

Atmospheric-pressure plasma promoted germination and growth in *Sorghum bicolor*

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Plants cannot move once plants spread their roots, they are exposed to various environmental stresses including thunder which is a plasma. Therefore, plants have mechanisms to survive and grow normally while enduring such stresses, and sometimes even use the stresses to their advance. There is an ancient tradition that thunder brings high crop yield, implying that the effects of plasma on plants. To elucidate this mechanism scientifically, we investigated the effects of plasma to *Sorghum bicolor* which is one of the important crops in the world and expected as a material of bioethanol recently.

For this work, a sorghum strain BTx623 was used because of several databases such as genome and transcriptome.^[1] Dry seeds were irradiated by an atmospheric-pressure plasma generated from air by creeping discharge.

In this work, it was revealed that plasma irradiation promoted seed germination and growth in sorghum. After irradiation of air plasma or air, RNA-seq analysis was performed using seeds 1 day after sowing. Greenhouse cultivation experiment was also conducted for growth promotion research (Figure 1).

To overcome the recent problem such as severe environmental change and an increasing world population, efficient production of food and energy are needed. This research will provide insight to securing crops, vegetables, and even bioethanol.

References

[1] Y. Makita *et al*, MOROKOSHI: transcriptome data base in *Sorghum bicolor*. *Plant Cell Physiol.* **56**, e6 (2015)

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Figure 1. Greenhouse cultivation experiment

Sorghum seeds were irradiated by air plasma (Plasma) or gas as a negative control (Control), and then the seeds were sown in soil. Left shows sorghums that were grown for 113 days.