Japanâ??s Green Science Alliance invents Fluorescent Fertilizer using QDNF technology

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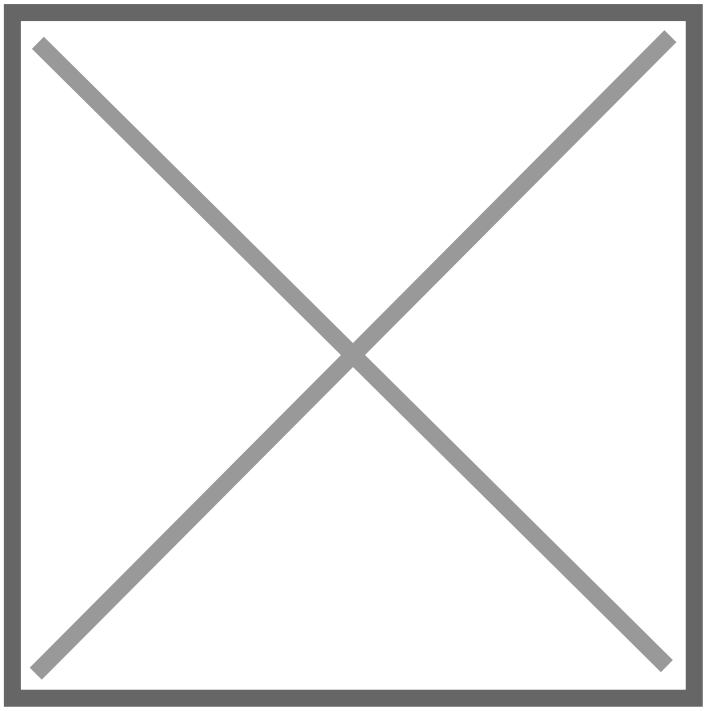

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Japan headquartered Green Science Alliance has developed a fluorescent fertilizer using super tiny materials (0.5â??9 nm) called fluorescent quantum dot nano fertilizer (QDNF).

QDNF are prepared in any forms such as pesticide, herbicide, or as an antibacterial residue sensor. QDNF can also be a carrier of essential metal (Zn, Cu, and Fe) into plants. A fluorescent plant (Japanese Musterd Greens) has been grown from seeds using QDNF.

Dr. Ryohei Mori, CEO of Green Science Alliance has synthesized graphene quantum dots with chemical composition comprising the three key fertilizer elements: nitrogen, phosphorus, and potassium. When such plants exhibit fluorescence under ultraviolet-light and blue light irradiation, it indicates that QDNF is absorbed in plant system supporting their growth.

Currently used commercial fertilizers have higher particle size, resulting in prolonged decomposition and absorption. Studies have reported that at least half of the fertilizers applied on the soil are wasted due to draining out by rain or evaporation.

In contrast, "nano fertilizer" which has particle size in the range of nanometers runs through the path between the cells of plants. Hence, the fertilizers can be absorbed in plants without the assistance of bacterial decomposition. As a result, nano fertilizers result in higher yields than commercial solid or liquid fertilizers.

Since nano fertilizers can absorb nutrients from both the soil and leaves, it can also be sprayed using drones. Along with fertilizer components, nano fertilizers contain components of the pesticides, herbicides, and metals required for plant growth. Furthermore, researchers are working towards introducing recombinant genes into plants using nano fertilizers as the gene carrier.

In addition, some quantum dots can act as stress sensors because their fluorescent light disappears when they react with stress-induced substances such as H 2 O 2, Ca 2+, and NO. Quantum dots on plant leaves can convert solar light into the light with a wavelength more favorable for plant growth.