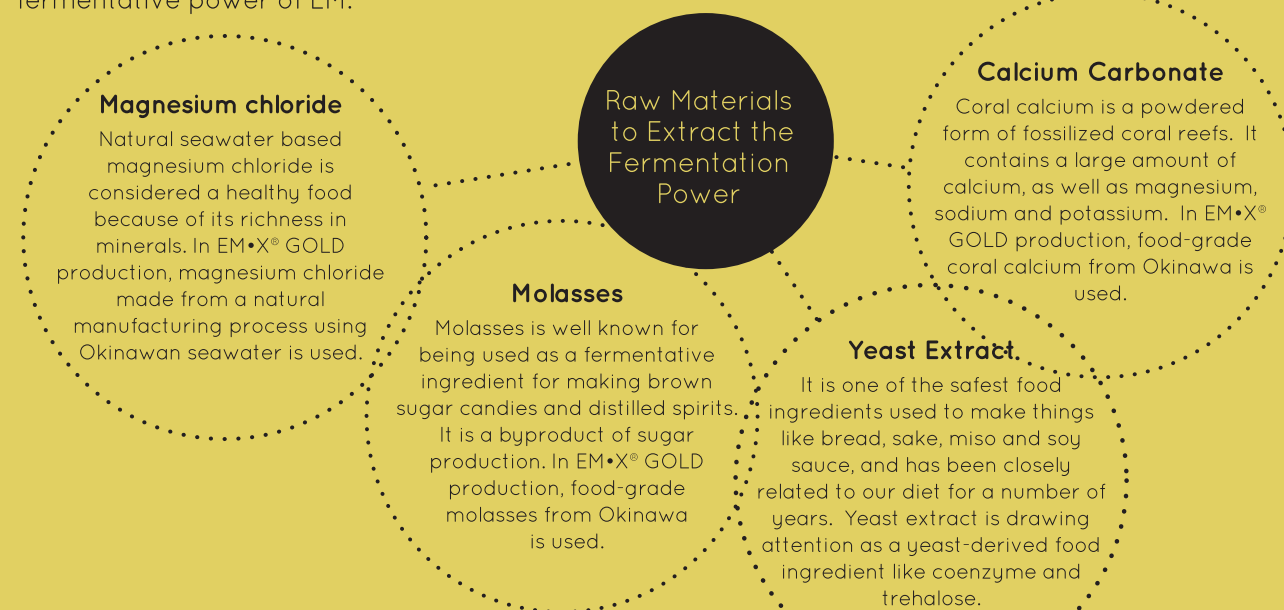


# Stringent Selection of Raw Materials to Extract the Exceptional Fermentation Power of EM™

EM•X® GOLD is a health drink made by going through a fermentation process using microorganisms, the same method as for traditional foods like miso and soy sauce. EM•X® GOLD contains highly bioavailable EM-derived low-molecular-weight enzymes. The effects of EM originate from the catalyst functions of a wide variety of byproducts like enzymes produced by EM's fermentative power. Accordingly, the ingredients of EM•X® GOLD are selected not simply based on their beneficial quality, but also on what is needed to maximize the fermentative power of EM.



## How to drink EM•X® GOLD

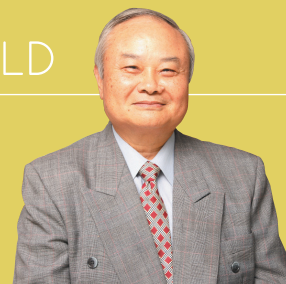
**Straight** You can drink it as-is, cold, or hot!

**In drinks** You can mix it with water, tea, or coffee!

**In your cooking** A spoonful to give it an extra kick. Use it when you are preparing your dish!

## 'Warming it up', the way to drink EM•X® GOLD

You can warm it up any way you like. When you warm EM•X® GOLD (80-100°C) effectiveness increases by two to three fold.



**Mix with water and heat**

Water becomes mellow in EM™ Ceramics. 2% EM•X® GOLD to 100% water is sufficient. boil boil... Drink it warm or let it cool. Store it in a bottle and take it wherever you go.

**Mix with warm water**

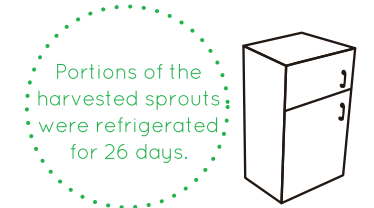
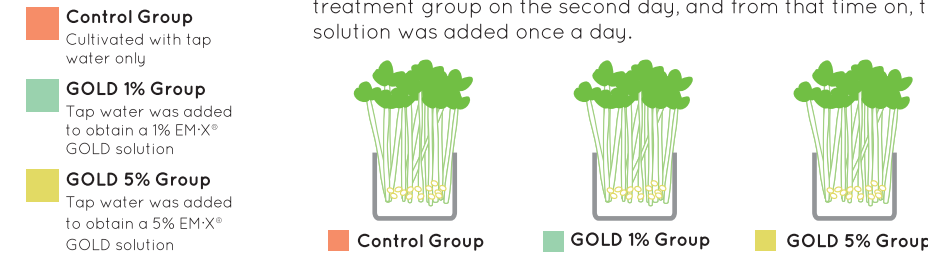
Water becomes mellow in EM™ Ceramics. Boil water with an electric kettle. Mix EM•X® GOLD with warm water.

