EFFICIENT MICROBES TECHNOLOGY
AN EVOLUTION IN HUMAN HEALTH

By Jason Anthony

EM is a naturally fermented liquid probiotic utilising effective micro-organisms, a technology developed in the early 1980s in Japan.

The existence and availability of probiotics in the South African market notwithstanding, EM is a new generation of bacterial technology with potential benefits far in excess of contemporary probiotic products.

EM technology has three major advantages over not only other probiotics, but other health products in general. These three points are all unique selling propositions:

EM is the only bacterial technology on the planet with which the products are naturally fermented and contain multiple classes of micro-organisms, those being Lactic Acid Bacteria, Beneficial Yeasts and Phototropic Bacteria. Almost every other probiotic in existence contains strains of only one class that being Lactic Acid Bacteria. As you will read later, using multiple types of microbes is the only truly effective means by which bacteria can properly establish themselves in the human body, and so the beneficial effects are quite easily observed by consumers.

EM is the first herbal probiotic available, combining the immense health benefits of natural herbs with the powerful effects of beneficial bacteria. Thus it is possible to draw on consumers from both the herbal and probiotic markets.

EM technology allows for the brewing of a variety of microbial products for multiple target markets. As you will read on the following page, this will, for the first time anywhere on the planet, allow probiotic products to cater to markets right across the field of human health.

Micro-biology and the utilisation of beneficial micro-organisms to resolve human illness is a science still in its infancy. Probiotic technology in the mass consumer market has, prior to EM, extended only so far as to boost populations of Lactic Acid Bacteria in the human gut. Whilst this bacterium is responsible for many functions
within the body, it is only one class of many natural microbes that are necessary to establish a viable and effective population in the body natural microbes which, due to the prolific use of antibiotics, chemicals and hormones in agriculture and livestock farming, are no longer available in our foods and water. And when one considers the vital importance of these microbes (such as natural yeasts and phototropic bacteria which form an intricate part of the growth, health and survival of almost every life form on Earth), the increase and proliferation of illness and life-threatening diseases in current society can be easily understood.

One of the key aspects of EM is its role, in the human body, in the assimilation of nutrition and processing of metabolites vital to survival and health. For this reason, the effects of EM are very often miraculous when dealing with lower income consumers who live most of their lives with nutritional deficiencies, not to mention the number of body problems that any strata of society is susceptible to: indigestion, cholera, IBS, TB, hypertension, acne, fungal growths, pneumonia, bronchitis, laryngitis, strep throat to name just a few.

EM technology also allows for the use of different combinations of herbs and juices in the fermentation of the product, meaning that companies marketing and distributing the products have the option of targeting multiple sectors of the health market with a variety of branded products. Potential products/markets include:
- General nutritional supplement (daily herbal probiotic).
- Stomach/gut health (low herb content, increased concentration of microbes)
- IBS treatment or preventative
- Diarrhoeal treatment or preventative
- Natural Energy Supplement (incl. Ginseng, St. Johns Wort and/or other herbs)
- Digestive aid (3 day course of 80ml/day, non-herbal)
- Natural Electrolyte replacement (increased salt and Kelp content)
- Fungal infection treatment (topical and oral)
- Kids probiotic
- Baby’s probiotic (low herbal content)
- Immune Booster

EM technology has the potential to have a massive impact on the people of South Africa as what will be the only naturally fermented multi-class herbal probiotic product in the country. Moreover, EM products can be sold into a number of targeted areas, thus establishing itself firmly in every sector of human health.

Efficient Microbes contract manufactures EM products that target specific markets, packaged and branded to the distributor specifications.

**BACTERIA AND HUMAN HEALTH**

It is a fact that the role and importance of bacteria in human health has been grossly underestimated and generally misunderstood by members of the public, as well as many in the medical fraternity. This brief overview will help to provide a vital understanding of bacteria in its relationship to the human body, and how the handling of bacteria alone opens the door to a new era in human health.
INTRODUCTION:
The gastro-intestinal tract’s healthy function relies on the presence of beneficial bacteria. Beneficial bacteria aid in digestion, correct pH balance, break down of foods and the prevention of the build up of harmful bacteria. A different cross section of beneficial bacteria types exists in different parts of the small and large intestine. They act to consume much of the simple carbohydrate food sources available in the intestinal tract so that bad bacteria and organisms are deprived of food and cannot reproduce.

