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# Conservation tillage positively influences soil organic carbon through earthworm excrement physical structure stability in a Chinese Mollisoil

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Identifying the relationship between earthworm activity and soil organic carbon is vital for both planning and performing farming operations. Numerous studies have emphasized that earthworms affect soil organic carbon greatly. However, the extent of this effect is still somewhat vague, and very little is known, not to mention the role of earthworm excrement. The objective for this study is to determine the effect of earthworm excrement on soil organic carbon following different tillage practices based on physical structure stability parameters. Both no tillage (NT) and ridge tillage (RT) led to significant total pore surface area, permeability, fluid conductivity, water resistance index and tensile strength increment than moldboard plow (MP) ($p<0.05$), whereas water repellency significant decrement ($p<0.05$). Similar to soil organic carbon, NT and RT significantly increase organic carbon in earthworm excrement than MP ($p<0.05$). A significant positive correlation ($p<0.05$) was found between organic carbon in earthworm excrement and total pore surface area, water repellency, tensile strength, respectively. This finding demonstrates that conservation tillage increase organic carbon in earthworm excrement through physical structure stability namely aggregation effect of earthworm excrement on soil water movement and gas diffusion, potentially important for the soil organic carbon increment.