

Soil Activator - build better humus

By working with the biological processes in nature, Penergetic k stimulates the microorganisms in soil, compost and manure.

- promotes healthy fertile soil
- stabilizes the decomposition process
- strengthens the soil food web reduces the need for fertilizer and farm chemicals

“Penergetic k works with the biological processes in nature to stimulate the microorganisms in the soil”

Penergetic k can be used for three different purposes:

• **In Fields:** accelerates the decomposition process of field residue, activates soil micro-organisms and assists in releasing fixed nutrients locked in organic and mineral soil layers

• **For Dry Manure and Compost:** stimulates an accelerated aerobic decomposition process, reduces odour and other nuisances and produces a nutrient rich humus

• **On Poultry Litter, Stables and Livestock Bedding:**

acts as a conditioner to improve the barn environment by reducing ammonia and insects, supporting disease suppression and decomposing poultry/livestock fecal matter and litter/bedding

* **Penergetic k** is OMRI-listed so is suitable for organic, transitional and conventional methods of agriculture.

Penergetic k is somewhat unique among the Penergetic products in that, unlike the other products, with **penergetic k** a higher application rate produces a bigger effect (especially in composting and barns/stables usages).



PRODUCT CHARACTERISTICS

Penergetic k uses a proprietary process to infuse information from essential minerals, herbs and other elements vital to soil health, aerobic processes, decomposition and root growth into a carrier medium.

CARRIER Medium (three forms): Calcium Carbonate, Bentonite or Molasses

A) Soil Treatment / Field Application

- Can be applied on its own or in combination with other applications (e.g. fertilizer, herbicides, etc.)
- Alternatively, can be mixed and spread with slurry or compost (should be mixed in same day applied)
- Dry application: use calcium carbonate or bentonite
- Spray application: use extra fine bentonite (as a wettable powder) – better particle suspension
- Can be applied prior to planting, at seeding time (i.e. side or bottom banding), pre-harvest or post harvest



Note: Before putting penergetic k in the sprayer, pre-mix with water in a bucket or container to ensure better homogeneity. Before use, read and follow spray instructions.



(Recommended) Rate of Application
(based on one spray application per crop)**:

Cereal Crops/Corn/Soybeans	250 grams/ha	100 grams/acre
Oil Seed Crops (e.g. canola, flax)	250 grams/ha	100 grams/acre
Pulse (lentils, beans, peas)	250 – 300 grams/ha	100 - 120 grams/acre
Hay, forage	200 – 250 grams/ha	80 - 100 grams/acre
Vegetables	600 grams/ha	240 grams/acre

** Note: For first time ever applied on a field, at operator's discretion, the rate of application can be increased (by up to double standard rate). In subsequent years, the standard application rate would apply.

≈ When Penergetic p is also to be applied on the same crop, consider allowing 15 days between the application of penergetic k and the application of penergetic p≈

B) In Compost and Solid Manure

Application Rate: 40 – 80 grams of penergetic k per m³ of manure or compost.

Note: the higher the rate of application the more accelerated the composting process.

Dry: Premix penergetic k with rock meal, sawdust or similar substances. This permits uniform and accurate application.

Wet: Stir penergetic k into water and leave for awhile. Re-stir and apply evenly with a watering can or spray applicator.



Apply penergetic k evenly to the compost layers. When existing heaps are no longer to be turned, poke several holes into the heap and pour Penergetic k into these holes.

Penergetic k can also be applied (dry or wet) while turning the compost piles or windrows.

For maximum effectiveness follow good composting practices, including monitoring temperature, regularly turning the pile or windrows, covering with breathable fleece to regulate moisture (in and out) and prevent weed seeds from infesting compost.



C) In Barns and Stables

In poultry barns spray penergetic k ($4 - 7 \text{ g/m}^2$) on litter and walls prior to introducing birds. Alternatively, it may be applied dry and/or mixed with litter prior to being spread in the barn.

For stables and livestock stalls apply penergetic k (4 g/m^2) to the stable floor or bedding after mucking out. Repeat this procedure each time after more bedding (straw or sawdust) is added.



penergetic 
The Future of Agriculture™

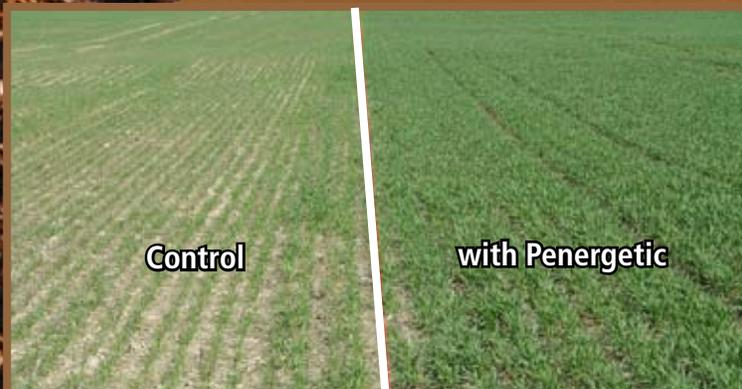
Soil Activator - build better humus

penergetic  **k**

- promotes healthy fertile soil
- stabilizes the decomposition process
- strengthens the soil food web
- reduces need for fertilizer and farm chemicals

Penergetic k is a soil additive that accelerates the decomposition process of field residue, manure and compost and strengthens nutrient recycling & disease suppression through the rhizosphere.

Penergetic k works with the biological processes in nature to stimulate the microorganisms in the soil.



