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## Changes according to Water Management of Methane Emissions through Rice Plants in Rice Paddy Fields

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### [Introduction]

It is known that methane is generated when the anaerobic condition due to irrigation of rice paddy continues, and about 90% of it is released into the atmosphere through the aerenchyma of rice plant. In this regard, this study was conducted to examine the changes caused by intermittent drainage other than continuously flooding plot.

### [Materials and Methods]

Saeilmibyeo was transplanted as young seedling on June 9, 2022 in the test field (Wanju) of the National Institute of Crop Sciences in order to check the change in the amount of greenhouse gas generated by water management and the effect of rice plant body. Water management includes continuously flooding, mid-season drainage(7/6~7/20), AWD(alternate wetting & drying) 10cm or 15cm . AWD treatment was carried out from 20<sup>th</sup> day after transplanting. Irrigation was performed again to 5 cm above the ground when the water level reached 10 cm or 15cm below ground. AWD plot was Continuously flooded 20 days from the 20th day before heading date to heading date, and then the AWD treatment was carried out again. The amount of methane generated was collected using the chamber method and quantified through GC method. Eight rice stock were planted in the chamber was compared with empty chamber(removing rice stock) to evaluate the rate of release into the atmosphere through the rice plant.

### [Results and Discussion]

The amount of methane generated in the continuously flooding plot was insignificant until 10 days after transplanting, and then reached a maximum about 30 days after transplanting. Of the 91.6kg/10a methane generation (accumulated amount from June 21st to August 24th), 88% was emitted through rice plants from the continuously flooding plot, and only 12% was volatilized directly from the soil into the atmosphere. However, in intermittent drainage(midseason drainage, AWD 10, and AWD15 etc.), the proportion of the amount emitted through rice plant was relatively reduced to 43%, 76%, and 56%, respectively. It was found that this was not a decrease in the amount emitted directly from the soil, but rather a decrease in the amount released through the rice.

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