

Growing greener greens

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A pioneering project to make our green vegetables even better for us has been launched by scientists at The University of Nottingham. The research will underpin future technological developments in agriculture that could help fight a looming food security crisis.

'Greens' like cabbages and broccoli are a well-known part of a [healthy diet](#) but they don't contain as large an amount of key minerals as they might, according to the lead scientist on the project, Associate Professor of Plant Nutrition, Dr Martin Broadley. He's secured funding to carry out new research into 'biofortifying' cabbages and their relatives (Brassica) to boost dietary intakes of calcium and magnesium.

The project has been funded by Biotechnology and Biological Sciences Research Council and a fertilizer company. It aims to enrich the edible parts of cabbages, broccoli and their more exotic cousins, Chinese cabbage and pak choi, with these minerals using conventional breeding techniques and by devising a recipe for a new type of fertilizer. Dr Broadley says the research could make a real difference to human health worldwide:

"This project is an exciting opportunity which could ultimately deliver real dietary benefits for the UK and globally. Recent studies have shown that leafy Brassica crops are excellent targets for biofortification with calcium and magnesium, even where vegetable consumption is relatively low, such as in the UK. By combining fertiliser-use with the development of more 'blue-skies' conventional breeding tools, we hope that this project will bring benefits in both the short and longer-terms, as

well as improve our understanding of plants."

All of us require 22 essential minerals to live. These minerals can be supplied by a balanced and varied diet. Yet billions of people worldwide consume insufficient minerals, including calcium and magnesium. Since most calcium is stored in bones, calcium-deficient diets can reduce bone strength and increase fracture-risks and osteoporosis. In developing countries, calcium deficiency can also cause rickets. Magnesium deficiency is linked to hypertension, cardiovascular disease, and pre-eclampsia in pregnancy.

In the UK, [vegetables](#) —excluding potatoes —provide less than one tenth of our calcium and magnesium intakes. It's thought a relatively modest increase in the concentration of these minerals in green leafy vegetables would have a significant beneficial effect on our health. Dr Broadley says this is likely to be achievable by improving fertilizers and breeding programmes:

"Although it seems an obvious solution, we do not yet know how much calcium or magnesium fertiliser to apply to soil to optimise dietary intakes. This is because fertiliser studies tend to focus on crop yield. The 'blue-skies' breeding approaches rely on the fact that each different variety of Brassica represents a unique collection of variants of genes (alleles). However, just like different dog breeds, Brassica varieties are —in theory —interfertile. By crossing different varieties, and finding combinations of alleles which alter the [calcium](#) and magnesium content of plant leaves, we can inform conventional breeding programmes. The most exciting part of this project is that it builds directly on recent investment in Brassica research in the UK and elsewhere, which means we will soon have a fully-sequenced genome to work with, alongside other important resources."

Professor Douglas Kell, BBSRC Chief Executive said: "Taking social

and economic issues aside, the challenge we face is to produce enough nutrition for a growing global population using limited resources and without significant negative impact to the environment. There are a number of ways to approach this through bioscience research, one of which is to actually aim to increase the nutritional value of the food we are producing. Dr Broadley's project is a good example of where UK bioscience research is taking on this challenge and his success in enriching essential minerals in cabbages, broccoli, Chinese cabbage and pak choi will be an important step in insuring against a future food security crisis."

Source: University of Nottingham ([news](#) : [web](#))

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