Inhibition of hyphal growth of the fungus *Alternaria alternata* by chlorine dioxide gas at very low concentrations


The efficacy of chlorine dioxide (ClO$_2$) gas at very low concentrations for hyphal growth of *Alternaria alternata* related to fungal allergy was evaluated using a fungus detector. The fungus detector is a plastic sheet with a drop of spore-suspending medium, and it makes possible clear observations of hyphal growth with a light microscope. ClO$_2$ gas (average 0.075 ppm, 0.21 µg/l) inhibited hyphal growth of the fungus, but not germination of fungal spores. The hyphal length was more than 1780 µm under air conditions (control) and 49±17 µm under ClO$_2$ gas conditions for 72 h. According to the international chemical safety card, threshold limit values for ClO$_2$ gas are 0.1 ppm as an 8-h time-weight average and 0.3 ppm as a 15 min short-term exposure limit. From these data, we propose that treatment with ClO$_2$ gas at very low concentrations in space is a useful tool for the growth inhibition of fungi in the fields of food, medicine, etc. without adverse effects.