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# Ultrasensitive quantification of nanoplastic uptake in plants by accelerator mass spectrometry

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Quantitative methods for analyzing nanoplastics (NPs) in biological systems are urgently needed to clarify their environmental fate and potential risks, yet current analytical options remain limited. Here, we present a practical approach for radiolabeling NPs with 14C, enabling sensitive measurement of NP uptake and distribution in plants using accelerator mass spectrometry (AMS). We synthesized 14C-labeled polystyrene NPs (14C-nPS) by reductive methylation of amine-functionalized nPS (nPS-$NH_2$, ~200 nm) with 14C-formaldehyde. The resulting 14C-nPS was applied in preliminary uptake and distribution studies in *Arabidopsis thaliana*. This method allows precise NP quantification in plant tissues at concentrations as low as 1 μg/L without inducing phytotoxicity. We anticipate that this analytical tool will help bridge methodological gaps in detecting trace NPs in complex biological matrices and support deeper understanding of NP pollution and its implications for ecosystems and human health.