

The EM Eco-Revolution

by Caroline Robertson

Imagine a chemical-free world with pristine air, food and water. This utopian ideal seemed impossible until a Japanese scientist discovered the earth-saving solution of Effective Microorganisms (EM). With endless applications in agricultural, industrial and domestic areas, EM is being hailed as one of history's greatest environmental breakthroughs.

Miracle Microorganisms

In 1980 when horticulture professor Dr. Teruo Higa threw away a series of common microorganisms he was stunned to see several days later that the grass there had grown greener and denser. For over a decade Dr. Higa had been exploring the regenerative power of microorganisms for use in agriculture. Deeply concerned about the earth's environmental crisis, Dr. Higa searched for a solution to revitalize soil and increase crop yields thereby combating world hunger. His honed beneficial brew called EM included 80 safe microorganisms containing common food fermenters such as yeast, fermenting fungi, actinomycetes, photosynthetic and lactic acid bacteria.

But to everyone's surprise, EM not only regenerated soil and boosted crops in record time; it emerged as an amazing water purifier, chemical-free cleaner, quick composter, deodoriser, preservative, health boosting antioxidant and probiotic. The brown liquid blend free from genetically modified material is now used to nurture healthy homoeostasis within one's inner and outer environment.

EM excitement escalated in Japan with schools, farms, government bodies and households adopting it as an affordable and effective alternative to chemicals. Dr. Higa patented the process and set up the EM Research Organisation (EMRO) as a non-profit organization to research and promote EM technology throughout the world with profits going to developing countries. Today EM is employed in over 120 countries as a low cost, sustainable agricultural aid, water and sewerage purifier, deodoriser, cleanser and health tonic.

I first encountered EM whilst visiting Thailand's Tao Garden Health Retreat and Spa in 2005. Struck by the flavoursome food, fertile gardens and fresh smell in the villas, the manager Walter Kellenberger attributed it all to EM. "Since using EM for cleaning and gardening our organic crops are healthier than ever and we've abandoned all harsh cleaning chemicals." Access to the full EM experience can be found at the world's first fully EM built and maintained hotel and spa launched in Okinawa, September, 2005. The EM Wellness Centre and Hotel showcases the scope of EM with all building materials, furnishings, bedding, toiletries, cleaning agents and food produced with EM technology.

EM-POWER

How can a mix of everyday microorganisms have such magical effects? Though the merits of cultures such as acidophilus and kombucha are well documented it's now

believed that a synergistic solution of microorganisms give longer, stronger benefits than a single one. The genius of Dr. Higa's EM discovery is the happy marriage of both aerobic and anaerobic microbes, previously thought to be incompatible.

EM's unique formula inhibits malevolent molecules and promotes beneficial bugs, enzymes, nutrients and proteins. This enhances regeneration and reduces degeneration to the degree that it is being used in the Hurricane Katrina aftermath to halt the spread of disease and odours.

EM's phototrophic bacteria degrade harmful substances and release healthy organic complexes such as antioxidants. The same lactic acid used in yoghurt sterilizes pathogens and decomposes organic matter. Fermenting fungi and yeasts secrete B vitamins, nourishing plant growth with phyto-nutrients that suppress odours and putrefaction. EM's actinomycetes produce anti-microbial substances that suppress harmful microbes. The three groups synergistically form a foundation on which beneficial life thrives.

EM intelligently enhances ecological harmony, adapting to each circumstance rather than being an indiscriminant antibiotic, antifungal, herbicide or insecticide. It triggers nature's innate balancing mechanism to re-establish equilibrium in a sustainable way.

Dr Higa also attributes EM's efficacy to the positive wave resonance it releases promoting substance and energy field unity. This is clearly evident from the food and flowers produced with EM as their colour and form far outshines those conventionally cultivated. As evident in the award winning orchids, herbs and fruits of the Tropical Plant Resources Research Institute of Okinawa, Japan. Company President Toichiro Nago says, "As EM prevents oxidation and produces antioxidants it also cultivates produce that lasts longer and has higher nutritional value." The International Nature Farming Research centre verifies this claim finding that crops grown with EM have less nitrate ions, decreasing the plant's pest and pathogen susceptibility, and higher vitamin C and carbohydrate levels.

