Effects of composting and antibiotics on cattle manure-borne antibiotic resistance genes

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Video Byte

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Abstract

Antibiotic resistance is increasingly prevalent, with costs to the economy and to human health. Globally, antibiotic usage in livestock is expected to increase by 66% by 2030, and antibiotics used in animals are clinically relevant to humans. Better understanding the effects of different antibiotics and manure management practices will help to decrease the potential for antibiotic resistance. In a recent study, researchers examined the effects of different manure composting techniques in dairy and beef cattle treated with different antibiotic regimens. They found that the total antibiotic resistance gene (ARG) expression, or “resistome,” changed with the progression of composting with time. The relative abundance of ARGs decreased over time in all conditions, except when the compost was externally heated, but in contrast to the overall trend, some ARGs, including Sul1, intl1, beta lactam, and plasmid-associated genes, increased in all finished composts. External heating more effectively reduced certain clinically relevant ARGs, fecal coliforms, and resistome risk scores and the compost composition was distinct between dairy and beef cattle manure collected during antibiotic administration. These results highlight the contribution of composting techniques to the resistome and indicate that while composting reduces the potential for antibiotic resistance to spread, additional mitigation measures may be needed.