Deuterium isotopic fractionation through the cell membrane of plants

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Water inside the cells is believed to exhibit no fractionation when it passes through the cell membrane [1]. The experimental results show a non-evaporative fractionation between intracellular and extracellular water, both in embryonic and non-embryonic carrot cells.

Materials and Methods

The carrot (*Daucus carota*) was grown *in vitro* and has been exposed to a water solution with uniform isotopic content. The water from aqueous solution and the cell water were analysed for H/D by isotope ratios mass spectrometry.

Results and Discussion

The isotopic data revealed a deuterium isotopic fractionation between the extracellular and cellular water in addition to the evaporative fractionation. The deuterium content was found to be higher within the cells by ~10 ‰ for the non-embryonic cells and by ~13‰ for the embryonic cells. This is a non-evaporative fractionation between the intracellular and extracellular water and represents a new step in the overall fractionation of the deuterium water in plants.

[1] DeNiro & Cooper (1989) *GCA* **53**, 2573-2580.

Contribution of natural/biogenic sources to particulate matter levels over Europe: A multi-scale modelling study

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A long-term assessment of biogenic/natural contribution to PM levels over Europe is still missing. We report on a multi-year modelling study including emissions for all relevant biogenic/natural sources calculated in the frame of the EU/FP6 NatAir project: vegetation, soils, sea, fires and volcanoes. Emissions were integrated into the regional scale chemistry transport model CHIMERE. Boundary conditions are updated with daily frequency using output from the global model GEOS-Chem, that includes an explicit calculation of desert dust emissions. Natural/biogenic sources are calculated to contribute ~40% to PM10 and ~25% to PM2.5 over Europe on a yearly basis, with more important contributions in Southern Europe (e.g. Iberian Peninsula) and during hot summers (e.g. 2003).

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