

# Detection of Cadmium in Sinapis Alba

Sample  
Sinapis Alba

Limits of Detection  
100 ppm

Elements of interest  
Cd

Lateral resolution  
100  $\mu\text{m}$

Mode of analysis  
Area scan

Measurement rate  
20 Hz

Quantum dots (QDs) are spherical semiconductor nanocrystals with a very stable and size dependent fluorescence. Nowadays they are used in bioimaging, optical and electronic industry. The most commonly used QDs contain toxic Cd in their core, that can be released into the environment depending on the shell shielding the core. It is hence necessary to assess the impact of Cd containing QDs on various environmental organisms. In this note the effect of Cd containing QDs on model organism white mustard (Sinapis Alba) was evaluated. LIBS was used as it is an appropriate method to determine the spatial distribution of Cd in model plants.

S. Alba plants were exposed to three different Cd containing compounds (CdCl<sub>2</sub>, CdTe QDs and CdTe/SiO<sub>2</sub> QDs) in nominal concentrations 20 and 200  $\mu\text{M}$  for 72 hours. The experiment was executed in specially adjusted 2 mL Eppendorf tubes. After the exposure, the plants were carefully washed in MilliQ water, dried, molded and embedded in epoxide onto a glass slide.

LIBS experiment showed significant differences in Cd behaviour in the plant depending on its source. Different concentrations also showed major distinctions. While in plants exposed to lower concentrations of Cd

containing aquaoussolutions/dispersions Cd was found mostly in the lower two thirds of the root, in plants cultivated in aqueoussolutions/dispersions of higher Cd concentrations Cd was detected in the whole root and the lower part of the stem. For all Cd sources the signal increased with concentration. LIBS was proven to be a fast method with sufficient precision and spatial resolution for plant analysis. It was also demonstrated that LIBS is a convenient method for analysis of relatively big samples.

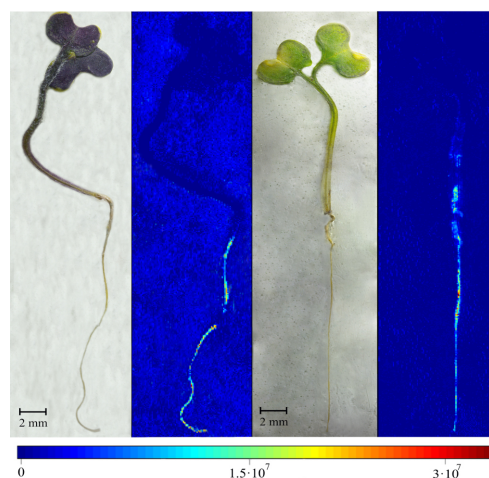


Fig. 1. Intensity of Cd QDs in Sinapis Alba