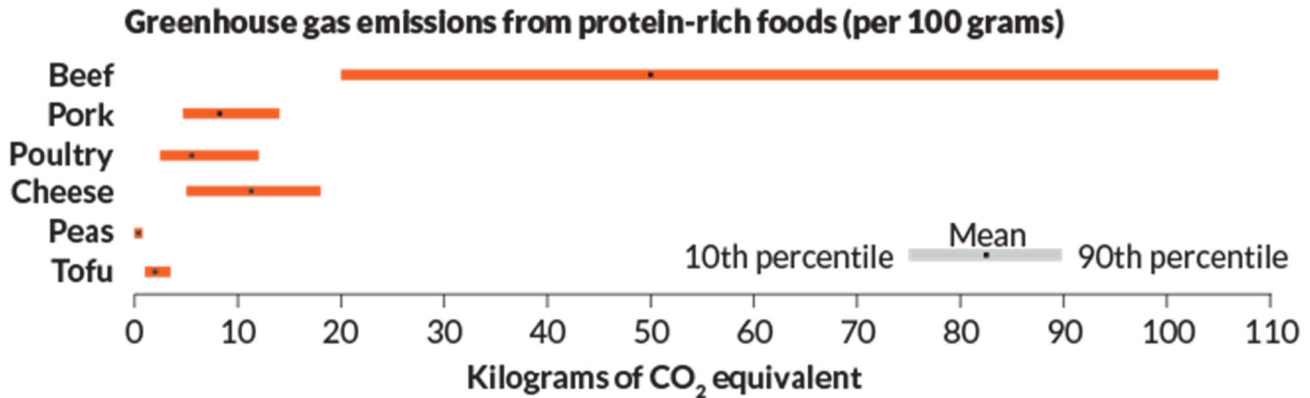


Tomorrow's Lab-Grown Meats

Analyze This!: Q

Directions: Read the *Science News* article "[Dreaming up tomorrow's burger](#)" and use the graph "Farm to table" to answer the following questions.



Source: J. Poore and T. Nemecek/*Science* 2018

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Read the graph:

1. What variable is graphed on the horizontal axis? Be sure to provide units, if appropriate.
2. What variable is graphed on the vertical axis? Be sure to provide units, if appropriate.
3. The gray bar near the lower right is a key for how data are plotted in the graph. What is the meaning of a dot, and what is the meaning of the length of a bar?

4. What is the mean value of greenhouse gas emissions for 100 grams of beef and what are the minimum and maximum emission values? What are the values for poultry and tofu?

Manipulate the data:

5. On average, how much more greenhouse gases does beef produce than poultry for the same amount of food? How much more greenhouse gases does beef produce than tofu for the same amount of food?

6. If producing 100 g of beef emits 50 kg of CO₂ equivalent, what is the ratio of CO₂ equivalent to mass of beef produced?

Connect the graph to the article:

7. “[Dreaming up tomorrow’s burger](#)” reports that Americans eat 79 g of meat per day. Assuming that this is true for 5 days of the week and that Americans eat only beef, how much CO₂ equivalent, in g and kg, is emitted to supply one person with beef for a week? For one month? For one year?

8. Based on your calculations above, now estimate the amount of CO₂ equivalent, in kg, emitted to supply the U.S. population with beef for one year. Assume that 325 million people live in the United States.

9. The American Heart Association recommends people eat four or five 107-gram servings of meat per week. If Americans adhered to American Heart Association recommendations, how many grams of CO₂ equivalent would be emitted per year? Make the same assumptions that you did in the previous question.

10. According to the article, animal agriculture accounts for 14.5 percent of humankind's total greenhouse gas emissions. Let us assume that beef is responsible for the entirety of the 14.5 percent. (In reality, it is a mix of animals, but we will make an assumption for simplicity.) Using mean values in the graph "From farm to table," calculate the percent decrease in greenhouse gas emissions if the whole planet switched from beef to poultry, and produced the same amount of meat.

11. Suppose the world switched from producing solely beef to solely tofu, by what percentage would total greenhouse gas emissions decrease?

12. Does this graph effectively display the data? Can you think of a better way to show the same data?

13. How does the graph provide motivation for the technologies reported in the article?

Analyze beyond the article:

14. Where do you think lab-grown beef might end up on the graph? How might its mean compare to beef?

15. What processes mentioned in the article might contribute to CO₂ equivalent emissions from lab-grown meat? What processes might be the most intensive? Why?