Rothamsted Press Release 16 September 2019 ABATTOIR WASTE FERTILISERS COULD BECOME THE NORM

*Sustainable phosphorus study echoes the founding of Rothamsted - but the ingredients list might not be to everyone's taste*

Scientists led from Rothamsted Research say their tests on a new type of sustainable fertiliser are very encouraging – although the news might leave many vegans conflicted.

That’s because the phosphorus in this product is not obtained by mining, but instead recovered from abattoir waste, including bones, hooves, tails, and skin.

Global food production is utterly dependent upon phosphorus fertiliser, the main ingredient of which, rock phosphate is not mined in the UK – meaning the hunt is on for local replacements that can reduce waste and contribute to greener farming.

[Published in the journal, PLOS ONE](https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0221647), this new study compared the effectiveness of an abattoir derived fertiliser against those made from rock phosphate.

Rothamsted’s Dr Tegan Darch, who led the study, said: “In experiments growing grass or wheat, in either soil or sand, the abattoir-derived fertiliser either matched rock phosphate fertilisers or surpassed them in terms of both yield and nutrient content of the plants. The important trace elements selenium and zinc were both higher in plants grown in abattoir waste fertiliser.”

The results suggest using abattoir waste in this way could make an important contribution to phosphorus fertiliser needs in the UK and beyond.

“The European Union alone produces over 20 million tons of animal by-products a year. If we could convert some or all of that into fertiliser, we may have found ourselves a new and sustainable supply of phosphorus,” added Dr Darch.

Whilst meat and bone meal has long been used as plant food, the uptake by plants of phosphorus from such fertilizers is low, typically less than half by the first year after application.

The new fertiliser’s creators, [Devon based agri-food company Elemental Digest Systems Ltd,](https://www.rothamsted.ac.uk/news/say-%E2%80%98thallo%E2%80%99-new-source-fertiliser) say whilst it takes natural processes years to convert organic materials and manure to usable nutrients, their patented technology achieves this in just minutes.

Their method uses abattoir by-products, including bones, bedding material, slurry and gut contents, plus waste from further industrial sources, such as wood ash, but it doesn’t contain any meat, brain or spinal cord material.

“Our data indicates that even in the short term, the recycled nature of this fertilizer means that it can be considered as a sustainable alternative to conventional fertilizers,” says Dr Darch.

Domestically produced abattoir waste could potentially meet about a quarter of UK agriculture’s fertiliser needs – and other measures could also be put in place to help extend the lifespan of rock phosphate further.

Suggested approaches include improving the efficiency of fertilizer applications to farmland, and a better understanding of how phosphorus moves between soil and plants.

Dr Darch said: “Plants that can access different forms of soil phosphorus, such as those tightly bound to the soil surface, or organic forms resulting from dead plants and microbes, and that use phosphorus more efficiently will need to be bred – either by conventional methods or through new technologies such as gene editing.

In addition, such measures could also help reduce the loss of excess phosphorus from soil into water, which causes the choking algal blooms blighting many freshwater and marine environments around the globe.

Fittingly, perhaps, Rothamsted Research was founded by the man who produced the world’s first commercial phosphorus fertiliser – which he made from animal bones.

The inorganic phosphorus fertilizer industry began in 1842 when Sir John Bennett Lawes, the founder of Rothamsted, patented the first commercial phosphate fertilizer, or “chemical manure”. Lawes created his fertilizer by dissolving animal bones in sulphuric acid, creating what was termed “superphosphate”.

While proving a great success, there were not enough bones to supply the increasing demand for phosphorus fertilizers – resulting in today’s rock phosphate industry being developed.

Those not sold on the idea of growing their food using processed animal carcasses should know the other main source of phosphorus with potential for recovery might be equally unappealing: sewage.

**Citation:** Darch T, Dunn RM, Guy A, Hawkins JMB, Ash M, Frimpong KA, et al. (2019) Fertilizer produced from abattoir waste can contribute to phosphorus sustainability, and biofortify crops with minerals. PLoS ONE 14(9): e0221647. <https://doi.org/10.1371/journal.pone.0221647>

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