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## Material and microbial changes during corn stalk silage and their effects on methane fermentation

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**Abstract:** Silage efficiency is crucial for corn stalk storage in methane production. This study investigated characteristics of dynamic changes in materials and microbes during the silage process of corn stalks from the initial to stable state. We conducted laboratory-scale study of different silage corn stalks, and optimized silage time (0, 2, 5, 10, 20, and 30 days) for methane production and the endogenous microbial community. The volatile fatty acid concentration increased to 3.00 g/L on Day 10 from 0.42 g/L on Day 0, and the pH remained below 4.20 from 5.80. The lactic acid concentration (44%) on Day 10 lowered the pH and inhibited the methane yield, which gradually decreased from 229 mL/g TS at the initial state (Day 0, 2) to 207 mL/g TS at the stable state (Day 10, 20, 30). *Methanosaeta* was the predominant archaea in both fresh and silage stalks; however, richness decreased from 14.11% to 4.75%.

**Keywords:** Silage corn stalk, volatile fatty acids, methane yield, microbial community

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