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Fertility and toxicity of the Martian regolith

Context:

One of the main technological challenges for enabling human colonization on Mars is the development of a sustainable food production capacity. A few years ago, Mars Odyssey space probe discovered that the Martian regolith contain high contents of chlorine and harmful minerals for the growth of plants, such as perchlorate salts.

Goals:

(1) To review the composition of the Martian regolith and inventory the nutrient supply capacity as well as the presence of toxic compounds
(2) To develop amendments and remediations strategies enabling the use of the Martian regolith for agricultural activities.

Tests will be run using an analogue regolith from the Pampas de la Joya desert in Peru. The initial focus will be on the removal of perchlorates using a lixiviation column.

Knowledge and skill required:

- Interest for space science and planetary bodies exploration
- Fundamental knowledge of soil chemistry
- Disposition towads bench work
- Good collaborative and communication skills

Collaboration:

This project is conducted in collaboration with the Asclepios project (www.asclepios.ch).

Keywords: Extraterrestrial regolith, chemical fertility, perchlorate, lixiviation

Working place: Géopolis

References:

https://www.nasa.gov/feature/can-plants-grow-with-mars-soil
https://asclepios.ch/wp-content/uploads/2020/08/REDMARS.pdf

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