The bacteria in your bowels outnumber the cells in your body by a factor of 10 to one. This gut flora has incredible power over the immune system, meaning that the health of the body is largely tied into the health of the gut. This becomes understandable when one looks at the fact that there are over 100 trillion bacteria - about 2 kilograms worth - that line the intestinal tract. This is an extremely complex living system that aggressively protects the body from outside offenders.

Beneficial bacteria (as well as pathogens) are almost completely killed off with the use of antibiotics, which many GPs tend to give out like candy to patients who come with any kind of bacterial or viral illness. Repeated use of antibiotics can virtually eradicate the good bacteria in the gut, which have to build up from scratch again each time a course of antibiotics is taken, allowing bad bacteria and harmful yeasts to take a foot hold in the GI tract and multiply at a high rate. This is exacerbated by poor modern diets high in sugar and simple carbohydrates. In addition, there is considerable evidence to suggest that eating antibiotics-fed animal meat can kill off good bacteria in the GI tract and therefore encourage harmful micro-organism overgrowth. Most non-organic meat derives from antibiotics fed animals.

Pathogenic bacteria, Candida and parasites thrive and grow in number on account of modern eating habits, mainly a high sugar intake, a high pasteurised dairy intake (many vegetarians), a high wheat (bread) intake and high alcohol intake. Diets high in such foods tend to provide an ideal environment for harmful organisms in the intestinal tract, which multiply in alarming numbers. All of the foreign organism problems have a major impact on the digestive system and overall health. They put a constant strain on the immune system and excrete a variety of toxins straight into the blood and digestive system (including Hydrogen Sulphide), often spread throughout the entire body, and may well contribute to early aging. Poor digestion also leads to poor nutrient uptake and vitamin and mineral deficiencies that, over years, can build up and massively impact the biochemical balance of the body and the efficiency of the basic processes therein, such as the neurotransmitters, hormones and energy production. Harmful organisms are known to contribute to conditions such as Irritable Bowel Syndrome (IBS) and Irritable Bowel Disease (Ulcerative Colitis or Crohn's Disease). These conditions are likely to be partly the result of inflammation on account of overgrowth of harmful organisms and presence of large amounts of toxins in the GI tract. There are currently (as of June 2008) 2904 studies on IBS listed on PubMed (the US National Library of Medicine) and it is indeed curious that so few doctors and GPs have any knowledge in this area.

Hydrogen Sulphide (H2S) is an endogenous (growing within the organism and not having any external cause) toxin produced in the body by the action of bad bacteria and fungi (such as Candida Albicans) fermenting sugar in the gastrointestinal tract. Elevated levels of H2S in the blood and tissues can result in mitochondrial dysfunction.
BENEFICIAL BACTERIA:
Beneficial bacteria help to consume available food sources in the intestine and thus deprive harmful bacteria (and also yeasts and parasites to an extent) of their normal food sources. Approximately 70% of the body's immune system capability derives from the beneficial bacteria in the GI tract. The average adult body contains approximately 2.5 kg of bacteria, both good and bad. It is estimated that the large intestine (colon) alone should contain approximately 1.5kg of beneficial bacteria. There are more bacterium cells in the body than the actual body's own cells. There are approximately 400+ varieties of bacteria in the digestive tract and take many years to build up through a healthy diet. Dr Elie Metchnikoff Ph.D, Nobel, laureate, postulated that the ideal ratio of good to bad bacteria should be 80:20, which is often the reverse in many modern Westerners. This is why eradicating all of one's probiotic bacteria by taking anti-biotics (or to a lesser extent colonic hydrotherapy) and simply taking a probiotic supplement afterwards (containing perhaps 2 or 3 strains of probiotic bacteria) is not really going to build up that same level of diversity of good bacteria as would occur naturally with a good diet.

