

## Mebiol Inc.

Offering the proprietary membrane farming technology (Imec) to maximize the use of contaminated soil after catastrophic tsunami in Japan

[www.mebiol.co.jp](http://www.mebiol.co.jp)

Mebiol Inc.  
1-25-8 Nakahara  
Hiratsuka, Kanagawa 254-0075  
JAPAN

Founded in	1995
No. of employees	11
State of Ownership	private
Primary stock exchange	N/A

**April 2011:** Started by a polymer scientist, Dr. Yuichi Mori, Mebiol provides unique membrane technology to improve productivity, quality and sustainability in agriculture. Its technology will contribute to bring solutions to the soil contaminated by sea water, toxic substances and radiation after the devastating tsunami on March 11<sup>th</sup> in Japan. Venture Valuation (VV) interviewed Dr. Mori, CEO and visiting professor at Waseda University.

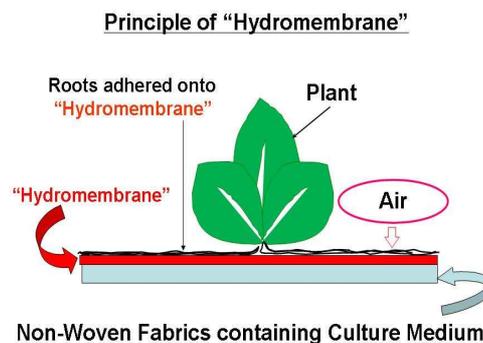


**VV:**

**What is your membrane farming technology?**

Mori:

Advanced membrane technologies have been applied to medical treatment for blood purification and oxygen enrichment, to water treatment for desalination and purification, and to energy processing for battery separator and CO<sub>2</sub> separator. Mebiol is globally the first and only company that has commercialized the membrane for plant cultivation which is called "Hydromembrane".



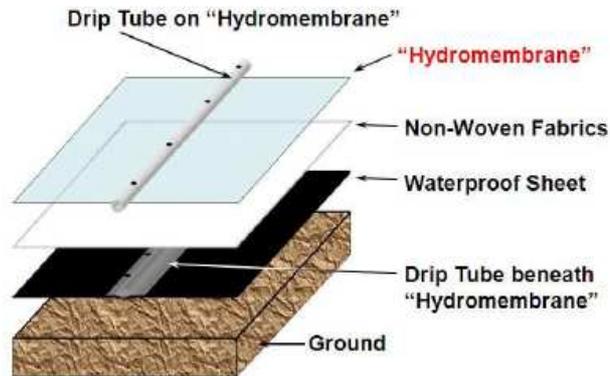
The plants grows on "Hydromembrane", a hydrophilic film made of hydrogel, which allows the passage of water and nutrients such as various ions, amino acids and sugars but not bacteria, fungi and viruses. It protects plants from diseases; use of pesticide is minimized.

Also the plants synthesize a lot of sugar to increase the osmotic pressure so that they take more water through "Hydromembrane" leading to high nourishment.

Our technology changes agriculture to industry by substituting an industrial product, "Hydromembrane" for soil, which solves low profitability and instability problems of farming.

**VV: How is your membrane technology (Imec) system implemented and operated?**

**Mori:** Our system consists of a waterproof sheet, non-woven fabric, the "Hydromembrane", and two drip tubes. The waterproof sheet is spread on the ground and the lower drip tube is put on it. Then the non-woven fabric is set on it. The fabric absorbs the water (fertilizer) supplied from the lower drip tube. "Hydromembrane" is spread over and the upper drip tube for the plant growth is put on it.



The system is simple, light weight, and inexpensive. Only "Hydromembrane" is changed every culture and the other materials are reusable as much as you would like to. The waterproof sheet entirely sealing ground (soil) enables farming anywhere: desert, closed site of factory, contaminated sites, etc.

Subsidized by the Ministry of Agriculture, the Imec system has been installed over 60,000 m<sup>2</sup> for two years. Pesticide-free and high quality tomatoes, the first products, have been well received by consumers. Melon, cucumber, strawberry, paprika, and lettuce will be soon available on the market.

