

Bacteria with interesting properties discovered in underground caves

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In one of the caves in Algeria where probiotic bacteria has been found. To the right Baraa Rehamnia, guest researcher in Natuschka Lee's research group at Umeå University. Credit: club de spéléologie et sport de montagne de Béjaïa

A research team from Umeå University, SLU and Algeria has found bacteria with a number of interesting properties in previously unexplored caves at a depth of several hundred meters in Algeria. One of these properties is the breakdown of gluten, which can therefore be of interest

to people with gluten allergies. The results are published in *Microbiology Spectrum*.

"This study is yet another example of the fantastic potential of exciting microbes on our own planet. Despite intensive research, we have so far only managed to map a small part of all microbes found on earth," says Natuschka Lee, researcher at the Department of Ecology and Environmental Sciences at Umeå University.

When Jules Verne wrote his novel "Journey to the Center of the Earth," many people trivialized the wild fantasies surrounding the existence of life in the underworld. It took several decades before biologists began to seriously explore life underground.

Today, it is known that at least 30% of all microorganisms on earth live deep underground—under completely different conditions than the [life forms](#) on the earth's surface, for example without sunlight and thus without plants. Research into underground life forms can give us interesting information about how life can develop in different ways on Earth and whether there can be life in the underground on other celestial bodies, such as on the planet Mars.

Caves can act as a natural gateway down to the underworld. Caves are found all over the world, but only a fraction of these have been explored. In the last decade, [cave](#) research has received a lot of interest—even in the context of space research, as some planets, such as Mars, have been found to contain many caves.

In the current study, Natuschka Lee in collaboration with Baraa Rehamnia, until recently visiting Ph.D. student from Constantine University in Algeria (who is doing her dissertation on this research topic during the summer of 2022) and Ramune Kuktaite, researcher at the Department of Plant Breeding at SLU in Alnarp, have looked for

interesting characteristics of spore-forming bacteria in up till now unexplored caves at a depth of several hundred meters in Algeria.

These bacteria are closely related to the Bacillus group, a group of bacteria much studied in astrobiology due to their impressive survival abilities and which on our own planet play a major role in several different contexts, partly as pathogens, partly as beneficial microbes in both ecological and biotechnology contexts.

"For example, we found strains that can produce antimicrobial substances or that can break down gluten, a substance that can cause inflammatory reactions in the intestines of many people. The bacteria were also found to be able to tolerate the [extreme conditions](#) found in our digestive system," says Natuschka Lee.

In the future, the researchers will investigate whether these [bacteria](#) can be of use to the biotechnology industry for, for example, gluten allergy.

More information: Baraa Rehamnia et al, Screening of Spore-Forming Bacteria with Probiotic Potential in Pristine Algerian Caves, *Microbiology Spectrum* (2022). [DOI: 10.1128/spectrum.00248-22](https://doi.org/10.1128/spectrum.00248-22)

Provided by Umea University

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