Planetary and Personal Panacea

Scanning through EM educational material I'm struck by its wide range of uses. Smiling Japanese school kids pour it into polluted waterways with sparkling results. Thai relief workers spray it on Tsunami hit regions and victims to prevent disease and decay. Housewives clean and deodorize every area of the house with it. Gardeners proudly display it's produce of perfect flowers and food. Breast cancer patients in Lahore drink EM-X with tangible benefits. Residents of Kenya's biggest slum enjoy the improved sanitation and smell it brings. Swimmers at a Kawasaki school pool no longer get asthma, skin and eye irritations since EM replaced chlorine. Pig, chicken and dairy farmers are amazed at its ability to neutralize foul odours, compost their waste and boost animal's health. Following are the many fields in which EM is reaping revolutionary results.

Water purification and recycling

Pure water is essential for healthy, prosperous living. With around 1,000 million people lacking access to safe drinking water in developing countries it's estimated

that 80% of deaths are due to contaminated water, at least ten million a year¹. With the water pollution problem expected to increase by up to eighteen times by 2025, a change of tide is crucial.

EM may provide an answer. Wide scale trials have proven EM can effectively purify water for safe consumption and recycle sewerage and wastewater for agricultural irrigation. As EM America's Executive Vice President Eric Lancaster says, "EM will basically make lagoon water into swimming water at a fraction of the cost and time." EM also eliminates foul odour from septic tanks, reduces sludge in sewerage systems and controls excess algae, slime and salination. Australia's VRM group are at the forefront of sewerage spill management. Their successful EM treatment of a Mackay sewerage flood led to less odour, toxic water and damage to wildlife than generally occurs with accidents of equal magnitude.

Rapid industrialization in Japan has led to heavy pollution of its waterways. In attempts to reverse the damage EM is being used by enthusiastic locals and government bodies to purify Japan's Yab river in Tochigi, Ainoya river in Ibaraki, Ariake Sea in Nagasaki and Seto Inland Sea at Hiroshima. In these areas they are seeing increases in marine wildlife numbers including octopus, shrimp, cucumbers, crabs in response to EM.

EM zealots gather in groups to baptize Japan's waters with EM. Environmental teams such as the one at Kyushu Island are dedicated to 'ecological cleaning activities', which include using at least 1 litre of EM each a month to purify water and soil. In Akitsu, Hiroshima since 60% of the population started using EM for domestic cleaning and gardening the town's water quality has improved significantly. In Zamami Village, Okinawa, after EM reduced the foul odour of 60,000 tons of dam water, 60% of residents reported an improved quality of water and the previously toxic readings of trihalomethane were lowered to a harmless level.

Bangkok has been using EM for years to reduce the foul odours and toxic water of shrimp farms, treat waste and improve water. Governor Samak of Bangkok endorses EM, "We are achieving good results with EM. We will continue to actively use it."

EM's cost-effectiveness is evident at Gushikawa City Library where since they started sewerage processing with EM annual costs reduced from \$10,000 US to only \$500 US. And when Hotel Nikko in Arivilla switched from chemicals to EM to treat their water they reduced expenditure by 5 million yen a year.

Agricultural wastewater not only pollutes waterways but is a massive waste when not recycled. Purification projects worldwide solved this problem in places such as Nanning city, China where they treat Cassava wastewater to reuse and purify Lake Weishan which was ruined by paper mill pollution. EM can also effectively eradicate serious pathogens as illustrated in Iwaki City, Fukushima where E. coli colony counts were reduced from 275 to 12.

Rivers and lakes overloaded by run-off containing agricultural fertilizers, household detergents, organic waste, urban stormwater drainage and the occasional oil and chemical spill can be treated effectively with EM. With water damage EM was successfully applied by the German government after the Elbe River flood disasters

of 2002 to decontaminate the toxic waters and prevent mold growth in the flooded buildings. And according to deputy Mayor Mr. Koji Yamawaki. EM removed Hiroshima's Utsumi canal's thick toxic sludge in a matter of months.

