

Characteristics of methanogens and methanotrophs in rice fields: a review

ABSTRACT

Methane is the second most important greenhouse gas after carbon dioxide (CO₂) with a global warming potential 25 times more than CO₂. Rice fields are one of the main anthropogenic sources for methane and responsible for approximately 15-20% of the annual global methane efflux. Methanogens and methanotrophs are two microbial communities which contribute to the biogeochemical methane cycle in soil by producing and oxidizing methane, respectively. In fact, the total methane emission from rice soil is the balance between methanogen and methanotroph activities. Methanogenic archaea are more active in highly reduced conditions and anoxic soils. However, methanotrophs are more active in oxic soils. These microorganisms have been studied frequently in different soils from natural wetlands to rice fields. This article has mainly focused on the characteristics of methanogens and methanotrophs in a rice soil ecosystem with the objective of deriving solutions the high level of methane emissions from paddy fields.

Keyword: Methane emission; Microbial communities; Rice soil