Lactobacilli and bifido bacteria help to inhibit potential pathogenic bacteria, such as E.coli or Clostridium perfringens. They help to prevent diarrhoea caused by rota virus or salmonella. They help to reduce the proliferation of Candida. They assist in increased defecation and help to reduce constipation. They help in digestion in general, by altering the pH (by producing lactic acid) and improving the uptake of minerals, especially calcium. They also help to digest lactose for the lactose-intolerant persons. They are also involved in the production of vitamins, for example, B1, B2, B3, B5, B6 B12, A, D and K, and also essential fatty acids. They assist in protein digestion. They help to clean the digestive tract. They produce natural antibiotics and anti-fungals such as hydrogen peroxide (not in the ridiculously high quantities that are available with H2O2 supplementation or other oxygenating products). In 1988, the US surgeon general's report noted that 'Normal microbial flora provide a passive mechanism to prevent infection.' They may increase the number of immune system cells in the body. They may even help to protect the body from environmental toxins and reduce waste at the cellular level. They also help to maintain healthy cholesterol levels and triglyceride levels, and break down and rebuild our body's hormones.

Sources of correct probiotics include true fermented products, for example, fermented cabbage juice, live kefir or (bio-) live natural yoghurt and some probiotics supplements. As a general rule, good fermented foods and drinks are those that are fermented (i.e. acidified with lactic acid) using probiotic bacteria. Good probiotic supplements contain 'probiotic' bacteria such as lactobacillus acidophilus, bifidobacterium, lactobacillus bulgaricus and streptococcus thermophilus.

The vast majority of active probiotic bacterial cells are destroyed by the stomach before they reach the small and large intestine. Therefore the exact number taken could in some ways be considered irrelevant or not so critical. The main purpose of taking probiotics is to provide viable cells of good bacteria which can seed or multiply in the small and large intestine. It is not, factually, to physically populate the colon with good bacteria from just the probiotic bacteria that survive and reach the colon. This would be a mammoth task given the small number that actually reach the colon and the several kilos of good bacteria actually required there. Providing a regular supply of seeding bacteria to the colon, and also ensuring optimal conditions (and food) for the good bacteria and adverse conditions (and a lack of food) for the bad bacteria, is the main goal to achieving and maintaining a healthy floral gut balance.
**Soil Based Organisms:**

SBOs are naturally occurring bacterial strains (i.e. micro-organisms) found present in soil that release powerful enzymes that help to kill off yeasts, mould, fungi and parasites. Modern farming methods, including the use of herbicides and pesticides are reputed to kill them off to a large extent. It is believed by some that even organic produce is grown from depleted soil and so are not very rich in SBOs.

One strain of SBO is Bacillus subtilis, has been used by Africans for many centuries. Alternative names include Bacillus globigii, grass bacillus or hay bacillus. It is a predominantly soil-based form of bacterium, commonly found in soil and decomposing organic matter. Some strains are known to produce antibiotics. It was inadvertently discovered by German soldiers during WW2. A large number of German soldiers were dying of dysentery in the African campaign with little or no medicine readily available. A team of German scientists eventually found out that when the local 'Arabs' were suffering from dysentery, they would eat a small amount of fresh camel dung. This dung was later found to be extremely high in a form of bacteria later named Bacillus subtilis. Bacillus subtilis was later grown commercially and used by the German army to cure dysentery.

Cultures of Bacillus subtilis were used throughout the 1950's as an alternative medicine due to the immunostimulatory effects of its cell matter, which upon digestion has been found to significantly stimulate broad spectrum immune activity. It was marketed throughout America and Europe from 1946 as an immunostimulatory aid in the treatment of gut and urinary tract diseases such as Rotavirus and Shigella, but declined in popularity after the introduction of cheap consumer antibiotics despite causing less chance of allergic reaction and significantly lower toxicity to normal gut flora.

