

# **Fate of nanoparticles in plants: contribution of spectroscopic techniques**

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For the last ten years, nanotechnologies appear as the new revolution of our century and raise the interest of both industry and research. The number of commercial products containing nanoparticles (NPs) was multiplied by 24 between 2005 and 2011. Some studies have demonstrated that NPs can be released from these products in the environment. Moreover, after wastewater treatment, NPs will be concentrated in sewage sludge that can be spread on agricultural soils. Finally, some nano-pesticides are being developed to increase foliar application efficiency. Thus it is very important to assess the impact and the fate of NPs in crop plants after both foliar and root exposure to NPs.

Synchrotron radiation is a powerful tool to investigate these questions by studying NP internalization and distribution in frozen-hydrated plant tissues as well as element speciation *in situ* at the sub-micrometer scale. In this type of analysis sample preparation is a key step to obtain reliable results and thus should be done very carefully.