

Effects of Plasma Treatment on Seed Germination

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Abstract : Effects of cold plasma treatment on various plant seed germination were studied. The seeds of hot pepper, cucumber, tomato and arabidopsis were exposed to plasma and the plasma was generated in various devices. The germination speed was evaluated compared to an unexposed control. A positive effect on germination speed was observed in all tested seeds but the effects strongly depended on the type of the used plasma device (Argon-DBD, surface-DBD or MARX generator), time of exposure (6s~10min or 1~10shots) and kind of seeds. The SEM images showed that arrays of gold particles along the cell wall were observed on the surface of cucumber seeds showed a germination-accelerating effect by plasma treatment, which was the same as untreated. However, when treated with the high dose plasma, gold particles were not arrayed at the seed surface, it seems that due to the surface etching. This may suggest that the germination is not promoted by etching or damage of surface caused by the plasma treatment. Seedling growth improvement was also observed by indirect plasma treatment. These lead to an important conclusion that the effect of charged particles on plasma play the essential role in plant germination and indirect plasma treatment offers new perspectives for large scale application.

Keywords : cold plasma, cucumber, germination, SEM

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