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ミドリカビ胞子からの電子スピン共鳴信号の同定(3)

Identification of ESR signals arisen from *Penicillium digitatum* spores-3

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Foodborne diseases encompass a wide spectrum of illnesses and are a growing public health problem worldwide, as the result of ingesting contaminated foodstuffs [1]. Although outbreaks of food borne illness or deterioration of food spoilage by bacteria growth have involved contaminated fresh and raw foods, the source of harmful bacteria in food can be treated to remove pathogens can reduce the risk of cross contaminating during food preparation. Non-thermal plasmas could be an effective method for killing pathogens and reduce pathogens on the surface of fruits and vegetables without alter the way the food looks. We have already studied the inactivation of the *Penicillium digitatum* spores by using non-equilibrium atmospheric pressure plasmas for food hygiene [2]. To clarify the inactivation mechanisms, the electron spin resonance (ESR) technique was used, and we have detected ESR signals arisen from *P. digitatum* [3]. We have searched for molecules in the spores to elucidate what are affected by the plasma treatments to lead to the lysis and the color change, quinone as the signals arisen from the spore is a candidate. In this study, we focused on an extensive identification of the ESR signals.

Spores of *P. digitatum* were immersed and dispersed into sterilized water added 1% of a surfactant to avoid clumping of the spores. Samples were prepared on synthetic quartz glass rods. The aqueous dispersed liquid was deposited on the quartz glass rod, followed by drying. ESR measurements were conducted using a standard X-band (9 GHz) and Q-band (33 GHz) spectrometer. All experiments were conducted at room temperature.

Figure shows the experimental Q-band ESR signals from fungal spores of *P. digitatum*. The ESR spectrum was analyzed by overlapping multiple Gaussian signals. Main component is located at g-value of 2.0040. Preliminarily the detected ESR signal represents overlap of semiquinone and peroxy-quinone. For the plasma exposed samples, the peroxy state originated the ESR signals. Further detailed identification will be presented.

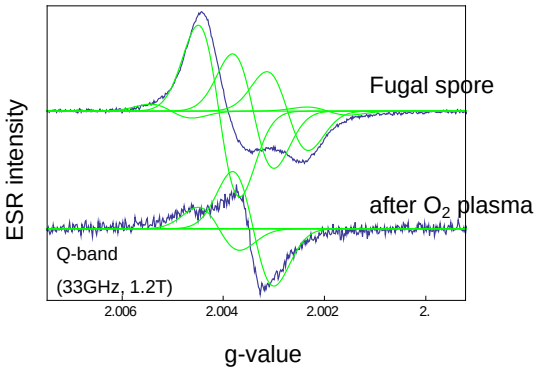

Figure Experimental Q-band ESR spectra for spores of *Penicillium digitatum*.

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References

[1] Global strategy for food safety (World Health Organization, 2012). [2] S. Iseki *et al.*, Appl. Phys. Lett. **96**, 153704 (2010). [3] K. Ishikawa *et al.*, J. Phys. Chem. Lett. **2**, 1278 (2011); Appl. Phys. Lett. **101**, 013704 (2012).

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