How does global warming affect fungal growth and decomposition of organic carbon from plant material?

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One of the most pressing issues affecting the world today is global warming. This phenomenon occurs because greenhouse gases, including water vapor, carbon dioxide, nitrous oxide, and methane, block the heat emanating from Earth's surface from leaving the atmosphere, resulting in an increase in temperature. This gradual change in temperature, although relatively small, has a huge impact on the environment and contributes to drought, which is currently a major issue in California. In addition, ocean water expands as it gets warmer, and glaciers and other ice will begin to melt, leading to rising sea levels. Faced with changing climates and global landscapes, many animal and plant species could be at risk for extinction. This project will focus on one of the major greenhouse gases, carbon dioxide. Because fungi play a major role in the storage and release of carbon from organic matter, the effect of varying levels of the gas on the growth of mushrooms will be observed. It is hypothesized that the increase in the mean global temperature is increasing the fungal decomposition of organic carbon from plant material, thus creating a positive feedback on the carbon cycle and increasing global warming. The species of mushroom that will be grown are called *Ganoderma lucidum* and *Pleurotus djamor. Ganoderma lucidum* are large, reddish-brown, glossy mushrooms that are found worldwide, and are used primarily for their medicinal properties. *Pleurotus djamor* are typically bright pink and coral-esque in appearance, but can range in color from white to beige as well. This particular species, which grows rather quickly and can handle relatively high temperatures in comparison to other mushrooms, is grown both for its beauty and for consumption. These primary decomposers will be grown on media (corn meal agar) in bags of sawdust, with one group at the mean global temperature during the pre-industrial era (1800-1870: roughly 13.7°C), and another group at the mean global temperature of 2015 (approximately 14.7°C). The growth rate as well as sporulation of these fungi will be recorded. In addition, the carbon emissions of each group will be recorded and compared at equal time intervals as they grow. In line with our hypothesis, it is predicted that the mushrooms grown at the warmer temperature will emit more carbon dioxide and grow faster in comparison to those grown at the lower temperature. By conducting this experiment, it is hoped that a better understanding of the cause of global warming is obtained, and that further discussion about the issue will be encouraged.