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Natural 15N abundance as a traceable biogenic marker to reveal the history of N fertilization and fingerprint food adulteration in organic food certification

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Production of organic foods that are really grown and processed and their traceability during distribution from production to consumption are still of prime concern. Organic agriculture that reduces negative environmental impacts and produces healthy foods has become one of the preferred alternative farming practices, since it enhances soil fertility and carbon sequestration. Despite debates about sustainability and profitability of organic agriculture, the organic food industry is one of the fastest growing businesses, because market and social forces have created price premiums on organic foods. To label ORGANIC, producers should attest the use of synthetic fertilizers and pesticides. However, no standard method to detect the use of chemical fertilizers is available. Therefore, food manufacturers and markets put more efforts to strengthen reliability of organic food certification by adopting extra inspection systems that are not regulated by relevant laws. One adoptable inspection system is the use of natural 15N abundance (δ15N) of crops and soils. Composted manure has a higher δ15N than synthetic fertilizer due to isotopic N discrimination. Differences in δ15N between isotopically different N inputs suggest that N isotope signatures of crop tissues could differ between organic and non-organic foods. In this regard, the use of δ15N can serve as a reliable biogenic marker not only to identify the use of synthetic fertilizers in organic certification but to ensure traceability and detect food adulteration, and this technique has been internationally patented and successfully launched into the Korean organic market. Here this essay reports experiences and feasibility in the future market.

Biography

Hee-Myong Ro has completed his PhD in Soil Science from Seoul National University and Postdoctoral studies from University of Manitoba Department of Soil Science. He is a Professor of Soil Science at Department of Agricultural Biotechnology, Seoul National University. He was awarded Outstanding Academic Achievement Award by KSSSF, Distinguished Scientific and Technological Papers by KoFST, Hwanong Award by Hwanong Research and Education Foundation, and Best Korea Award by Herald Media. He has published more than 85 papers in reputed journals and has been serving as an Editorial Board Member of repute.

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