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Reaction mechanism between cell membranes of *P. digitatum* spores and oxygen radicals MASAFUMI ITO, HIROSHI HASHIZUME, TAKAYUKI OHTA, Faculty of Science and Technology, Meijo University, KEIGO TAKEDA, KENJI ISHIKAWA, MASARU HORI, Graduate school of Engineering, Nagoya University — *P. digitatum* spores were exposed to oxygen radicals 10 and 20 mm downstream from our developed atmospheric-pressure oxygen-radical source. Treated spores were stained by 1,1'-dioctadecyl-3,3',3'-tetramethyl indocarbocyanine perchlorate (DiI), which has been used for investigation for functions of cell membranes. For control spores, DiI is not permeable into cells because cell membranes have selective permeability. Stained spores were observed by confocal laser microscopy. At 10 mm distance, 84% of total spores were intracellularly stained with 1.5-minute oxygen radical treatment. On the other hand, at 20 mm distance, about 80% of the total spores were intracellularly stained at least with 3-minute oxygen radical treatment. Based on the results of inactivation rates of *P. digitatum* spores and oxygen-radical densities, the results indicated that the increase of ratio of the number of intracellularly stained spores was correlated with the density of $O(^3P_j)$ rather than $O_2(^1\Delta_g)$. These results and SEM observations suggest that $O(^3P_j)$ plays an important role as an inactivation factor by disturbing the normal function of cell membranes and influencing intracellular organelles without major deformation of the membranes.

Masafumi Ito
Faculty of Science and Technology, Meijo University

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