Penergetic k primary applications include:

- composting of in-field crop residue and field mulch
- soil preparation prior to planting
- aerobic breakdown of manure and compost
- improving barn/stable conditions

BENEFITS

A) Soil Treatment

- Conditions the soil to support the development of healthy plants
- Promotes better root growth and increased root exploration capacity
- Nurtures the soil food web and stimulates the activity of soil micro-organisms
- Increases soil's water absorption capacity and plant resistance to drought
- Optimizes the effectiveness of fertilization and thereby reduces fertilizer consumption
- Strengthens plant defenses against diseases and pests
- Reduces the need for pesticides and fungicides
- Increases crop yield/acre, production per plant and plant consistency
- Suitable for organic farming (OMRI listed)

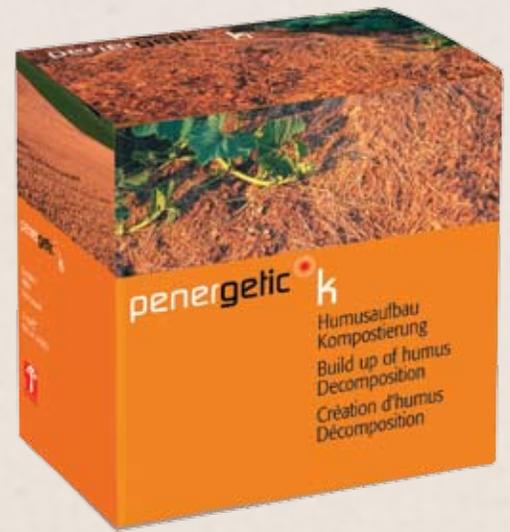
* ***Optimal benefits achieved when used in combination with penergetic p.***

B) Composting

- Activates accelerated composting by an aerobic process
- Suitable for composting solid manure and plant matter
- Reduces insect pest problems and odours associated with composting
- Produces more homogeneously consistent compost mix
- Limits loss of nutrients (e.g. nitrogen) during composting process
- Proven and cost effective approach to composting
- By supporting more thorough breakdown of manure, prevents nutrient overload on fields

C) Barns and Stables

- Reduces flies and odours in livestock stalls
- Helps control odours and contagion of disease in poultry barns
- Starts composting process in soiled livestock bedding / poultry litter



PRODUCT CLASSIFICATION

Penergetic is an “information transfer technology” which uses a proprietary process to infuse information from essential minerals, herbs and other elements vital to soil health, composting and root growth into a transfer medium.

TRANSFER MEDIUM (three forms): Calcium Carbonate, Bentonite or Molasses

APPLICATION

A) Soil Treatment / Field Application

- Can be combined with other applications (e.g. fertilizing, herbicides, etc.)
- Alternatively, can be mixed with slurry (should be mixed in on same day spraying occurs)
- Dry application can be done with calcium carbonate
- Spray application is best with Penergetic k (bentonite) as better particle suspension
- Best applied after previous crop harvested or at least 14 days prior to planting

Note: before putting penergetic k in the sprayer, pre-mix it in a bucket or container to ensure better homogeneity. Product can be applied at the same time as herbicides or insecticides.

Rate of Application (based on one spray application per crop):

Cereal Crops/Corn/Soybeans	100 grams / acre
Oil Seed Crops (e.g. canola, flax)	100 grams / acre
Pulse (lentils, beans, peas)	100 -120 grams / acre
Vegetables	240 grams / acre

≈ For best results use also use Penergetic p on crop ≈

B) In Compost and Solid Manure

40 grams of penergetic k per m³ of manure or compost.

Dry: Premix penergetic k in rock meal, sawdust or similar substances. This enables uniform and accurate application.

Wet: Stir penergetic k into water and leave for a while. Apply evenly with a watering can.

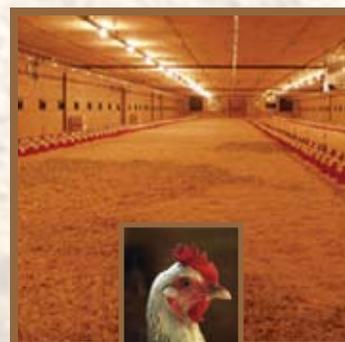
Apply penergetic k evenly to the compost layers. When existing heaps are no longer to be turned, poke several holes into the heap and pour Penergetic k into these holes.

Penergetic k can also be applied while turning the compost.

C) In Barn and Stable

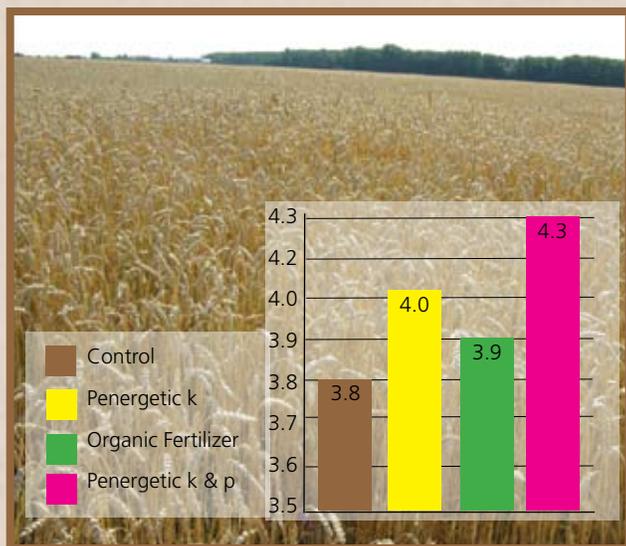
Apply penergetic k (3 g/m²) to the stable floor after mucking out. Repeat this procedure each time after littering down.

In poultry barns spray Penergetic k (3g/m²) on litter and walls prior to introducing broilers.

