

Elucidation of adaptation mechanism of rice to environmental stress through cold plasma treatment

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Rice is a major crop in Southeast and East Asia and one of the world's staple grains. Due to recent population growth and the impacts of climate change, it has become increasingly important to develop rice cultivars with higher yield and enhanced tolerance to environmental stresses. Traditionally, rice improvement has relied on breeding, mutagenesis, and genetic transformation, and more recently, CRISPR technology has also been utilized.

Interestingly, Suriyasak *et al.* reported that exposing rice seeds to cold plasma prior to germination restored delayed germination caused by heat stress during seed maturation [1]. This suggests that cold plasma treatment may alter the environmental stress responses of rice seeds and has potential as a next-generation breeding technology.

In this study, we investigated the effects of cold plasma treatment on the germination and early growth of rice under low temperature conditions. Our results showed that cold plasma exposure significantly enhanced germination rates at low temperatures. Moreover, under slightly low temperature conditions, seedlings grown from cold plasma-treated seeds exhibited longer shoot lengths compared to untreated controls. These findings indicate that cold plasma treatment not only improves germination but also influences stress responses during early seedling development. We will also discuss the mechanisms.

References

- [1] Suriyasak *et al.*, *Agric. Sci. Technol.*, **1**, 5-10 (2021)