

## These little beads



are balls of gum in a hard shell that contain safe bacteria that change colour depending on the nutrients in the soil.

Two naturally occurring genes have been added: one for the beads to **sense nitrogen** and the other that means they can **change colour**.

The beads and the bacteria have been **scientifically shown** to be **safe** and will not contaminate the environment.

Limited modification has been used. **Simple, harmless** abilities are given to these bacteria which allow them to sense nitrogen and to change colour.

The bacteria are **physically contained** within a casing that minimises escape.

The ability to escape from the beads has been thoroughly tested, and those that do leak do not have a significant effect on the local environment.

They are **too weak** to compete in the outside world and quickly die.

# agrEcoi



## Using less fertiliser is good for the environment.

By only applying it where it's needed, excess can be saved, which is good news as fertiliser production and use are big contributors to the pollution of waterways and carbon emissions.

Reducing excess nutrients running off agricultural land into the surrounding waterways could **reduce eutrophication** which causes algae to grow, suffocating other species and affecting biodiversity.

At least **50% of nitrogen pollution** is attributable to agricultural runoff, which could be reduced if fertiliser was used only where it's needed.

Producing fertiliser is very inefficient so saving it could also mean **lower carbon emissions**.

Is *Escherichia coli* K-12 safe?

**The bacteria aren't harmful:** This *E. coli* strain is not considered a human or animal pathogen nor is it toxicogenic. *E. coli* K-12 has no known survival mechanisms in the environment.

It is an enfeebled organism as a result of being maintained in the laboratory environment for over 70 years.

Its derivatives are currently used in a large number of industrial applications, including the production of human drugs such as insulin.

Has it been tested?

**Agencies, scientists and professionals have scrutinised it:**

These beads have only been released for use after passing a rigorous risk assessment procedure. The European Food Standards Agency is made up of 21 scientific experts, and is supported by more than 40 external experts in fields such as food and environmental food microbiology, molecular biology, genetics, toxicology, immunology, biotechnology, food sciences, plant biology, and statistics. There was a public consultation and reviews will be made as it is used around the country.



They're an **affordable** way for **small scale farmers** to **save fertiliser**. A few days after being spread on freshly ploughed fields, the beads change colour to indicate soil that needs fertilising. Only bits of land that need it are then fertilised, and then the beads **biodegrade** within about a week.