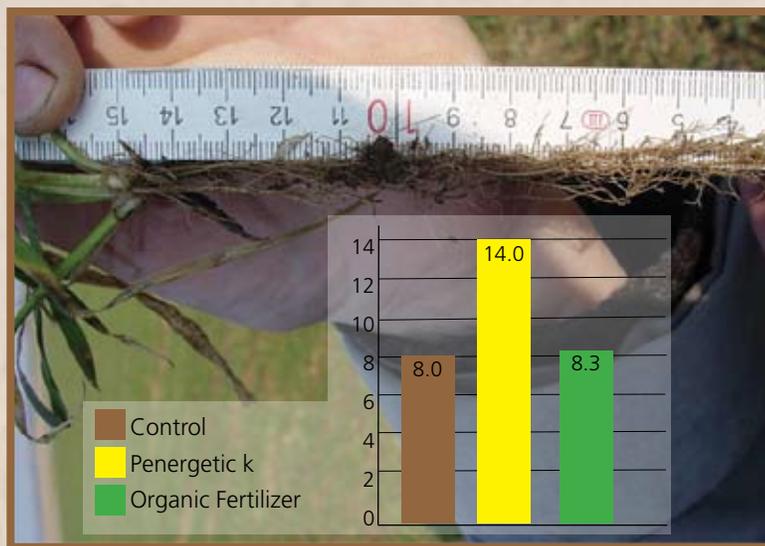


FIELD RESULTS - Winter wheat

Productivity (in tonnes/ha)



Length of Roots Comparison (in cm)

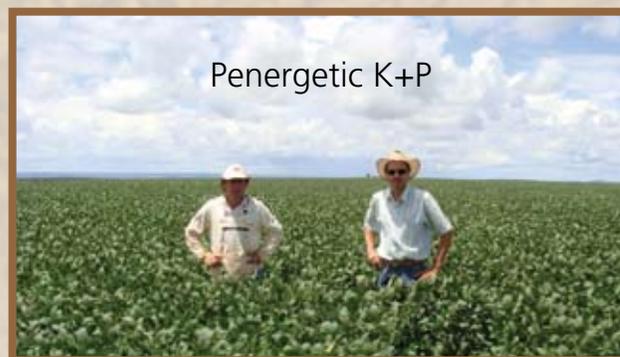
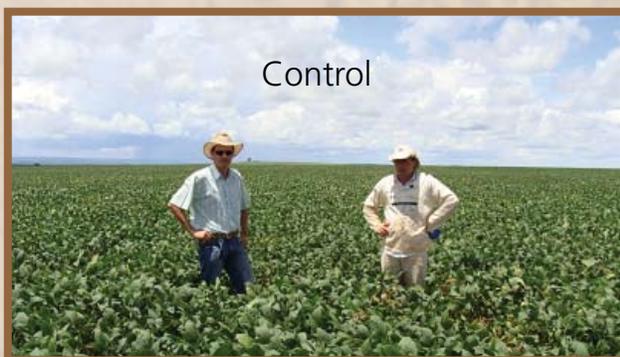


TEST RESULTS (bushels/acre)

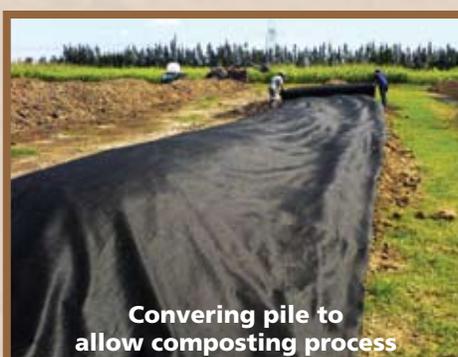
Wheat	Conventional	Penergetic p	Compost with Penergetic k & Penergetic p
Performance	22.3	37.1	66.8

Source: INIA (Instituto Nacional de Investigaciones Agropecuarias), Uruguay

FIELD RESULTS - SOY BEANS (note difference in height and consistency)



COMPOSTING



For further information contact:

+91 22 32400072

PENERGETIC INDIA
info@penergetic.in

www.penergetic.in

COMPOST TEST

with and without penergetic k

Materials and methods

Test was done on two piles of manure as follows:

Pile 1: allowed to decompose based on conventional composting procedure

Pile 2: composed by conventional means with addition of penergetic k (applied at 40 grams/m³)

Results

Days until completion of composting process

Pile 1: 80 days Pile 2: 45 days

Parameters	Pile 1: Without Penergetic k	Pile 2: With Penergetic k
Organic matter (%)	47.7	71.2
Ash (%)	52.3	28.8
Carbon (%)	13.5	26.9
Total Nitrogen (%)	1.5	3.2
C:N Ratio	9.0	12.2
Humic Acid	18.6	19.1
Fulvic Acids	2.3	7.7
CEC	60.8	65.5

Biological Analysis

Fungi	Analysis of four samples – 3 untreated and 1 with penergetic k			
	Untreated Samples			Treated Sample
	Sample A	Sample B	Sample C	Sample K
Aspergillus caespitosus ●	6	5	11	1
Aspergillus fumigatus ●	52	49	18	5
Aspergillus niger	-	25	-	27
Aspergillus terreus ●	2	-	-	-
Emericella nidulans ●	1	-	2	-
Fusarium nygamai (104) ●	5	9	-	-
Puccinia	5	1	-	-
Penicillium murabile ○	1	-	1	1
Gliocladium Gliocladium ○	-	1	-	2
Actinomycetes ○	-	1	-	1
Trichoderma ○	-	1	1	5

Note: when tested at 25°C a significant presence of beneficial organisms (Gliocladium, Actinomycetes and Trichoderma) was observed in the sample from the pile treated with penergetic k and a low incidence of detrimental fungi (Aspergillus fumigatus).

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The fungi marked with the symbol “○” are beneficial for agricultural production. In particular, Gliocladium, Actynomietes and Terichoderma are favourable fungi (especially Trichoderma), which are often used to create natural fungicides as a means of avoiding or reducing the use of chemical products. The use of penergetic k in treating compost promotes the favourable development of these fungi and stimulated their multiplication – thereby essentially offering the same benefits of a natural fungicide.

