Effects of plasma on cellular differentiation and metabolic activity in beneficial fungi

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Beneficial fungi have been actively used inagriculture, food industry, and environmental issues. However, improvement oftheir efficiency and usefulness is still a main subject for intense research. In thisstudy, the potential of atmospheric pressurenon-thermal plasma for activating beneficial fungi was examined.We used a filamentous fungus *Aspergillusoryzae* in the study. *A. oryzae*has been popularly used in fermenting soybean and rice, producing soy sause andalcohol. We investigated the effect of plasma treatment on cellulardifferentiation, and production and secretion of two important enzymes, amylaseand protease by fungus. Spore germination of *A. oryzae* (a filamentous fungus fermenting soybeans and rice) wasslightly increased after treatment with micro DBD plasma using nitrogen gas for1 and 2 min. Transcription level of several germination related genes measuredby Q PCR was also elevated after plasma treatment. Cellular production andactivity of amylase and protease were slightly enhanced, and expression ofseveral genes involved in the protein secretory pathway was elevated aftertreatment with nitrogen plasma. Our data up to now demonstrate a possible effectof plasma treatment on the activation of fungal cell differentiation andprotein secretion. Further study on mechanism and activation analysis iscontinuously going.

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