

Press release**Leibniz-Institut für Agrartechnik und Bioökonomie e.V. (ATB)****Dr. Ulrike Glaubitz**

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Scientific Publications

Biology, Environment / ecology, Nutrition / healthcare / nursing, Zoology / agricultural and forest sciences
transregional, national**One Health: Scientists advocate for the inclusion of soil microbiomes for a holistic approach**

The One Health approach considers a close link between the health of all living organisms and aims to bring them into a sustainable balance. However, the smallest organisms living in the soil, the so-called soil microbiome, have been largely ignored in this approach so far. This is what researchers aim to change now. In a commentary in the renowned journal Nature Microbiology, they argue for the inclusion of the soil microbiome as a future key component for the One Health approach.

Our health is closely linked to the health of animals, plants, and our shared environment. This holistic One Health approach focuses on our common dependency with the aim of sustainably balancing the overall health and combating risks such as infectious diseases, antimicrobial resistance and the climate crisis. To this end, politics, science and medicine in the fields of human and veterinary medicine, environmental and agricultural sciences and food technology need to cooperate interdisciplinarily.

Scientists from Australia, Italy, and Germany have now published a comment article in the journal Nature Microbiology with the aim of integrating a further focus into the approach. "Healthy soils are the foundation of planetary health and, in turn, of human, animal, and ecosystem health. So far, the soil and its microbiome - i.e. all the bacteria, archaea, microbial eukaryotes, and viruses - have hardly been taken into account," explains Ahmed Abdelfattah, group leader of the working group "Microbiome Management" at the Leibniz Institute of Agricultural Engineering and Bioeconomy (ATB). Yet the soil is one of the most important, and diverse habitats on earth; up to eight billion organisms can live in just a handful of soil.

On the one hand, microbes can be beneficial for the health and balance of an ecosystem, while other species, despite being a very small fraction, can be harmful to us and our environment. Since the COVID pandemic at the latest, it has become clear how closely human and animal health are linked. In order to prevent future transmission of infectious diseases between humans and environments, a comprehensive, transdisciplinary knowledge is needed. The authors point out that soil organisms play a crucial role here.

Abdelfattah explains further: "Soil microorganisms are the main source of the natural microbiomes of living organisms. The destruction of the soil microbiome, e.g. through contaminated wastewater, soil erosion in agriculture, but also due to climate change, and reduced biodiversity, evidently goes hand in hand with diseases and significantly reduces the quality of our environment."

Soil health is also essential for healthy nutrition and food security. Microorganisms influence nutrient cycling, improve plant growth, and are involved in the degradation of pollutants.

"The effective management of human health demands the best possible knowledge to support policy action at different levels and scales. Therefore, a more integrated and well-resourced landscape of key stakeholders of researchers at the

Science-Policy-Interface is urgently needed that explicit consider soil health and microbiomes, as an important component in broader implementation of the One Health approach," says Prof Brajesh Singh of Western Sydney University and the lead author of the paper.

With their publication, the authors draw attention to major gaps in our knowledge: how exactly does the soil microbiome influence our environment and our health? And what can cause a disruption of the system? A transdisciplinary and systematic approach – that includes soil - could assess and predict risks related to human pathogens, antimicrobial resistance, and contaminant toxicity, and offer preventive and mitigating measures.

contact for scientific information:

Dr. Ahmed Abdelfattah – Working Group Leader Microbiome Management, ATB
aabdelfattah@atb-potsdam.de

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