The fungi marked with symbol “●” are considered to be bad for agricultural production. In particular, Aspergillus fumigatus and Fusarium nygamai are two undesirable fungi, especially for field crops such as wheat and sunflowers. Aspergillus fumigatus is also unfavourable for human health and has been shown to be carcinogenic. When untreated compost is spread on the field a farmer runs the risk of spreading these harmful fungi to the crop, which are unhealthy for plants (and the soil) and lead to the application of fungicides. The absence or reduced incidence of these detrimental fungi in penergetic k treated compost means land application with penergetic compost significantly reduces the risk of introducing unfavourable fungi to the soil and crops.

The quantity of fungi shown in the table needs to be multiplied by 10^4 (or 10,000) in order to calculate the total quantity of colonies of that specific fungi identified in a given sample. For example, reference to “6” for Aspergillus coespitosus in Sample A: means that 60,000 units of this fungi were identified as alive and capable of creating more colonies of this (undesirable) fungi.

Summary of Study Results

As evidenced by this study, the benefits of using penergetic k in compost treatment include:

- Increase in organic matter content of compost
- greater carbon and total nitrogen content – due to less loss of ammonia to the air through volatilization during the composting process, as an aerobic (instead of an anaerobic) process is established
- higher Carbon to Nitrogen ratio
- accelerated and more complete composting process
- reduced odour emission during composting (as aerobic process prevents putrefaction)
- accelerated production of beneficial fungi – good for the soil regime (and plants)
- reduced risk of spreading fungi detrimental to crops when compost treated with penergetic k is used

Penergetic k can also be applied in barns/stables to reduce insects, odours and start the decomposition process of spoiled bedding and animal wastes. Penergetic k may also be applied on fields: pre-harvest, post-harvest or prior to planting to activate soil nutrients, promote breakdown of dead/decaying matter and releases nutrients locked in the soil.

For further information contact Penergetic India: phone 91 22 32400072 or info@penergetic.in

HUMUS AND COMPOST

A STARTING POINT FOR A NEW ETHIC

by: Erhard Hennig

Everybody knows the biblical story of Noah's ark. At that time people had become so evil that God decided to put an end to his creation, but he also wanted to give mankind a chance for a new start. Therefore Noah's ark was to save the animals and the plants from the flood. Details can be found in the bible.

Goethe's words, four years before his death, sound like a prophecy:

*"If we reflect deeply about the
troubles of our time,
it seems as if the world is ready
for Doomsday.
And the evil accumulates from
generation to generation.
I foresee the time when
God will no longer be happy
With mankind, and when
He will again be forced
to destroy the world
to rejuvenate His creation.
I am sure that it is all
designed this way
when the time
of rejuvenescence comes."*

Today there cannot be a rescue any more in the sense of Noah's ark. It is up to everybody to avert the total catastrophe from mankind. Even millions of arks in the whole world could not save us from disaster. Today Noah's ark would have to be designed in such a way that the constructive forces still present help to stimulate recovery and produce ecological energies. The saving can be initiated only by each individual. It would be inadequate to get lost in psychoses, fears or carelessness. Only constructive forces, i.e. those which cooperate, will survive the chaos of the distressed world.

We had better learn from history: We know those areas in all parts of the world in which mankind destroyed the original fertility of the holy earth by technological intervention. Through this process the ecological system was so heavily burdened that it finally collapsed. A typical example is the highly developed culture of the Maya in Middle America which was destroyed through their own fault. The destruction of the forests or the ruinous exploitation of corn growing led to changes of the climate and to disturbances of the water economy as well as to droughts and floods and finally to the formation of steppes and deserts.

The situation of mankind today is unprecedented. In former times the Maya had been able to emigrate into northern, still fertile regions. Where are the free spaces today? The velocity of the destructive processes is higher than ever before. By the application of modern technologies it takes

mankind today only decades or even less for what has taken mankind centuries in former times. Mankind already recognizes the problems of environmental pollution, and we are shocked by the pollution of the soil, the waters, the oceans etc. Now we have to ask ourselves what has happened to us and this Earth we call home? Only a simple mind would assume that mankind does not change with the rapid change of its environment. We should very clearly bear in mind that the effect of an arbitrarily altered world has a direct impact on us (cosmic law of cause and effect). Only a few scientists have been studying the effects of environmental pollution on the mental state of health.

We note with great uneasiness that the psychological and mental damages caused by the creeping contamination are no longer invisible. Our lives are dictated by materialism and its laws, which gained us the reputation of an affluent and a wasteful society. Some are even talking about a "distorted" state of mind with ongoing inability of reflection. We may well trust the words of the great doctor and Nobel prize winner Alexis Carrel, who found - and we have no reason to doubt - that poisons like pesticides, etc. change the cells of the nervous system and influence the composition of the blood detrimentally. When our blood changes then our mind also changes (negative thoughts and wrong nutrition are poisons in the blood). A clean blood circulation is indispensable for clear reflections. This is to say that the human blood, just as the soil and its humus, is a place where living substances, i.e. living macro-molecules, are concentrated.

If we look at the pH in this connection, the following values indicate a healthy state:

- healthy blood 7.35 – 7.45
- mature compost 6.60 – 7.40•
- humus soil 7.00 – 7.20

Here we are faced with repeatable measuring results of different ecological-biological companies. In comparison with the values mentioned above, the neighboring fields, chemically fertilized, showed pH-values of 5.5-6.8. Besides, we may be surprised to hear that the pH-values of humus and mature compost are very similar or even equal to that of healthy blood.

