

Lab-grown meat would 'cut emissions and save energy'

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An alternative to conventionally-reared meat could cut emissions

(PhysOrg.com) -- Meat grown using tissue engineering techniques, so-called 'cultured meat', would generate up to 96% lower greenhouse gas emissions than conventionally produced meat, according to a new study.

The analysis, carried out by scientists from Oxford University and the University of Amsterdam, also estimates that cultured meat would require 7-45% less energy to produce than the same volume of pork, sheep or beef. It would require more energy to produce than poultry but only a fraction of the land area and water needed to rear chickens.

A report of the team's research is published in the journal *Environmental Science & Technology*.

'What our study found was that the environmental impacts of cultured

meat could be substantially lower than those of meat produced in the conventional way,' said Hanna Tuomisto of Oxford University's Wildlife Conservation Research Unit, who led the research. 'Cultured meat could potentially be produced with up to 96% lower greenhouse gas emissions, 45% less energy, 99% lower land use, and 96% lower water use than conventional meat.'

The researchers based their calculations on a process, using Cyanobacteria hydrolysate as a nutrient and energy source for growing muscle cells, that is being developed by co-author Dr Joost Teixeira de Mattos at the University of Amsterdam. At the moment this sort of tissue engineering technology is confined to the laboratory, but the researchers estimated what the various costs would be for producing 1000kg of cultured meat using a scaled-up version of the technology compared to the costs associated with livestock reared conventionally.

In comparison to conventionally-produced European meat, the team estimate cultured meat would involve approximately 7-45% lower energy use, 78-96% lower greenhouse gas emissions, 99% lower land use, and 82-96% lower water use depending on the type of meat.

'We are not saying that we could, or would necessarily want to, replace conventional meat with its cultured counterpart right now,' said Ms Tuomisto, 'however, our research shows that cultured meat could be part of the solution to feeding the world's growing population and at the same time cutting emissions and saving both energy and water. Simply put, cultured meat is, potentially, a much more efficient and environmentally-friendly way of putting meat on the table.'

The team point out that their calculations do not currently take into account additional savings from, for instance, the lower energy costs of transport and refrigeration of cultured meat compared to the conventional variety. They also suggest that land freed up from farming

could be reforested or used for other carbon sequestration purposes, further lowering the carbon footprint of cultured meat.

Ms Tuomisto said: ‘There are obviously many obstacles to overcome before we can say whether cultured meat will become part of our diet, not least of which is whether people would be prepared to eat it! But we hope our research will add to the debate about whether we could, or should, develop a less wasteful alternative to [meat](#) from animals.’

More information: A report of the research, ‘Environmental impacts of cultured meat production’, is published online in *Environmental Science & Technology*.

Provided by Oxford University

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