

145 - Impact of silica supplementation on virus infected cucumber cultures

Rolle der Kieselsäureapplikation Virus infizierter Gurkenkulturen

Sabine Holz, Grzegorz Bartoszewski², Michael Kube, Carmen Büttner

Humboldt-Universität zu Berlin, Lebenswissenschaftliche Fakultät, Albrecht Daniel Thaer-Institut für Agrar- und Gartenbauwissenschaften, Fachgebiet Phytomedizin, Lentzeallee 55/57, 14195 Berlin, Deutschland, phytomedizin@agrar.hu-berlin.de

²Warsaw University of Life Sciences Department of Plant Genetics Breeding and Biotechnology

Silicon (Si) is omnipresent in soil and for plants accessible as soluble silicic acid [Si(OH)₄] (Epstein 1999). Plants take up silicic acid via the root system. It is transported to shoots and leaves coupled to the transpiration stream and finally deposited in cell walls (Currie and Perry 2007). Beneficial effects for plants are higher yield, mechanical strengthening, mitigation of abiotic and biotic stresses (Ma et al. 2001). Si is discussed to play an important and active role in plant disease resistance in general (Fawe et al. 2001). Biotic stresses comprise for instance fungi, bacteria or insects. Silicic acid pretreated cucumber plants show improved defense, if infected with a fungus through deposited Si in the cell wall acting as a mechanical barrier against penetration. However, a potentially protective role of Si with regard to plant viruses is still not clarified.

This study aims to understand the impact of Si treatment on the plant transcriptome and on virus infections in particular. In an initial experiment, we examined the transcriptome of micropropagated *Cucumis sativus* line B10 plants (Burza and Malepszy 1995) treated with Si and a non-treated control group. Transcriptome data were generated from enriched total mRNA templates by Illumina's RNA-Seq approach from the *in vitro* derived templates. Differential expression analysis provided upregulated candidate genes, which may promote virus replication. Therefore, we examined the impact of Si in cucumber infected experimentally by Cucumber mosaic virus (CMV). This virus is known to infect more than 1,200 plant species causing diseases on crops, woody and ornamental plants worldwide. RealTime RT-PCR is applied in subsequent experiments on selected genes for the analysis of the expression of plant genes but also virus replication. Ongoing analyses will examine the role of silicic acid on CMV infection in cucumber under greenhouse conditions.

References

- BURZA, W. AND S. MALEPSZY, 1995: Direct Plant-Regeneration from Leaf Explants in Cucumber (*Cucumis sativus* L.) Is Free of Stable Genetic-Variation. *Plant Breeding* **114**(4): 341-345.
- CURRIE, H. A. AND C. C. PERRY, 2007: Silica in plants: biological, biochemical and chemical studies. *Ann Bot* **100**(7): 1383-1389.
- EPSTEIN, E., 1999: Silicon. *Annu Rev Plant Physiol Plant Mol Biol* **50**: 641-664.
- FAWE A, J. G. MENZIES, M. CHERIF and R. R. BÉLANGER: Silicon and disease resistance in dicotyledons. In: *Silicon in Agriculture*. L. E. DATNOFF, G. H. SNYDER and G. H. KORNDÖRFER, Elsevier, Amsterdam, p. 159-170.
- Ma J. F., Y. Miyake and E. Takahashi: Silicon as a beneficial element for crop plants. In: *Silicon in Agriculture*. L. E. DATNOFF, G. H. SNYDER and G. H. KORNDÖRFER, Elsevier, Amsterdam, p. 17-36.

146 - Untersuchungen zum Auftreten des *Arabis mosaic virus* in Birken aus Rovaniemi (Finnland) mit Virus-spezifischen Symptomen

*Investigations on the occurrence of *Arabis mosaic virus* in birches from Rovaniemi (Finland) with virus-specific symptoms*

Richard Pauwels, Markus Rott, Susanne von Bargaen, Carmen Büttner

Humboldt-Universität zu Berlin, Lebenswissenschaftliche Fakultät, Albrecht Daniel Thaer-Institut für Agrar- und Gartenbauwissenschaften, Fachgebiet Phytomedizin, Lentzeallee 55/57, 14195 Berlin, Deutschland, phytomedizin@agrar.hu-berlin.de

Pflanzenpathogene Viren treten weltweit an Gehölzen auf (Büttner et al., 2013). Beispielsweise wird seit 2002 ein starkes Auftreten von Birken (*Betula spp.*) mit virusspezifischen Symptomen wie