How can we positively react to this situation? First we look at the soil as a living organism: the soil is the largest and most universal laboratory of the world in which nearly all organic and inorganic nutritive substances are transformed. Unless it is abused, the soil behaves like a living system, similar to plants, animals and human beings. Today we know that fertile soil contains an incredible quantity of mature compost, microbes and micro-organisms. In only 1.0 gram of high-quality soil or compost millions of soil organisms, such as fungi, amoebae, algae etc., can be contained. Up to 20 billion can be verified by modern optical devices. That means that more organisms are living in a fistful of soil than there are people on the whole earth. A farmer is able to feed two big units of cattle per 1 ha (= 10 000 m²), with a mass of 1,000 kg, while under the ground more than twice the amount of micro-organisms have to be fed, corresponding to a mass of 2,000 kg.

The soil becomes more valuable when it has a greater diversity and is rich in species and numbers of individual organisms. Each organism in the soil fulfills a special task. The micro-organisms gradually disassemble the organic substances in the soil, digest them and finally excrete them as components of humus. We are talking of a "chain reaction". The earth-worm-solution is regarded as the best form of humus which exists on earth. In the compost the organic substance is nearly reduced to its final components, i.e. to the final form of plasma. Today we know that organic substances up to a molecular weight of 1,500 can be absorbed by plants. Only then the regeneration of humus begins.

The regeneration of humus is a fascinating event: Nature does not afford the luxury of allowing the elements of life after the death of organisms, tissues and cells to decompose and to mineralize, as the chemist says. Although an organism decays, the dying material becomes mother soil. By this process life does not end, but starts again. What results from the decaying process is what we really call "the renewal of life", namely fertility of the soil.

The following gives a simplified scheme:

1. The decomposition process, performed by the dissolution of the substances of plants and of animals to the final form of plasma; in parallel,
2. The composition and transformation of the plasma to the components of new organic substances through the action of the soil micro-flora and micro-fauna; and furthermore
3. the reception and transmission of the living substances by the roots of the plants.

This presents the circulation of living substances as already published in 1951 by Dr. Rusch in the "Medizinisches Wochenblatt" ("Medical Weekly") as the "Law of preservation of living substances".

Goethe knew the laws of nature when he said:

"Death is the trick of nature to create new life"

This is how many people think about their own life cycle according to which human death is merely a transformation into another form of life! Nobody has ever succeeded in synthetically producing living substance in spite of many attempts in all parts of the world. Neither has the synthetic dye "chlorophyll" the ability to produce a single molecule of carbon hydrate, because the living substance is missing.

Forty years have passed since Rusch and Santos discovered the law of the living substance. Today we understand the living substance as "living macro molecules" (LM). LM are the smallest components of the cells of plants and of animals, which preserve the principle of life after the decay, and which stay alive. A part of the bacteria from salt deposits could be resurrected after 300 million years. Mineral coal also bears LM. The very first living substances, which settled on the weather-worn crumb of the earth, were micro-organisms. If we had no micro-organisms today, men and animals would not be able to survive, which means that we would die out. A cooperative activity lasting 400 million years has created an interaction between advanced plants, bacteria, fungi and other micro-organisms. These are the so-called control circuits.

A very lively soil, as well as a lively compost, has a disinfecting effect. Soil and compost are capable of eliminating pathogens and of controlling them biologically. If this control function, which nature still offers to us, did not work, our Planet Earth would have already turned into a garbage heap giving rise to epidemics.

Chemical substances cannot be disintegrated because of the missing natural enzymes; they are not provided by nature. In general, the consumers of poisons are reassured by quoting Paracelsus who said that the dosage makes the poison. Today it is absurd to refer to this principle, because we are now able to produce artificial chemical compounds which cannot be disintegrated at all, or which are disintegrated very slowly and which accumulate in animals and in men. Thus even a minimal dosage can be poisonous. Apart from chemical poisons there are poisons from the processes of decay which

are dominant in agriculture and which damage the environment, the soil and the entire ecological system. The effects are felt by animals and men. An agricultural scientist said in 1900: "Putrefaction is the mother of growth". Farmers and gardeners simplified the slogan to: "What stinks that fertilizes. Today we know that quite the contrary is correct: "Rotting (or decomposition) is the mother of sane growth".

Putrefaction processes generate foul smelling gases like ammonia, sulfuric hydrogen, methane as well as the ptomaines putrescine and cadaverine. Indole and skatole are small transformers of excrements. They attract insects and are simultaneously their breeding places. Finally pesticides are applied, adding to the vicious circle. In our work we found the natural law confirmed saying that organic substances, such as dung and manure, which have already been transformed into putrefactive material, can no longer be decomposed (re-transformed into rot).

On the other hand, we realized that fields as well as vineyards, which have been supplied with optimal compost for many years, became very fertile. Owing to the optimal development of the edaphone ("everything living in the soil", according to France) the dosages of compost could be drastically reduced.

Here are some examples of what compost and rotted manure can achieve: A pharmaceutical company which produced drugs from herbs, planted herbs for many years in order to save the high expenses for the collection of wild growing herbs. According to the accepted chemical rules the company used synthetic nitrogen. Year by year the active substance of the plants decreased – especially the concentration of alkaloid. So the company decided to return to collecting the wild growing herbs. However, with the application of humus and compost to the cultivated herbs an unexpected result was achieved: After a short time, the concentration of the active substance in the cultivated herbs treated with compost equaled that of the wild herbs. This is only one example, of many, which demonstrates that the cultivated plant, correctly nourished, equals the wild plant with regard to biological and physiological efficiency and is thus not condemned to degenerate.