An innovative use of EM is using it to convert wastewater sludge and turning it into potent fertilizer. This is being done by compost company Green Sun Co. Ltd by mixing the town's wastewater sludge with EM, rice bran and chicken manure and making it into pelletised organic fertilizer.

Agriculture

Serious health and environmental concerns raised by chemical farming are leading more people to prefer organic produce. EM and Kyusei Nature farming methods support this trend by promoting agriculture that is productive, profitable, energy conserving, environmentally sound and safe for consumption.

One of the biggest agricultural problems is the lack of nutrients and topsoil due to chemicals, row- crop production and intensive tillage. EM solves this problem by reinstating millions of microorganisms to the soil turning it into eco-gold. This sustainable soil called zymogenic soil creates the most conducive growing conditions.

A soil rich in minerals and regenerative microorganisms provides optimum production levels, reduces disease and produces top quality crops all without chemicals. As Dr. Teruo Higa says, "EM technology in agriculture not only does away with the need for agricultural chemicals and artificial fertilizers, but achieves better results in every way than when they are used." When EM is introduced to soil it competitively excludes pathogens, pests and weeds; nurtures nutrients and earthworms; decomposes organic matter and detoxifies chemicals. This rich soil environment promotes plant germination, flowering, ripening and increases crop quality and quantity. As Dr. Teruo Higa explains, "At the present time, average yields for rice grown using conventional methods are currently running at nine bales per 10 acres. Nevertheless, within only a few years of instigating the use of EM, we have seen rice yields rise to 14-15 bales/10 acres." This shift from chemical farming to organic practices can yield better crops within a year as Hiroshima Ikeda farming brothers testify, "After using EM for one year our rice harvest yielded 70% more than the previous year." Mr. Osamu Saito, vice president of Kitamura EM Farming confers, "Activated EM has markedly reduced disease and improved yields of vegetables."

As developing countries prone to food shortages need EM technology urgently the charitable, non-profit EM Research Foundation are channeling profits into agricultural projects in countries such as India, Sri Lanka, Africa and South America.

Recycling Waste

Throwaway, consumer societies are accumulating more garbage than the earth can accommodate. The US alone creates 222 million tons of garbage annually and at least 60% of that goes to overflowing landfills. Food scraps comprising about 11% of this landfill decay stink, attract rodents, emit dangerous greenhouse gases and don't

decompose completely. Whereas with the aid of EM many countries are proving that it can easily be converted to valuable soil- enriching compost.

A model EM example is the Izumiohtsu factory of Sumitomo Rubber Industries Ltd, which used to pay for garbage removal until 1999 when they began composting the waste from 14,000 meals a month and selling it back to employees. Since the Sapporo Grand Hotel started treating their waste with EM it no longer emits a foul odour, processing costs were lowered by 30% and they recycled waste into fertilizer for farmers. Also in Japan, Funao town converts 22% of their garbage to compost, reducing their annual garbage by 300 tons and saving vast sums on disposal costs. In Pune, India, since 2002 the city garbage has been sprayed with EM from a fire engine daily and compost is made ready to go to farmers within fifty days. In Hanoi since 2001, the Cau Dien Compost Factory has been collecting 160 tons of organic waste a day from the city market and, with EM, converting it into compost within 38 days.

Other countries where large scale EM waste management is saving money and the environment include China, Korea, Burma, Vietnam, New Zealand, Thailand, Africa and South America.

An easy way to recycle household waste is to compost organic garbage into garden food using EM Bokashi. Householders are finding EM composts their organic waste in a month as opposed to six months when using conventional composting methods. There is also only a very mild sour smell and none of the heat, gas or bugs associated with aerobic compost methods. If more people employed EM composting the soil would revitalise and landfill reduce in record time. Such as in Yanagawa City, Fukuoka, where 13,000 households are using free activated EM for garbage composting, replenishing soil and purifying water.