According to clinical studies documented in the medical research report, IMMUNOSTIMULATION BY BACILLUS SUBTILIS PREPARATIONS, by micro-biologist J. Harmann, the cell wall components of ingested Bacillus Subtilis are able to activate nearly all systems of the human immune defence, including the activation of at least three specific antibodies (IgM, IgG and IgA secretion) which are highly effective against many of the harmful viruses, fungi and bacterial pathogens which regularly attempt to invade and infect the human system.

**EM TECHNOLOGY EXPLAINED**

The basic groups of microorganisms in EM are lactic acid bacteria (commonly found in yogurt, cheeses), yeast (bread, beer), and phototrophic bacteria.

The reason for EMs efficacy and results is not, as many people believe, the number of microbes present in the product but, rather the number of *microbial species*. As stated earlier, the bacteria in the GI tract number in the trillions, or more than 2kg by weight. Thus, achieving an effective re-population of the human gut with beneficial bacteria has nothing to do with volumes of bacteria ingested, but rather with the diverse types of bacteria needed to form a stable consortium which can multiply and dominate the system. Although lactic acid bacteria are the most predominant bacteria in the GI tract they cannot establish an optimum consortium without the natural symbioses they share with other types of microbes. In the natural world various classes of bacteria are utterly reliant upon each other for growth and stability, as can be seen by the diversity of microbial life in soils and plants. EM technology utilises three major classes of beneficial micro-organisms those being Yeasts,
Lactic Acid Bacteria and Phototropic Bacteria - as opposed to other probiotic supplements which are almost all single-classed products.

EM technology is one of the only technologies on the planet that allows for a variety of different classes of bacteria to be grown and maintained stably in a probiotic consortium. This consortium dominates any system into which it is introduced, motivating all existing bacteria in that system in a regenerative direction. For this reason, EM products do not depend on billions of lactic acid bacteria (found in other probiotic products) in order to be effective. Rather, through microbial diversity, EM closely mirrors the natural range of microbes that are found in our soils and food.

The microorganisms in EM are known to produce bioactive substances, vitamins, hormones, enzymes, amino acids, and antibiotics. EM consists of a wide variety of effective, beneficial, non-pathogenic aerobic and anaerobic microorganisms cultured in diluted molasses that are mutually compatible with one another.

EM products are complex microbial cultures consisting of microbes from three or four genus. Focusing on the population counts is not as important as focusing on the diversity of the microbes. If EM products were to have one less genus of microbes, these products would function like other probiotics on the market and the results would not be as significant.

Other factors to look at when considering EM Technology based probiotic cultures is that they are all naturally fermented at body temperature, especially relevant when one considers that the human body's most important source of beneficial bacteria is naturally fermented foods. This means the finished products are raw, containing 40 trace minerals, amino acids (up to 18), various organic acid compounds, nearly 100 types of enzymes, B complex vitamins, Vitamin A (in the form of Retonin, the form ready for absorption by the body), as well as the live microbes which make up the solution itself.

Any microbiologist will agree with the statement that freeze drying of microbes also causes some form of cellular damage, which can greatly affect performance of the microbes. This is the main reason most probiotics on the market contain billions of cfu/ml. It is necessary to use tremendous numbers of "weaker" microbes to get the effects of "stronger" microbes.

Lastly, consider that one microbe produces one type of enzyme, one type of vitamin, and/or one type of organic acid. When there is not a variety (diversity), the nutrients and digestive aids are not supplied. This is another reason why the benefits of EM products are so great and varied.

Effective microorganisms probiotic cultures are stable at room temperatures for at least two years. They are sold in liquid medium and are alive (stable) so they are ready for action when used. And, they produce various beneficial, bio-available compounds for the user. Bio-availability is a key factor in choosing a supplement because it is ready to use for the body. There is no conversion process that the body must go through.