Trace elements, especially quartz-meal, play an important role. Many years ago a large-scale test caused a sensation, proving that 18 of the most dangerous pathogenic agents like paratyphus, tetanus, tuberculosis, anthrax, etc. are killed by aerobic composting, whereas typhus and tuberculosis bacteria do not only remain in anaerobic soils, but they even propagate. It could also be proven that a lot of virulent pathogenic agents of the foot-and-mouth-disease and of the pig pestilence were killed in aerobic soil. We asked ourselves frequently which secret might be concealed in the compost to kill such dangerous pathogenic agents. There must be an enormous discrepancy between the great antagonists, putrefaction and decomposition/rotting – between the putrefactive bacteria directed against life and the oxygen-amenable organisms. It is due to the active substances, the antibiotics, the fermenting substances, enzymes, etc., which are created during composting, that cause the dangerous pathogenic agents to be killed.

The examination of compost is surprising. In 1.0 gram of compost we discovered ½ gram of penicillin. At that time, 40 years ago, I came to the conclusion that there must be a healing effect in good compost. But in the days of a highly-esteemed chemistry it was not appropriate to voice such an opinion. Today my statement of the healing effect of the compost is a verified fact! The two books "Trilogy of Humus" and "Compost in a 100-year Development", point to the phenomenon of the healing power of compost – as a cause and as an effect of the causal law. Formerly, before the soil became heavily charged with poison and chemistry, it was considered to be sacred.

We could also confirm the statements of the book "My Agricultural Testimony" by Sir Albert Howard. The book previously ranked among top world literature, but until the end of World War II it was only available in English. Dr. Rohde from the Institute of Humus Economics and Composting translated it into German. His wage for this work, during a time of great famine, was 200 kg of potatoes – just enough to stave off starvation.

Here is another example which shows us the marvelous effect of compost. Is it imaginable that a green piece of land with trees, bushes and hedges was created on a huge dump with not even one blade of grass growing? This ecological miracle happened when the ruins of the war, divided into lots of 25 ha and burying the bombed districts of the cities, had to be turned into green fields resembling parks thanks to the miraculous effect of compost. And it is hardly believable with what kind of organic substances and which primitive means we had to work. Just to give one example: It was garbage from the households, the entire waste of the market places and all leaves collected in fall. Today the former ruins have turned into green oases, surrounded by new city districts. New life started from the ruins - in the true sense of the word, life originates from death!

But also a field or a garden of inferior quality can become fertile again by appropriate measures. Let me give an example. A vegetable farmer desperately reported: "When the winds blow hard my gardening is moving!" He was talking about the fine soil on the ground, subjected to erosion by the winds. Once a fertile clay with a sand bottom, it weakened over the years through the permanent removal of vegetables, balls of humus and organic substances. In the end, the soil was not able to absorb water, i.e. the rain created small puddles, but the devastated soil could not absorb the precious liquid any more, and the water evaporates

The productivity of the soil could be increased by the following measures:

1. Permanent coverage with organic substances.
2. Extensive supply of compost.
3. Addition of clay to substitute the missing argillaceous earth (quartz meal was not available at this time).

According to my experience with compost, I dare to say: Compost and humus are the best means of repairing nature!

At that time we recognized, as mentioned before, that compost had a healing effect on the soil. Consequently, we can say that there is a life-supporting power, a healing power for all living beings, as pointed out earlier by Dr. Rusch. When coming in contact with the inhabitants of biological farms, everyone will encounter healthy rural families enjoying the good health of the fields, on which plants grow and animals graze. The picture of creative "agriculture" is rounded off by Christian faith and respect for the Creation.

Now, let us turn to the effect of compost in relation to quartz-meal. The micro-organisms, which are concentrated in the compost, such as fungi, actinomycetes, yeasts, green and blue algae and many more, form chelate and thus support the symbiosis between the minerals and the plants. Such a process produces excretions such as amino acids, carbon hydrates, organic acids, enzymes and other complicated substances. These substances help to access the minerals (trace elements). This is also one of the secrets of nature. Chelates are the substances binding inorganic minerals with organic molecules. The energy of the chelates comes from the radiation energy, which is contained in the atoms of the minerals in every mineral substance. The ability to generate chelates is a feature of -

how could it be different - compost and humus. The energetic quartz-meal is a precious gift of nature to mankind. In the basalt/diabase meal silicic acid, which is responsible for the stability of e.g. wheat, is contained in its maximum concentration.

The presence of the trace element cobalt is also important. Cobalt is most important for the generation of vitamin B1, as we will soon see. Even a small grain of the meal causes its effect. The quartz-meal "Biolit" has a surface of ca. 2600 m²/kg. Strong colloidal binding energies, which play an important role in the absorption of nutritive substances, are generated by the large surface of the meal.

When the Russian biologist Alexander Gurwitsch discovered that all living cells emit an invisible radiation, he caused an uproar in the world of science. Today it is considered to be true that biological processes are able to generate radiation, as all living organisms emit radiation. All living organisms, plants, animals and human beings not only have a physical body consisting of material matter, atoms and molecules, but also an energy body. In our atomic age we know that every mineral substance contains a potential of radiation energy. And it is actually this energy by which any form of life gets its impetus, its target and its biologically-directed formation. This fact has been recognized and verified.

From the studies of Prof. Popp we know that living cells are emitting bio-signals called biophotons, which can be regarded as the language of the cells. Without the presence of mineral substances, as a carrier of radiation energy, the development and the formation of living substance is impossible. If we look at the trace elements in quartz-meal from this perspective, the context becomes even more interesting for us; also, with regard to the biological quality of the life of the soil.

The biological quality of the life in the soil starts in the cells. Every atom and every group of atoms have their individual, singular and non-exchangeable positions in the molecule, pre-determined by nature, and are bound to a certain function and arrangement. However; poisons, such as pesticides, cause a change of germ substance as well as a change of atoms, with the consequence that diseases are generated instead of health.

Biological quality originates from the natural, non-changeable position of the atoms in the germ substance. Only ecological agriculture works according to these principles.