Since 1996 the composting concept has been taken to many schools by the Bokashi Outreach Network Program in the US. It aims to train kids to take steps towards an environmental solution rather than perpetuating the problem. Teachers such as Pusch Ridge's 'recycle Queen', Nancy Gifford are introducing EM in a school-wide program to compost cafeteria waste. She also uses EM in the school's small garden and sends students home with Bokashi bags to bury. In Yoetsu Junior School, Kamakura City, 450 students started learning about EM since 1996. All students are given composting bokashi buckets and were excited to see that their EM composted garbage made their school corn crop grow faster, larger and tastier corn than those grown without EM. Also in Australia the 'Scraps from Lunch to Lunch from Scraps' program run in ten Adelaide schools showed children how to recycle food into fertilizer. Bertram Hawker Kindergarten children benefited according to director Margie Colton, "It's allowed them to see the cycle of how things can be used again to grow food."

Animal Husbandry

When Japan's Tamaki dairy farm fed cows EM fodder and sprinkled it in their stalls they noticed remarkable changes. Within two weeks the bad odour disappeared, the milk increased and mastitis was almost eradicated. Other benefits of using EM with livestock are that it discourages flies and pests, improves animal's digestion and

produces great dung for fertilizer. Research from ARC-Onderstepoort Veterinary Institute also demonstrates the ability of EM to prevent the growth of pathogenic microbes including those causing botulism and salmonella poisoning. In the Netherlands amongst the 1,000 farmers using it agree that EM reduces livestock illness, improves milk quality and creates cleaner water and living conditions.

Aquaculture

Fish farms are notorious water polluters. EM has revolutionized aquaculture operations worldwide with shrimp farms in Thailand and fish farms in Cairo, Austria and Japan reporting cleaner water, increased fish numbers and natural weed control after converting from chemicals to EM. The Spital/Pyhrn Fish Farm in Austria found fish numbers doubled after employing EM and farm maintenance costs significantly reduced.

Building

Sick house syndrome is a phenomenon where chemical fumes from carpets, paints, building and decorating materials create debilitating symptoms in susceptible people. In order to prevent sick house syndrome and increase a building's longevity, 150 EM houses have been built by Sansyodo Inc, Aichi, Japan. Since Mr. Hattori moved into his EM house he says there is "no more sneezing and less flies and mosquitoes." Mr. Sakamoto is happy that he no longer suffers from asthma attacks and his grand daughter's eczema cleared up. Other residents report that their migraines and allergies have disappeared. The house is healthier too with EM preventing concrete cancer, white ants, termites, rising damp, mould and wood rot.

Health

Therapeutic applications of EM-X, the EM and herb infused tonic, are slowly emerging. EM-X contains 18 amino acids, 40 trace minerals, and dozens of antioxidant compounds and enzymes. Scientific and clinical trials have established EM-X's ability to regenerate cells and destroy degenerative influences such as cancer cells and free radicals. Scientists claim that EM-X releases positive wave resonance that promotes regeneration and assimilation of nutrients.

Chinese medical research revealed that EM-X markedly inhibited human cancer cells involving breast cancer, hepatocellular carcinoma and chronic myelogenous leukemia cells.² Parkinson's patients may find EM-X helps reduce neural degeneration, following research conducted by the Imperial College London supporting EM-X's neuroprotective ability.³

Anecdotal evidence of EM-X's anti-cancer quality's abound. Chinese doctor Huirong Tao, who is associated with the Toudi Clinic in Hokkaido Japan, cites the success stories of four cancer patients treated with EM-X and a special diet. Their tumours, whether situated in the chest, the prostate or the liver, diminished significantly and in some cases disappeared. Mamdooh Ghoneum, an immunologist at the University of Medicine and Science in Drew, California, has also shown that EM-X stimulates activity in natural killer cells, an essential factor in the attempt to control cancer.

Because EM-X contains living organisms it responds differently according to the individual's internal environment. Experimenting with EM-X myself for a month I found it made my body hum. I could feel an energetic buzz pulsing from through my palms and feet, which stabilised my previously bad circulation.