EM is also one of the only microbial products in the world to contain strains of phototrophic bacteria, a class of bacteria known to break down toxic substances and produce beneficial by-products such as the antioxidant vitamin A. Phototropic bacteria plays a huge role in the growth and health of plants and soil systems, and is considered the most versatile bacteria on earth.
The principal classes of micro-organisms in EM are:

A. Photosynthetic Bacteria ~ the key to EM
The photosynthetic or phototropic bacteria are a group of independent, self-supporting microbes, considered to be the most versatile bacteria in existence. In soils and plants, these bacteria synthesize useful substances from secretions of roots, organic matter and/or harmful gases (e.g. hydrogen sulphide), by using sunlight and the heat of soil as sources of energy. Useful substances developed by these microbes include amino acids, nucleic acids, bioactive substances and sugars, all of which promote growth and development. The metabolites developed by these microorganisms are absorbed directly into living organisms and act as substrates for increasing beneficial populations.

Phototropic bacteria are one of the key elements both in EMs structure and its workability and benefits. These micro-organisms have been on Earth since before there was oxygen. They are, in fact, anaerobic and consume carbon dioxide, ammonia, methane and hydrogen-sulphide. In short: they survive by consuming toxins and pollutants. Even more importantly, however, phototropic microbes excrete oxygen, amino acids, antioxidants and other substances that enhance life. The aerobic bacteria then consume the oxygen generated by the phototropic bacteria and they in turn excrete carbon dioxide. This is food for the phototropic bacteria - which they readily consume.

The entire key to EM and why it works lies in this following paragraph. If any datum within this document could be considered to be an axiom and of senior importance to anything else, this would be it:

It is the interdependency and mutually beneficial actions of these various microbes which make it possible for them to establish themselves within the human body (or any environment) and motivate the already-existing bacteria in a beneficial and regenerative direction. Any one of these classes of microbes attempting to influence any environment without the others is, therefore, attempting to operate in a synthetic environment because they do not operate alone in the natural world. To word it differently: although Lactic Acid Bacteria, beneficial yeasts and other microbes have properties which are hugely beneficial to organism health, they will never be able to function as they should without the other bacteria (namely phototropic bacteria) that are essential to the establishment of viable survival conditions.

Due to the increased use of chemical fertilizers and pesticides in modern farming, man is no longer getting, from his foods, the various bacteria that form a part of the survival of the human body, a fact evidenced by the diseases and illnesses of the 20th and 21st centuries. The action of EM in providing man with mutually-supportive bacteria which have the ability of influencing the entire bacterial population of the body has never before been uniformly achieved. Thus it can be said that we have reached a new era in the evolution of human health.

B. Lactic acid bacteria
Lactic acid bacteria produce lactic acid from sugars and other carbohydrates, developed by photosynthetic bacteria and yeast. Therefore, some foods and drinks such as yogurt and pickles have been made with lactic acid bacteria for decades. However, lactic acid is a strong sterilizing compound, and suppresses harmful microorganisms and enhances decomposition of organic matter. Moreover, lactic acid bacteria promote the decomposition of material such as lignin and cellulose and ferment these materials, thereby removing undesirable effects of non-decomposed organic matter.
Lactic acid bacteria also produce antibacterial compounds that are known as bacteriocins. Bacteriocins act by punching holes through the membrane that surrounds the pathogenic bacteria. Thus, bacteriocins activity is usually lethal to the pathogen.

Lactic acid bacteria have a number of well-established benefits. They can improve lactose digestion, play a role in preventing and treating diarrhoea and act on the immune system, helping the body to resist and fight infection. Several lactic acid bacteria may help prevent initiation of colon cancer. It has also been demonstrated that lactic acid bacteria slow the growth of experimental cancers.

C. Natural Beneficial Yeasts
Beneficial Yeasts synthesize antimicrobial and other useful substances required for cellular growth from amino acids and sugars secreted by photosynthetic bacteria, organic matter and other microorganisms. The bioactive substances such as hormones and enzymes produced by yeasts promote active cell division. These secretions are also useful substrates for effective microbes such as lactic acid bacteria and actinomycetes.

NB: This product will not promote Yeast overgrowth such as Candida Albicans.

