

Antibiotics in manure a far-reaching impact on abundance of human pathogenic bacteria in soils

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Scientists of Helmholtz Zentrum München, in a joint study with researchers of Julius Kühn Institute in Braunschweig, have found that the repeated application of manure contaminated with antibiotics lastingly changes the composition of bacteria in the soil. The focus of the investigation was on sulfadiazine (SDZ), a widely used antibiotic in animal husbandry which enters the soil via manure. In the latest issue of the journal *PLoS ONE*, the researchers report that repeated application of the antibiotic leads to a decrease in beneficial soil bacteria and at the same time an increase in bacteria that are harmful to humans.

Since antibiotics are commonly used in animal husbandry, the implications for agricultural areas that are fertilized with the manure of these animals are of great interest. The study results confirmed the scientists' hypothesis that the application of antibiotics has an effect on the composition of [soil bacteria](#). "After repeated application of [manure](#) contaminated with antibiotics, we found a decrease in the bacteria that are important for good soil quality. This means a loss of soil fertility and thus in the long run a decline in crop yields," said Professor Michael Schloter, head of Research Unit Environmental Genomics at Helmholtz Zentrum München. "Moreover, the number of microbes living in the soil that are harmful to humans increased under the experimental conditions of the study."

Wide-reaching consequences for human health

"The increase in human pathogenic microorganisms in the environment has wide-reaching consequences for [human health](#)," says Professor Schloter. "We are in continuous contact with these microorganisms, and the probability of contracting an infection increases accordingly. This applies particularly to diseases of the respiratory system and the lungs, as bacteria are spread through the air and inhaled. Moreover, many of the bacteria are resistant to commonly used antibiotics, which often makes treatment more difficult. We must therefore urgently develop a new mindset as regards the use of [antibiotics](#) in [animal husbandry](#)."

More information: Ding, G-C. et al. (2014), "Dynamics of soil bacterial communities in response to repeated application of manure containing sulfadiazine," *PLOS ONE*, 9(3): e92958, [DOI: 10.1371/journal.pone.0092958](#).

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