**The applicability of zeolite minerals in nature development on calcareous poor soils?**

**Background**

Zeolite minerals are able to bind ammonium ions (NH4+) and simultaneously release cations due to their ion-exchange properties, making them promising to mitigate for the increased atmospheric nitrogen deposition (Doorn van, et al., 2021). In pilot experiments, the ammonium removal of different zeolites was tested (vulkamin, actionine, optizec) when applied to an ammonium nitrate solution (based on mean annual nitrogen deposition in the Netherlands) and to different non-calcareous nature soils. Highest ammonium removal was found two weeks after actionine and optizec application to the ammonium nitrate solution (> 80%) and the slightly buffered grassland and softwater lake soil solutions (> 50%). In addition, calcium, potassium and sodium cations were released, indicating ion exchange with ammonium. Reductions in ammonium were lower in the acidic (oak forest) and over-limed (heathland) soil solutions, due to higher cation concentrations (H+; Ca2+) which compete with ammonium ions for absorption by zeolites. Vulkamin was less effective in ammonium removal and led to raised pH of the soil solutions, which in turn stimulated organic matter mineralization or nitrification, depending on initial soil conditions. More refined research about long-term effects and field experiments are needed to evaluate whether zeolites can be used in practice as mitigation tool for the raised nitrogen deposition.

Doorn, van J., Lucassen, E.C.H.E.T., Douma, M., Roosmalen, M., Roelofs, J.G.M. & A.J.P. Smolders. Mitigating nitrogen deposition with zeolite: potential applicability for different soil types. Landschap 2021 (2): 107-115. <https://www.landschap.nl/wp-content/uploads/2021_2-vandoornp106-115.pdf>

**Research**

Two long term field experiments will be started at Heerenven (Arcen) in cooperation with Het Limburgs Landschap in autumn 2022. The effects of sod cutting, zeolite type and dosis will be tested on soil chemistry and softwater vegetation (experiment 1) including the (expected) suppression of the invasive species *Crassula helmsii* (experiment 2). In early spring (2023) plant species will be introduced and the effects on abiotic conditions, as well as on vegetation, can be monitored.

**Information**

Jelmer van Doorn and Esther Lucassen

B-WARE Research Center, Radboud University Nijmegen

[E.Lucassen@b-ware.eu](mailto:E.Lucassen@b-ware.eu)

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