



Water solutions for the world.

Growing Young Plants with Oxygen Nanobubbles

FOREPORT Taiwan:
GOOD RESULTS GROWING
YOUNG PLANTS WITH OXYGEN
NANOBUBBLES



FOREPORT Taiwan

Foreport was set up in 1979 with their head office in Taipei Taiwan. Foreport specializes in import and export of horticulture products. This includes seeds, plants, and bulbs as well as related material and equipment.

Besides service they give to Taiwanese growers by their technical team, they also have three nurseries in Taoyuan, Puli, and Chin Jing. The primary function of the greenhouses is to do trials for new varieties, produce seedlings, rooted cuttings, store bulbs and related materials.



In December 2019 till February 2020, Foreport did commercial nanobubble trials with young plants. The purpose was to show the power of the Solari submersible nanobubble generators to their customers.

nanOBUBBLE Research

Taiwan is known for its hot and humid climate. The months from December through to February are different in terms of light and temperature. During this period, all plant growth is determined by the amount of natural light.

All crops under cultivation slow down in development during the winter season.

Even though natural light is the limiting factor in growth we could see significant differences in crop performance of plants treated with nanobubble oxygen water and the crop grown with normal water.



O2 nano bubbles irrigated

normal irrigation water

The differences in growth can be seen by the size of the plants in the photos above. The photos show the difference in root growth to that point of plant development.



RESEARCH SETUP

- Cultivation location west of Taipei
- Water tank is 15m³
- In the water tank submerged one Solari 737 submersible nanobubble mixer
- Trial period 5 Dec 2019- 15 Feb 2020
- Seedling period: 2019/12/04-2019/12/31
- Transplanted in 3" pots for 4 weeks
- Transplanting period: 2020/01/01-2020/02/15
- Supervised by Foreport and a government research institute

For 15 tons of water the Solari submersible unit is run for 4 hours. Incoming water is measuring 6.5 ppm of dissolved oxygen. The DO was set on 20 ppm in the tank, with a loss of a little less than 10% through the water system. This translated to 18.3 ppm in the greenhouse at the plant roots. Irrigation recipe had the normal intervals during cultivation.



O2 nano bubbles irrigated

normal irrigation water

RESEARCH OBSERVATIONS AND CONCLUSIONS

- Nanobubbles treated seedlings, as is the expectation, will have a higher survival rate during hot summers because they developed a stronger root system.
- After transplanting, in the 3rd week, the treated plants are bigger than without treatment.
- The harvested vegetable in 6th week is about 25-30% heavier than without treatment.



O2 nano bubbles irrigated

normal irrigation water

plant stage week 6



RESEARCH OBSERVATIONS AND CONCLUSIONS

See below table showing differences between nanobubbles vs normal water on height, number of leaves and fresh weight.

Results cultivating vegetables with and without O2 nanobubble treatment after transplant 6 weeks:

(Equipment used Solari Submersible UFB Generator and Oxygen Concentrator)

Product	Treatment	Notes	Height (cm)	No of leaves	Fresh Weight (g)
Brassica rapa var. perviridis	Nanobubbles	O2-O2	16.4	8.5	25.9
小松 *	Normal	CK-CK	15.3	8.4	20.4
Brassica chinensis Linn	Nanobubbles	O2-O2	12	12.1	31.2
青江菜* <i>spoon cabbage</i>	Normal	CK-CK	10.4	11.9	24.6
Lettuce "black leaf"	Nanobubbles	O2-O2	14.5	8	26.6
黑葉*	Normal	CK-CK	12.6	7.9	20.4

notes:

* this information is in Taiwanese and is copied as provided in the table from Foreport. We are not aware of the corresponding English word.

The table above is as supplied by Foreport where the same equipment as the Solari Submersible Nanobubble Generator coupled to a Oxygen Concentrator was used.



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