We can generally say that any herbicide is poisonous for a plant. Pesticides not only influence the metabolism of parasites, but also the metabolism of the treated plant. Cellular poisons, which originate from pesticides, damage the plasma of the plant, thus making it impossible to develop a healthy cellular structure. Therefore again the warning: diseases will be generated instead of health.

The advocates of chemicals and pesticides have created the totally perverse idea of exposing food to radiation without taking into consideration the sensitive enzymes and vitamin groups. In addition, there is a heavy campaign for micro-wave ovens. The question arises: Has everyone gone mad?

The mental dullness of our time has once more become evident.

It is not without reason that humus is considered to be the miracle substance of nature, an elixir of life. However, the fatal fact is that in the last 100 years our fields have become deprived not only of humus, but also of the most important trace elements such as magnesium, copper, cobalt, zinc, etc. But this is not the whole story. The decrease of indispensable micro-animals in the soil and specific

micro-organisms to organisms such as earth-worms detrimentally influences the fertility of the soil and creates a dangerous situation. Today our soils contain a maximum of 2% humus, and sometimes only 1.5% to 1%. Such soils are sick and powerless. The question of "where in nature is humus generated without the influence of human beings?" is answered as follows: "only in deciduous forests and in untouched areas".

Consider that it takes 1000 years to generate a humus layer 2.5 to 5 cm thick. It must also be considered that the distance from the surface of the earth to its center is 6000 km. But, only 10 to 30 cm of it consists of soil which contains humus. This thin layer serves people to preserve life and enables them to produce food; so the destiny of mankind depends on a 30 cm layer of soil. We thus recognize the enormous task and responsibility to preserve and maintain the humus layer. Fortunately, after 100 years of development a perfect composting method to create humus can be offered today. According to our practical and scientific experiences compost can be produced which:

1. reactivates the humus system;
2. makes the younger generation change perspective;
3. re-installs the equilibrium of the fields;
4. exerts a healing effect on the land, plants and animals, which is then transmitted to human beings.

The most well-known law of nature is:
"the law of causality"

This law contains the notion of "cause", i.e. of cause and effect. For a long time the law of causality has been mathematically verified. The mostly forgotten studies of Prof. August Bier, the great surgeon and rejuvenator of the forests, are based on the law of causality. In his book "The Soul" he writes: "I believe that without the idea of causality mankind would not find its way in this world and therefore would not exist. An effect without cause does not exist nor does a cause exist without effect". In modern words this is called "feedback".

One example is intended to underline the law of causality: for centuries the cattle in the Schwarzwald has fallen sick at the end of winter and frequently has died because something was missing in the food. The search for the cause was difficult. Was it the long winter, the lack of food, or was something else missing, perhaps mineral substances?

The answer was finally found by Prof. Riehm, Freiburg: The soil, which is based on granite ground in the Schwarzwald, was poor in cobalt, quite in contrast to basalt and diabase, but cobalt is an indispensable substance for the formation of vitamin B12.

A recent article in the newsletter "Global 6/91" of the "Bund für Umwelt und Naturschutz" (Federation for the Protection of Nature and Environment) contains some pages of complaints about

- emissions of ammonia,
- super-nitrification of the soil,
- destruction of the soil,
- pollution of drinking water with nitrates.

There is no word about the reasons; the report is all about the effects, so that we have to ask if people are afraid of the truth. The true cause is the poverty in humus and the contamination of the soil. But, only the farmers are being blamed, which is the easy way out.

The problem of "nitrogen" is a very special one. Doubtlessly, nitrogen is the most important nutritive substance apart from carbon. The farmers and the gardeners know two ways of nitrogen supply (to the soil):

1. via technical-synthetic nitrogen compounds
2. via atmospheric nitrogen.

The first source and its effects are well known. Although nitrogen is a gas and not a mineral, the industry wrongly and silently attributed it to the group of mineral fertilizers, though it does not belong to this group. There are three historical periods relating to nitrogen:

The first one is the time before Liebig (1803-1873). In 1888 Heilriegel discovered the fascinating bacteria symbiosis with legumes, which represented the first nitrogen compound with tuberous bacteria.

The second period began in 1918 with the ammonia synthesis of the Haber-Bosch-technology by which the technical synthesis of atmospheric nitrogen was established. Then, in 1925, Liebig's era began and reached its climax in the seventies with the intensive application of synthetic nitrogen. The nitrogen enthusiasm gradually came to an end in more recent times.

The third period started with the introduction of ecological-biological agriculture. If we want to survive, the idea of synthetic fertilization will have to be abandoned. What is important is respect for the existing law of nature, i.e. the law of life, whether we like it or not. We, the representatives of ecological-biological agriculture, travel an apparently difficult path, though natural and without poisons, which, if we look at it more closely, proves to be the simplest, cheapest and most useful path. Later I will speak more about it. As it is generally known, the air of the earth consists of 78% of nitrogen. This amounts to approximately 80,000 tons of air above each ha (10,000 m²) of ground area.

Goethe said:

*"God gave us the nuts,
But we have to crack them."*

And the nitrogen content of the air is such a nut to be cracked.

Let me first say a few words about "LUFÄ" (Agricultural Institute for Investigation and Research): LUFÄ has its own interpretation of the nitrogen problem in biological agriculture. When the "Landwirtschaftliche Zentralblatt" (agricultural journal) reported 12 years ago: "By the chemical treatment of the soil the nitrogen binders azotobacter were reduced by 80%", LUFÄ reacted in nearly all relevant journals as follows: "Biological production is not a realistic alternative: The need for fertilizer N could theoretically be covered by planting fodder legumes; however, as our fields require an average of 200 kg nitrogen per ha, 30-40% of them would have to be planted with fodder legumes which can only be used as producers of nitrogen fertilizer, but not as fodder." Then environmental pollution is used as an argument as they conclude: "The biological nitrogen factory may cause environmental problems, because large quantities of nitrate N will be washed out from the ploughed legumes fields". Such semi-truths were supposed to be believed by the farmers. This example shows the fiasco of the teaching of our time. The teachers representing the "old school", – i.e. Profs. Roemer-Halle, Laatsch,

Scheffer etc. – would be upset about how casual, one-sided and industry-oriented the information supplied to our young farmers is.

