

# **Influence of Soil Water Status and Atmospheric Vapor Pressure Deficit on Fermentation of Oriental Melon (*Cucumis Melo. L*) Grown in Plastic Film House.**

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## **Objectives**

The influence of soil water potential and VPD on fermentation of oriental melon (*Cucumis Melo. L*), especially water filling symptom within placenta, was investigated. Aim of this study is elucidate the relationship of soil water potential and climatic factors to fermentation of oriental melon, in particular incidence of water filling symptom.

## **Materials and Methods**

The experiment was carried out in conventional plastic film house for oriental melon, where air humidity and temperature was not controlled, variations of VPD were mainly dependent upon changes of climatic conditions.

Gumssaragi-Eunchoen grafted to hybrid squash 'Shintoza (*Cucurbita maxima*×*C. moschata*)' used for experiment.

At different phenological stages (fruit swelling, after ripening), two irrigation treatments (-10kPa, -50kPa) were applied under two VPD levels : high VPD condition was obtained during sunny day (25. April 2004), and low VPD condition was obtained during rainy day (27 April 2004). Root-pressure driven xylem sap flow was evaluated such as followed precedence. 5 plants were decapitated 1cm below the cotyledonary node. After a few drops of exudate were discarded, a sap sample was collected in PE centrifuge tube for 2 hours and weighed.

Soil water potential was monitored at 15cm depth by tensiometer (Soil Moisture Co., USA), climatic data was recorded on datalogger (TR-71S, T&D Co., Japan) and vapor pressure was calculated using Murray's equation.

## **Results and Discussion**

Diurnal changes of root-pressure driven xylem sap flow was exhibited and exudation of xylem sap was strongly dependent on the soil water potential. At high soil water potential and low VPD condition, the remarkable increase of fermentation rate was observed in fruit at ripening stage.

However, the soil water potential had not a significant effect on the production of water filled oriental melon at high VPD condition.

These results showed that high soil water potential and low VPD condition exert effect on fermentation of oriental melon.

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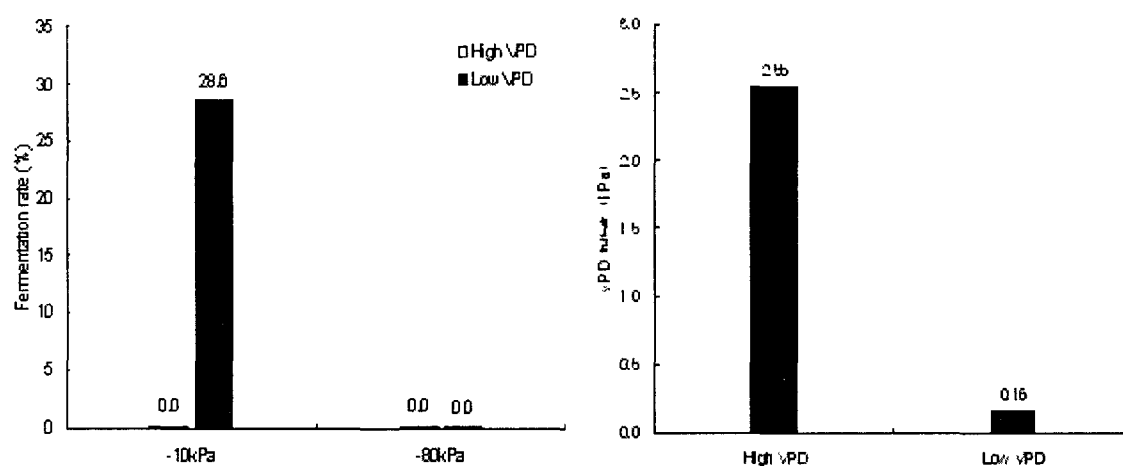


Fig 1 Influence of soil water potential and Vapor pressure deficit (VPD) on fermentation of oriental melon (*Cucumis Melo. L*)

Table1 Vapor pressure deficit between air and plant organs (a : fruit, b : leaf) under different VPD conditions.

(a)

VPD condition	Fruit	Air	$e_{\text{Fruit}} - e_{\text{Air}}$ (kPa)	Transpiration <sup>†</sup> (g/hr)
High	Temp. = 28.0 °C RH = 100% $e=3.77$	Temp. = 30.0 °C RH = 50% $e=1.82$	1.95	0.79±0.31
Low	Temp. = 16.0 °C RH = 100% $e=2.12$	Temp. = 15.0 °C RH = 94% $e=1.54$	0.58	0.43±0.20

(b)

VPD condition	Leaf	Air	$e_{\text{Fruit}} - e_{\text{Air}}$ (kPa)
High	Temp. = 27.6 °C RH = 100% $e=3.69$	Temp. = 30.6 °C RH = 25.9% $e=1.14$	2.55
Low	Temp. = 16.9 °C RH = 100% $e=1.93$	Temp. = 17.3 °C RH = 90% $e=1.77$	0.16

<sup>†</sup> Fruit transpiration was determined by weight-loss technique. (Shirazi, A. and A.C. Cameron. 1993. Hortscience 28 : 1035-1038)