

Effects of Open-Top Chamber on soil chemical properties and microbial growth

ABSTRACT

Global warming is the main concern in today's century as it comes with numerous side effects to the natural environment. Open Top Chambers (OTC) consist of metal constructions with transparent vertical side-walls and a frustum on top. An opening in the middle of the frustum allows an air exchange to reduce temperature and humidity effects in the chamber. The size of the open top chamber which is located in Universiti Putra Malaysia is slanted 60°, 50cm tall, 2.08m basal diameter hexagon chamber. The Open Top Chamber experiments were carried out to determine how much global warming has affected and is still affecting the temperature, pH, the moisture and the growth of the microbes in the tropical soil. The aim of this study is to elucidate the effects of temperature increase on the soil microbes' population and on the pH of the soil. The study was conducted to observe the effect of heat on the population of soil microbes and the pH of the soil which was collected on the same day for 6 consecutive months. The microbes from the samples were grown on agar plates. The population of microbes on the plates were used as values were for Colony Forming Unit (CFU) value calculations. The effects of OTCs on mean temperature showed a large range of CFU values throughout the 6 months but did not differ significantly between studies. Increases in mean monthly and diurnal temperature were strongly related, indicating that the presence of warming effect by the OTCs. Such predictive power allows a better mechanistic understanding of observed biotic response to experimental warming. This study will be useful for the understanding of the global warming effect on microbes. The Open Top Chamber experiment has proven to be one of the effective model for global warming research and data collected especially on the growth of soil microbial obtained would be of great use for further experiments.

Keyword: Open Top Chamber; Global warming; Soil chemical properties; Microbial growth