- All Natural and Organic Ingredients
- Naturally-Fermented
- Soil Based Micro-organisms Formula
- No Preservatives
- Live Microbes, Not freeze dried for increased viability

MICROBIAL SPECIES:
Bifidobacterium animalis ssp lactis, Bi bifidum, Bi longum, Lactobacillus acidophilus, L. bulgaricus, L. casei, L. delbrueckii, L. fermentum, L. plantarum, L. diacetylactis, L. lactis, Bacillus subtilis, Rhodopseudomonas palustris, Saccharomyces cerevisiae, Streptococcus thermophilus.

-------------------------------------------------------------

INGREDIENTS IN EM HEALTH BOOSTER:
100% Natural Fruit juices, Kelp, Molasses, Sodium Chloride, Purified and structured water, SCD EM Food Grade

INGREDIENTS IN EM HERBAL PROBIOTICA:
100% Natural Fruit juices, Kelp, Chamomile, Rose Hips, Olive Leaf, St Johns Wort, Elderberry, Siberian Ginseng, Astragalus Molasses, Purified and structured water. Made with blend of SCD EM Food Grade.

SUGGESTED USE:
Adults: 3 Tablespoons per day.
Children: 3 Teaspoons per day.

OBSERVED BENEFITS:
NOTE: The below findings are based on observation and feedback only, and make no medical claims. Any results that have been once-off successes have been omitted. The following results have been tabulated from the many testimonials that have been received from EM customers and patients.
- **AIDS patients** using EM have been found to have their symptoms assisted by EM and have started getting healthier and stronger within days. The EM increases the ability of the stomach and body to assimilate the nutrition from food and as a result, the patients have gotten stronger and with increased immunity. In addition to the above, external wounds caused by AIDS have been seen to heal.

- Success has been had in the areas of cancer and tumours. Multiple testimonials have been received of EM reducing tumours to apparent zero, and the patients putting on weight and getti

**WHAT MAKES EM DIFFERENT FROM OTHER PROBIOTICS**

By Dylan Anthony

We are often asked about the microbial populations in our Probiotics. Marketing methods have followed the "more is better" mentality, keeping people from looking at more of the quality and diversity. This has a lot to do with the fact that as the diversity of microbes increases, it is more difficult to follow the standard "scientific method", which is based on isolated variables, not compounded effects.

Effective Microorganism products, are complex microbial cultures consisting of microbes from three or four genus. The manufacturers are clear that focusing on the population counts are not as important as focusing on the diversity of the microbes. If EM Health Booster were to have one less genus of microbes, these products would function like other Probiotics on the market and the results would not be as significant.

Other factors to look at when considering EM Technology based probiotic cultures is that they are all naturally fermented at body temperature. This means the finished products are raw, containing 40 trace minerals, amino acids (up to 18), various organic acid compounds, nearly 100 types of enzymes, B complex vitamins, Vitamin A (in the form of Retonin, the form ready for absorption by the body), plus the live microbes.

Any microbiologist will agree with the statement that freeze drying of microbes also causes some form of cellular damage, which can greatly affect performance of the microbes. This is the main reason most Probiotics on the market contain billions of cfu/ml. It is necessary to use tremendous numbers of "weaker" microbes to get the effects of "stronger" microbes.

Lastly, consider that one microbe produces one type of enzyme, one type of vitamin, and/or one type of organic acid. When there is not a variety (diversity), the nutrients and digestive aids are not supplied. This is another reason why the benefits of Effective Microorganisms products are so great and varied.

Effective Microorganisms probiotic cultures are stable at room temperatures for at least one year. They are sold in liquid medium and are alive (stable) so they are ready for action when used. And, they produce various beneficial, bio-available compounds for the user. Bio-availability is a key factor in choosing a supplement because it is ready to use for the body. There is no conversion process that the body much go through.

EM Health Booster also works as a detoxifier that uses nature for a synergistic effect in the digestive system, helping to supply bio-available nutrients to the body while supporting the growth of other beneficial microbes in the digestive system. The detoxifying activity comes from both the naturally synthesized vitamins, enzymes, and other antioxidant compounds and the photosynthetic microbes that are known to break down various toxic compounds in nature.