

Chemical Engineering Thesis Defense

Microbial Metabolic chain elongation

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abstract

This research explores a microbial metabolic process in soil which could be a possible cause of production of complex organic compounds in the soil, thus it is important to consider it in the carbon cycle. Simple substrates such as ethanol and short chain carboxylates such as acetate can be converted to longer carbon chain carboxylates under anaerobic and methanogenesis inhibited conditions, through cyclic, reverse β oxidation pathway, which each time elongates the carboxylate by two carbons. Chain elongation process is overall thermodynamically feasible, and microorganisms gain energy through this process. There have been limited insights into the versatility of chain elongating substrates, understanding the chain elongating microbial community, and its importance in sequestering carbon in the soils.