

# Enhancement of Melon Yields by Rice-Straw Application in Protected Film House

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## Objectives

This investigation was carried out to analyze the uptake of mineral nutrients in plant and changes in soil chemical properties by soil amendment, and to verify the increased yield of melon as the result of rice-straw application.

## Materials and Methods

- Plant material : Melon, cv. Uls-net
  - transplanted on May 30, 2004 and on February 20, 2005
- Experiment field : Two farmlands (Soil condition : Health and Badness)
- Treatments

Soil condition	Year	Chemical fertilizer (kg10a <sup>-1</sup> )			Compost (MT 10a <sup>-1</sup> )
		N	P <sub>2</sub> O <sub>4</sub>	K <sub>2</sub> O	
Health	2004	3.1	2.0	2.6	1
	2005	3.1	2.0	2.6	1
Badness	2004	5.9	3.5	13.3	1
	2005	-	-	-	rice straw 2 + compost 2

- With the object of the improvement of soil physical properties and the exclusion of accumulated salts, rice-straw and deep plowing were supplied on farmland with bad soil condition in 2005.
- Soil and plant samples : collected at intervals of 10 days after transplanting

## Results and Discussion

- Rice-straw application and deep plowing for improving soil amendment strongly promoted an increased yield of melon, so melon yield in this year was 3.5 fold much than in last year.
- An increase of EC, organic matter and available phosphorus as the effect of rice-straw application and deep plowing highly enhanced the physicochemical properties of soil. A soil amendment accelerated uptake and utilization of mineral nutrients into melon plants and, therefore, promoted a healthy growth of melon plants.
- Mineral nutrients contents in leaves measured at harvesting stage in 2005 remarkably increased, in particular showed in macro-nutrients. As compared with two soil conditions, the contents of mineral nutrients in 2004 were higher in a healthy farmland, however, those contents in 2005 were much concentrated in an improved farmland.

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Table 1. Yearly fluctuation of soil chemical properties and melon yield in two farmlands at harvesting stage by year

Soil condition	Year	Yield (kg10a <sup>-1</sup> )	pH (1:5)	EC (dS/m)	OM (%)	T-N (%)	Av.P <sub>2</sub> O <sub>5</sub> (mg/kg)	Ex. cations (cmol <sup>+</sup> kg <sup>-1</sup> )			
								K	Ca	Mg	Na
Health	2004	3.100	7.07	3.19	1.47	0.46	586	1.7	10.2	4.1	0.8
	2005	4.000	7.24	2.60	3.35	0.19	543	1.5	13.0	3.7	0.8
Badness	2004	1.300	6.31	3.77	1.62	0.24	632	2.2	9.6	4.2	0.8
	2005	6.000	6.77	7.14	4.82	0.29	1278	4.0	14.4	7.4	1.9

Table 2. Concentration of mineral nutrients in melon leaves in two farmlands at harvesting stage

Soil condition	Year	N	P	K	Ca	Mg	Na	Fe	Cu	Mn	Zn	B
		----- % -----							----- mgkg <sup>-1</sup> -----			
Health	2004	1.41	0.48	1.56	6.03	1.87	0.10	554	12	53	113	365
	2005	2.62	0.28	3.87	7.16	1.47	0.23	167	-	24	79	142
Badness	2004	1.24	0.24	1.38	4.31	2.83	0.32	209	11	78	86	271
	2005	3.75	0.46	6.18	7.37	2.23	0.59	277	-	63	70	165