**VV: How do you differentiate your technology from the existing methods?**

**Mori:** Our film culture system cost is around one-fourth of hydroponics, three times higher than soil culture. We remind you, however, that the installation is easy and time efficient. "Hydromembrane" is recyclable and safely incinerated as well.

(\$1000 / 1000 m<sup>2</sup>)

	Film Culture	Soil Culture	Hydroponics
<b>System Cost</b>	45	15	200

Since the waterproof sheet perfectly prevents runoff of supplied water/nutrition solution into outside, fertilizer consumption is, on average, only 10% of hydroponics, 34% of soil culture.

(Kg / 1000 m<sup>2</sup>, year in Tomato Production)

	Film Culture	Soil Culture	Hydroponics
Nitrogen (N)	7.2	28	76
Phosphate (P)	2.8	20	37
Potassium (K)	15.2	26	145

- ◆ No loss of fertilizer in Imec
- ◆ 30 % of fertilizer & huge amount of irrigated water are lost into ground in soil culture
- ◆ 20 % of fertilizer is disposed every production cycle in hydroponics

Another differentiation is the quality of product. "Hydromembrane" makes tomatoes sweeter and tastier than those grown with the hydroponics method.

Tomato Species	Nutrient Contents /100g Tomato			
	Sugar (g)		Amino acid (mg)	
	Fructose	Glucose	Glutamic acid	GABA
<b>Film Culture large tomato</b>	<b>2.2</b>	<b>2.1</b>	<b>269</b>	<b>43</b>
<b>Film Culture medium tomato</b>	<b>3.4</b>	<b>3.4</b>	<b>213</b>	<b>29</b>
<b>Film Culture mini tomato</b>	<b>3.3</b>	<b>2.9</b>	<b>252</b>	<b>14</b>
Hydroponics large tomato ("kokumi" by Kagome)	1.4	1.0	137	8

Analytical body : Kanagawa Industrial Technology Center (Official Body)

**VV:**

**Are you planning to develop business abroad?**

Mori:

Yes, we are. We receive inquiries and visitors from all parts of the world. The membrane farming works in harsh climate and in challenged environments. It has been proved in barren soil in Dubai. We found out that tomatoes grown in the desert are better quality than in Japan. They are happier under strong sunlight and long hours of sunshine despite the lack of fertile soil. Our technology is creating new trading business in the Dubai desert (see photo).





Our corporate growth strategy is to keep improving our technology in Japan and develop our market abroad in partnership with the agriculture industry. We are exploring several opportunities in China, India, countries along the Mediterranean Sea, Middle Eastern countries, Russia, Australia, Mexico, USA, etc.

By the way, our patents have been applied for 127 countries and registered in over 40 countries including Japan, US, Australia, Russia, etc. The database of the WIPO (World Intellectual Property Organization) confirms that no patent similar to ours exists. (Publication No.: WO/2008/035580)

**VV:**

**What are your current objectives?**

Mori:

We are willing to contribute our farming technology to rebuild Japan's north-east region. That region was severely damaged by tsunami and exposed to radiation in the vicinity of the damaged Fukushima Daiichi nuclear power plant.

In addition to the disaster, the active farming population has seriously been decreasing. The farmers are aging and young people leave agriculture and move to big cities. By offering our innovative farming system which may interest savvy young people, we are hoping to help the agriculture industry create employment.

**VV Comments after the Interview:**

Dr. Mori pointed out that the agriculture industry is still relying on the plant cultivation method (Hydroponics) developed in Holland over 200 years ago. The 21<sup>st</sup> century we are living in is very different. We are facing global warming, an aging society, population growth, food and water shortage, pollution and contamination.

Two centuries ago, who could suggest there would be a way to cultivate tomatoes on barren soil, and make contaminated land possible to produce vegetables? We are expecting Mebiol to demonstrate its technological advantages and bring solutions to the soil contaminated after disastrous tsunami on March 11<sup>th</sup> in Japan.

**Contact**

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