

# Plasma mediated activation of microbial cell differentiation

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We have evaluated the potential of atmospheric pressure non-thermal plasma in enhancing cell differentiation and function in beneficial fungi, *Aspergillus oryzae*, a fermenting fungus and *Flamulina velutipes*, a mushroom. Our experimental results demonstrate a possibility that plasma can activate spore germination and enzyme secretion in *A. oryzae* and fruiting body formation in *F. velutipes*. Plasma generated reactive species in media seemed to accelerate depolarization of spore membrane and intracellular Ca<sup>2+</sup> level. MpkA MAP kinase was activated and level of mRNA for spore germination associated genes was increased after plasma treatment. Long-lived species in media are likely to be involved in enhancing enzyme secretion. Our results to date suggest that plasma generated reactive species can enhance fungal spore germination, probably by stimulating spore swelling (loosening cell wall) and depolarizing the cell membrane, leading to the activation of calcium and MAPK signaling [1]. Our work was supported by the National Fusion Research Institute (NFRI) and National Research Foundation of Korea (NRF) (2016R1D1A1B03934922).

## References

[1] M. Veerana, J.S. Lim, E.H. Choi, G. Park, *Sci. Rep.*, 9, 11184 (2019)