



## **The study of the deuterium isotopic fractionation through the cell membrane of the plant**

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The purpose of this study is to prove that there is a water deuterium isotope fractionation when the water passes through the cell membrane. The carrot (*Daucus carota*) was grown *in vitro* in a Murashige and Skoog mineral-salts medium and has been exposed to a water solution with a uniform isotopic content. After seven days the cells culture was filtered and the cells water was vacuum extracted. The water from aqueous solution and the cell water were analysed for hydrogen by isotope ratios mass spectrometry. The procedure was repeated for 14 and 21 days old cell cultures. The measurements have revealed a water deuterium isotopic fractionation between extracellular water and cellular water. The deuterium was found to be higher within the cells by 10 ‰, for non-embryonic cells and 13‰, for the embryonic cells. This fractionation is a non-evaporative fractionation between intracellular and extracellular water and it represents a new step in the overall fractionation of deuterium water in the plants. The existence of such isotopic fractionation through the cell membrane implies that the relationship between the deuterium content of cellulose nitrate from plant and meteoric water should be revised. Also, this finding is of interest for the understanding the balance and dynamics of the hydrogen isotopes in the environment.

### References

Lajta K. & Marshall J. D. (1994) *Sources of variation in the stable isotopic composition of plants*. In : *Stable Isotopes in Ecology and Environmental Sciences*, (eds. K. Lajta & R. H. Michener), pp.1-21, Blackwell Sci. Publ., London