

# EM Application in Hotel Nikko Alivila

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EMRO

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Hotel Nikko Alivila is one of the best resort hotel, which located in middle region of Okinawa, and 250 thousand of tourists visit this hotel a year. Recycle water supply system is worked in all hotel, and no waste water from the hotel flows into the sea, for environmental friendly eco-hotel establishment. EM was applied into waste water treatment system from December 2000, and several positive effects are seen. EM is applied to make compost from septic tank sludge in the hotel, and the compost is applied to garden.

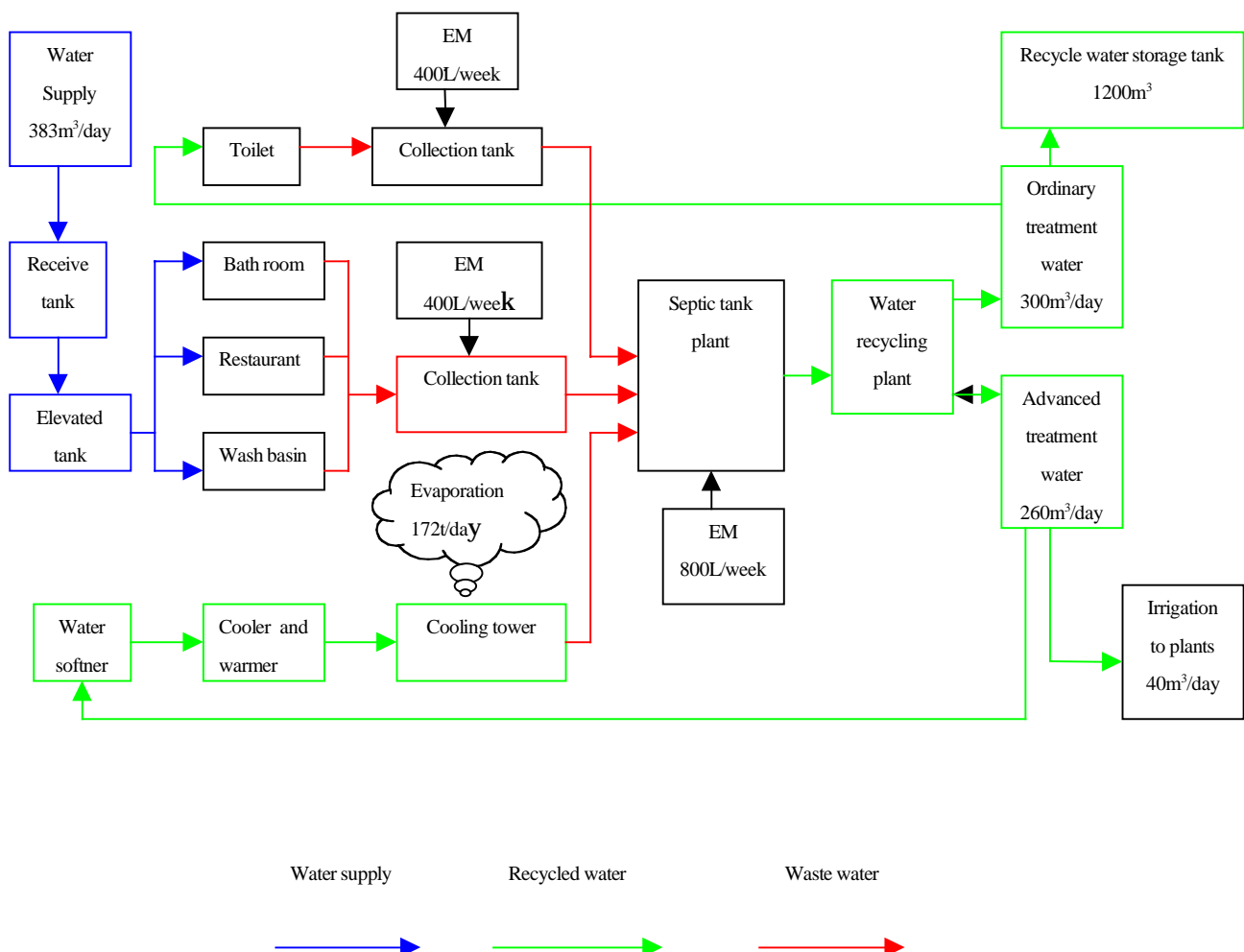
## Water recycling system by EM

1,600 liter/week of Extended EM is applied into septic tank, and quality of recycle water is kept high stably. The recycled water is used for

- (1) Washing water of toilet,
- (2) Irrigation to plant in the hotel,
- (3) Cooling water of cooling tower for air-condition, etc.

And more than 1,000 kg of sterilization chemicals for water is saved a month after EM application.