# Effect on Growth and Antioxidative Activity of Radish Sprout by EM•X® GOLD

by Hisanori Asami, EM Research Organization

## Experimental Method

- Cultivation of Radish Sprouts**  
Liquid solutions were prepared for the 3 groups (treatment groups).
- Radish seeds were soaked for 5 hours in solutions for the Control Group, GOLD 1% Group, and the GOLD 5% Group respectively. Then, the seeds were weighted to obtain 12 g for each treatment group, placed in their respective cultivation kit and left in the lab for 6 days at a temperature of 27 °C. During the cultivation period, the solution of each group was replaced according to its treatment group on the second day, and from that time on, the solution was added once a day.
- Six days after beginning the experiment, portions of the grown sprouts were harvested and placed into hermetic container and refrigerated for 26 days. This was to evaluate the effects of EM•X® GOLD in keeping the freshness of the radish sprouts.



## Experimental Results



### Observation of Growth

The picture shows the growth of radish sprouts after six days from the beginning or the treatment. During this period, the seeds obtained nutrients only through the regular way and without receiving any external influences in their growing conditions. However, by observing the sprouts, we found that the sprouts from the 1% and 5% GOLD Groups had their embryonic axes thicker than those of the Control Group; also their cotyledons were already developed, and we found that they were of firm texture when we tasted them. Also, judging by the sprouts appearances, it seemed that by adding EM•X® GOLD, it affected their growth to be homogenous in most part and uniform in size.

After harvesting the radish sprouts, 10 sprouts were randomly selected from each treatment group for measurements. The fresh weight\* (root excluded), the lengths of embryonic axis and root were measured to determine the average value. Also, the weight per unit length was calculated from the fresh weight and embryonic axis length.

\*The weight of a plant without drying it.

### Measurement of Axis Thickness and Weight

As Table 1 shows, no statistically significant difference was recognized in the average of each sprout fresh weight, embryonic axis length and weight per unit length, but it was recognized that by adding EM•X® GOLD, the fresh weight and weight per unit length had tendencies to increase.

Table 1 Growth Conditions of the Radish Sprouts in Each Treatment Group at the Time of Harvest

Treatment Group	Fresh Weight (mg)	Embryonic Axis Length (cm)	Weight per Unit Length (mg/cm)
Control Group	175	8.13	21.6
GOLD 1% Group	179	7.92	22.6
GOLD 5% Group	190	8.21	23.2

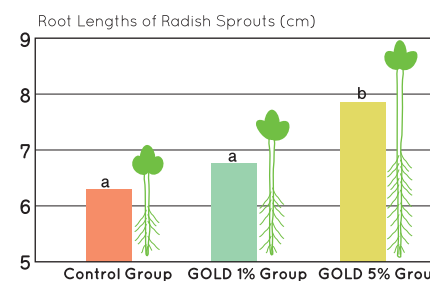


Figure 1 The effects on the root growth in each treatment group. Their significant differences are indicated in multiple comparisons of the Turkey's Test and by the opposite signs in the alphabet letters (a, b). (p<0.05)

### Measurement of Root Length

The results of the root length measurement are shown in Figure 1. The average root length was as follows: 6.27cm for the sprouts from Control Group, 6.81 cm for the GOLD 1% Group, and 7.94 cm for GOLD 5% Group. Comparing the root lengths of the Control Group and the GOLD Groups, the length of the GOLD 1% Group length was 0.5 cm higher, and the GOLD 5% Group length was 1.7cm higher than the length of the Control Group. In other words, the sprout root growth was enhanced by adding EM•X® GOLD to the water in its cultivation, and by adding a 5% concentration of the solution, a statistically significant difference was recognized which showed its growth-enhancing effects.

It was recognized that by adding EM•X® GOLD to the radish sprouts, its metabolism was accelerated growth was enhanced, particularly in its root.

To assess the freshness-keeping ability of the radish sprouts, antioxidant activity was measured at the time of harvesting and 26 days after harvesting, using the DPPH method. This method evaluates the radical scavenging activity by having the 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical generating agents react to the antioxidant components found in the radish sprouts. With Vitamin C being an antioxidant substance, the results are expressed in equivalent weight (mg VC/100g fresh weight), based on Vitamin C.

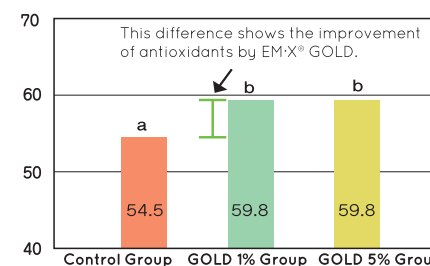


Figure 2 Antioxidant activity on the 26th day after harvesting in each treatment group. Their significant differences are indicated in multiple comparisons of the Turkey's Test and by the opposite signs in the alphabet letters (a, b). (p<0.05).

### Measurement of Antioxidant Activity

After harvesting, the antioxidant activity of the radish sprouts in the Control Group was 65.2 mg VC, 65.6 mg VC in the GOLD 1% Group, and 67.9 mg VC in the GOLD 5% Group, each value is per 100g fresh weigh. No significant difference among the treatment groups was recognized. However, by the 26th day of refrigeration, the antioxidant activity of sprouts in the Control Group was 54.5 mg VC/100g fresh weight and 59.8 mg VC/100g fresh weight for both GOLD 1% and GOLD 5% Groups, showing a significant higher value compared to that from the Control Group (Figure 2).

It can be said that the EM•X® Gold, which was absorbed by the radish sprouts, has enhancing effects to the natural defense mechanism of plants, a mechanism that is necessary for plants to live and to protect themselves against excess active oxygen.