Beauty

EM's natural yeasts, amino acids and alpha hydroxy acids support the skin's natural renewal cycle and pH balance. The skincare brand SK-II applies the same principle as EM through the use of fermented sake filtrate. The formula called Pitera has been scientifically proven to increase skin metabolism by 70%. Because EM encourages regenerative dermal microorganisms users say it softens the skin, smoothes wrinkles and makes hair grow back to its original colour and softness. This has led to EM face creams, shampoos and soaps. Staff at Japan's Amayama hospital for aged care also claim that EM infused water is much gentler on sensitive elderly skin.

Domestic cleaning

Satisfied housewives with EM bottles illustrate its innumerable uses in EM publications. Not only an effective substitute for chemical cleansers, EM actually purifies rather than pollutes the air and waterways. From large scale environmental cleanups to domestic kitchens EM is used to remove mould and grime, eliminate foul odours, replace washing powders, reduce insects, clear pipes and cleanse everything from pets, floors and walls.

EM Forms

Because EM is a living technology, it is flexible in its application, and therefore comes in a variety of forms. These include liquids, granular material and ceramics. Since EM's available under many names this can cause confusion however the most common name for the original ferment is EM-1. Subsequent cultures from this are often called activated EM. Though imitations are available, only the EM trademarked product can be trusted for quality and efficacy.

The registered trademark name for the original liquid microbial product is EM•1®. EM•1® can be used as a starter culture and grown one time for economical benefits. This growing process, similar to making wine or beer, is called Activation. The resulting product is referred to as Activated EM•1® or AEM•1®. Though imitations are available, only the EM•1® trademarked product can be trusted for quality and efficacy. All authentic products that are made with permission from EM Research Organization bare the EM logo.

Following is a list of EM products.

- **EM-X** is a golden, tasteless health tonic fermented from EM-1, antioxidant herbs and organic rice.
- **EM-5 (Sutochu)** is a highly effective natural pesticide and insect repellent made from fermented EM-1, alcohol, vinegar, molasses and anti-oxidant plants.
- **Fermented Plant Extract (FPE)** is a powerful plant fertilizer made from freshly cut grasses, weeds and crop residues fermented with EM-1.
- **EM Togishiru** is starchy water, molasses and EM-1 used as an effective domestic cleanser and air freshener.

- **EM mud balls** are used for water and soil remediation.
- **EM Bokashi** is a dry composting mix combining EM-1 and organic material to convert food into fertilizer. It may include rice bran, corn bran, wheat bran, maize flour, rice husk, bean husk, rice straw, animal dung, sawdust and coconut fiber.
- **EM Ceramics.** Since EM survives very high heat it can be baked into silica clay ceramics. In water these ceramics break down the water particles to increase its bioavailability and resistance to malefic microbes. The water is said to reverse oxidation and elicit beneficial magnetic resonance to enhance natural cell regeneration. Ceramics can be added to cooking rice, deep frying food, fish tanks and powdered into paints and soil. An innovative dentist is adding EM ceramics to cavity fillings with promising results.
- **EM Toiletries** infused with EM-1 these include soap, toothpaste, shampoo and face cream
- **EM Salt.** Okinawan sea water is harvested on the full moon and fermented with EM-X. The sea water is dried and the resulting salt is a health salt containing all the bio-available trace minerals from the ocean.
- **EM Bokashi Rub Oil** is a warming liniment combining EM and fermented herbal oils recommended for arthritis, aches and fungal infections.
- **EM Paint** has been shown to reduce mould, termites, toxic fumes and enhance paint durability.
- **EM clothes** make the body warmer according in infra-red ray research.
- **EM Glass-stone (Super Sol)** used as a foundation filler in roads, floors and walls. This protects a structure from deterioration, pests, chemical fumes and radiation.

Resources

- www.emtechnologynetwork.org
- www.emamerica.com/data
- www.emro.co.jp/english

Acknowledgements