**Flow chart of water recycling in Hotel Nikko Alivila.**



## Sludge composting from septic tank by EM technology

### Method

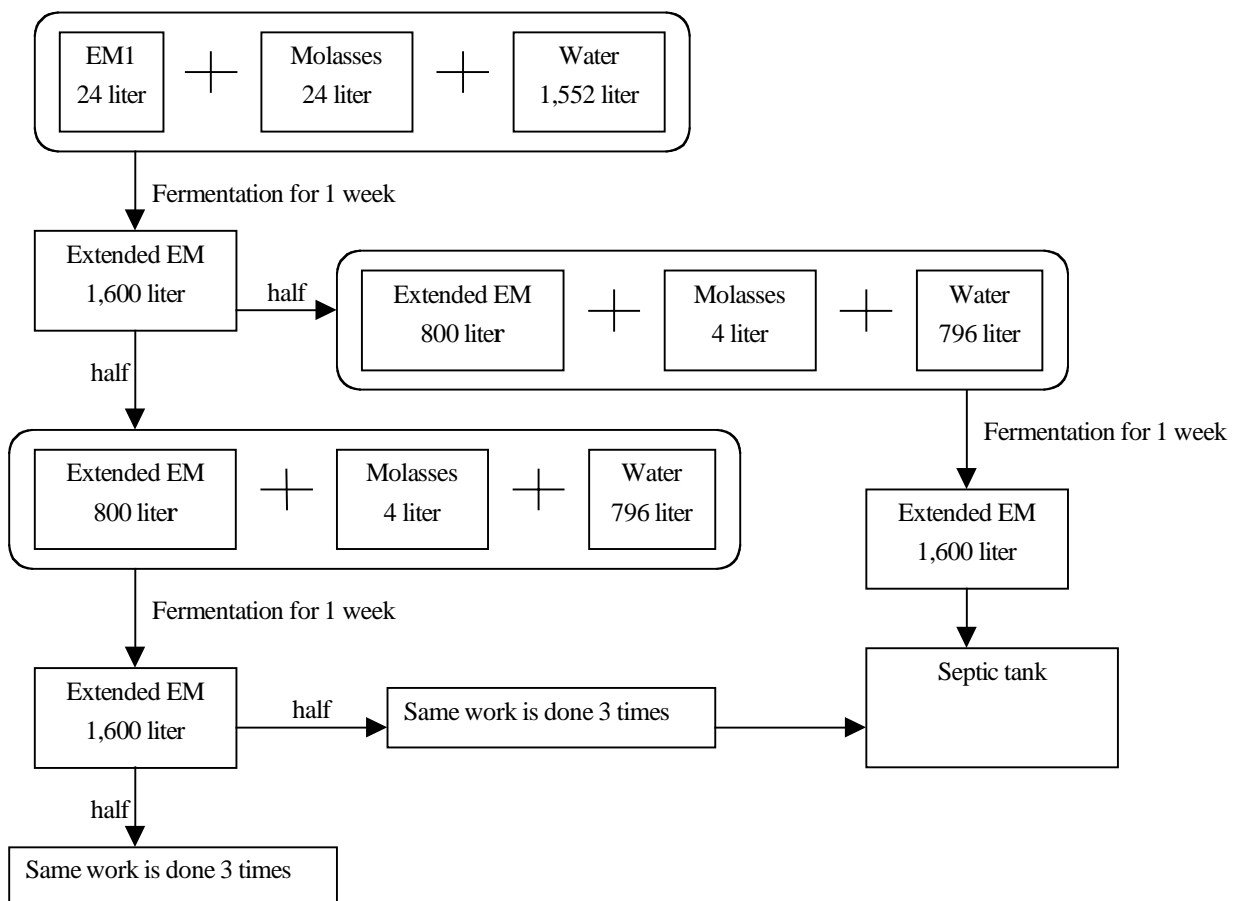
1. Sludge is mixed with cut turf grass by heavy equipment such as bulldozer. Total production of sludge is 7.2 ton a year, and cut turf grass is 2.7 ton a year.
2. The mixture is carried to compost preparation unit, and keep for 3 months for decomposition. Total production of EM treated compost is 5 ton a year.

The compost is applied to plantation and garden in the hotel.

## Extended EM solution preparation for water treatment

### Method

As following method, 24 liter of EM1 is cultured to 1,600 liter which is called Extended EM. The Extended EM is separated half, and cultured again to 1,600 liter each. One of them is applied to septic tank, and other is separated half again for next culture preparation, which is repeated 4 times. Therefore, 24 liter of EM1 is extended to 8,000 liter finally during 5 weeks.



### Analysis data of recycled water in cooling tower No.1.

Corrosive index	Standard	Average before use EM	Average during use EM
Chloride ions	<200	219.6	79.40
Sulphate ions	<200	65.52	42.20
Silica	<50	26.62	23.80
Total Fe	<1.0	0.133	0.042

Unit: ppm

Water sampling and measurement was done once a month.

Before use EM means Dec 1999 to Nov 2000.

During use EM means Dec 2000 to Nov 2001.

### Cost of EM treatment.

Materials	Cost of before use EM	Cost of during use EM
Rust-preventive agent (CL-53)	870,000	0
Rust-preventive agent (DS-3A)	423,000	0
Algaecide (SD-1)	1,380,000	0
Original salt for water-softener	405,000	0
Sterilizer for recycled water	1,248,000	0
EM1 and molasses	0	382,200
Total cost	4,326,000	382,200

Unit: Japanese Yen

Before use EM means Dec 1999 to Nov 2000.

During use EM means Dec 2000 to Nov 2001.

### Consideration

EM technology is introduced to waste water treatment system in Hotel Nikko Alivila for reduce chemicals of recycle management. 800 liter a week of Extended EM (1600 liter a week at present) has been applied from December 2000, and as a result, amount of chemicals for recycle system and index of corrosive substances were reduced.

EM treated recycle water is applied to washing water of toilet, automatic irrigation system for plants in the hotel, cooling water of cooling tower for air-condition, which recycle water has effect of life extension of machine units and plants. During EM treatment, 1:2000 of diluted Extended EM is flowing in recycle water supply in hotel all time. 40 ton of recycled water is irrigated to plants every day. Sludge from septic tank is treated to compost, which is effective for plant management in the hotel.

EM technology could be effective for environmental control in and around the hotel. Hotel Nikko Alivila is get attention as environmental friendly hotel in Japan.

Hotel Nikko Alivila

<http://www.alivila.co.jp>