
Fixing 'Food Miles': How Graphene-enhanced Farming Can Cut Costs and Emissions

2020-09-05

A start-up company based at The University of Manchester has begun trials of a graphene-enhanced growth material that could revolutionise food production in the UK and overseas, reducing transportation and contributing to sustainability in farming worldwide.

AEH Innovative Hydrogel Ltd secured £1m of Government funding through Innovate [UK](#) in July and begins work on the project in the University's Graphene Engineering Innovation Centre ([GEIC](#)) on 1 September 2020. The two-year project will develop a unique, virtually maintenance-free 'vertical farming' system ('GelPonic').

GelPonic relies on a growth substrate for indoor fruit-and-veg that improves performance in numerous ways. The hydrogel growth medium conserves water and filters out pathogens to protect plants from disease, while a graphene sensor allows remote monitoring, reducing labour costs. Moreover, the production of the growth medium outputs significantly less CO₂ compared to traditional solutions and can also be used in areas with drought conditions and infertile soil.

Help for farming through technology

AEH - led by Dr Beenish Siddique (pictured) - has been supported by the European Research Development Fund (ERDF) [Bridging the Gap](#) programme and was a 2019 prize-winner in the prestigious Eli Harari competition, run by the University. The extra funding announced by the Government on 17 July is part of a broader £24 million spend to assist [UK](#) farming through pioneering technology.

Beenish said: "One of the biggest hurdles in controlled environment agriculture is operational cost, which makes it a low-profit-margin business. The fact this system is almost maintenance-free could make a big difference to whether farms can be successful or not."

"We believe there is an opportunity here to change the future of farming not just here in the [UK](#) but around the world," she added. "Globally, around 70% of the fresh water available to humans is used for agriculture and 60% of that is wasted; agriculture also contributes around 20% of global greenhouse-gas emissions. Our system helps control that waste and those emissions, shortens germination times and could enable an increase of 25% in crop yields."

Post-COVID sustainability

One of Beenish's colleagues at the GEIC is Commercialisation Director Ray Gibbs, whose role is to help to bring innovative ideas to fruition through launching start-up and early-stage companies such as AEH. He believes the current pandemic, in tandem with net-zero targets, has sharpened the Government's focus on investment in innovation.

Ray said: "The COVID-19 pandemic has demonstrated the fragility of the [UK](#) supply chains, none more so than food supply. Indoor farming allows us to grow food in the [UK](#) that would normally come from another part of the world. That contributes to self-sustainability, reduces food miles and means we're not so reliant on international markets for our food."

AEH is developing its system alongside project partners and subcontractors including Crop Health & Protection (CHAP), Labman Automation, Grobotic Systems and Stockbridge Technology Centre (STC).

CHAP's Innovation Network Lead Dr Harry Langford said: "There is a significant market demand for more sustainable hydroponic substrates. This project is an exciting opportunity to optimise and scale-up a novel hydrogel product and demonstrate this product directly to the end-user, within a highly innovative automated production system".

Read the [original article](#) on The University of Manchester.