From this point we are moving into different directions. According to LUFA, in its function as representative of agricultural sciences, it would be useless, for the above-mentioned reasons, to gain nitrogen by the use of azotobacter. According to LUFA, the alternative would be to procure 200 kg of pure-N from the fertilizer-box, and furthermore there would be chemical companies which produce such bacteria and offer them for sale in order to replace bacteria-losses in the soil. But for the farmers this means to throw their money out of the window. Let us just turn to our own "soil-nitrogen-fertilizer-factory". This is based on a more cyclical, holistic and healthy way of thinking; what I mean is that the nitrogen cycle comprises the following: oxygen (O₂), carbon (C), quartz-meal and an elaborate root system. How does this fit together? It fits very simply. Firstly:

1. The "elixir" oxygen is easy to activate. The trick is to loosen the soil, but not with the plough which only mixes different layers.
2. The nitrogen is picked up from the air by the azotobacter.
3. Carbon (C and CO₂) has to be added to this combination, because these elementary processes need a lot of energy.

But, where should the carbon be taken from? Now we have to pay a very high price for the decades of nitrogen euphoria: Carbon has been badly neglected. The reason is that the industry could not make money from it (only the farmer can, but he was fooled, see LUFA).

4. The trace element cobalt (Co) in the quartz-meal plays the role of the mediator in the form of cobalamin.
5. The elaborate root system starts off the cycle.

From Dr. Rusch we know that lactic acid bacteria settle in the area of the micro-roots producing the lactic acid. Thus a cooperation is generated by:

- o lactic acid + cobalt / cobalamin / vitamin B12
- o binding of molecular nitrogen(N₂) by azotobacter
- o rhizosphere micro-root system
- o lactic acid bacteria / lactic acid, which leads
- o in cooperation with the trace element cobalt (quartz-meal) to the formation of cobalamin / vitamin B12 which is
- o the precondition for the development of the azotobacter which bind molecular N₂, in the soil which can be
- o absorbed by plants.

Thus, cobalamin is indispensable for the development of the azotobacter to bind the molecular nitrogen (N₂) to the soil and for the generation of the tuberous bacteria. Only in this way is nitrogen production able to work.

But the whole process is prevented by

- application of fertilizer salts
- putrefaction processes in the soil
- lack of oxygen (compression of the soil)
- denitrification processes

The correct sequence of these processes is of the highest importance from an agricultural and as well as horticultural point of view. Only in this way will eco-biological agriculture win the eternal fight for the nutritive substances nitrogen (N,) and carbon (C / CO,) and will not have to be afraid of the competition with "chemical agriculture".

Extensive consultations would have to be initiated concerning the sensitive parts of the system, i.e. the soil, the roots and the living organisms in the soil: For this process conceals one of the miracles of nature which takes place hidden in healthy soil. Formerly 80 million micro-organisms could be found in 1.0 gram of fertile soil without fertilization, 80% of the micro-organisms being azotobacter. And today? Nearly zero.

With regard to C and CO, it has to be added: The carbon dioxide comes from the breathing of the soil and of the plants. The plant, with its micro-root system, maintains the "circulation of the carbon" in symbiosis with the edaphone. The breathing of the soil demonstrates the entire biological activity of the soil. The unforgettable Viennese scientist Sekera stated in his lectures: "It is not the extent of the fields which contributes to the richness of a country, but the rooted area of soil." Alfalfa, with its cultivation period of 2 or 3 years, serves this purpose very well, especially with regard to the energy supply.

From the processes mentioned above, we can conclude that these measures present the very best protection against nitrification and against the danger of a wash-out, so that nitrate-nitrogen will no longer enter into the drinking water!

So we learned that the emission of nitrate-nitrogen into the ground water can be avoided. Despite this fact denitrification is generated by the lack of oxygen in soil, by putrefaction processes and by compression of the soil; denitrification is a process by which the nitrates are reduced to lower oxygen nitrogen compounds and finally to elementary nitrogen. This means that N₂, which is fugitive, escapes from the circulation of the soil into the atmosphere. Such losses of nitrogen caused by denitrification can be considerable. Another enormous loss of nitrogen, recognizable by its smell, is caused by the evaporation of putrefactive manure, which is also responsible for acid rain. Dutch scientists noted: The ammonia clouds of Holland can still be observed in Lapland. Besides, one third of the dying of forests is caused by mass animal production.

As we know, acid rain is caused by:

1. Oxidation of SO₂ leading to H₂SO₃ and later to H₂SO₄ = sulphuric acid
2. NO in combination with rain, snow and fog becomes HNO₃ = nitric acid
3. Ammonia from purification plants and mass animal production.

Acid rain increases the amount of protons in the soil, leading to a release of Al and Mn-ions, which are heavy poisons for plants and for the micro-root system. This supply of poison to the top of the trees and into the soil is responsible for the dying of the forests. Our fields and green areas are also affected. As a consequence the living organisms in the soil are dramatically reduced and cannot rejuvenate any more. Many micro-organisms are irretrievably lost. The depletions in agriculture can only be mitigated by a healthy cycle of crops, together with the formation of humus and compost.

Our living space and our environment are in their totality an enormously complex system consisting of innumerable compounds which are all connected to each other. This cooperation has been working for billions of years with an incredible perfection and precision. What we are talking about here are control circuits. This perfect cooperation, which has guaranteed the functioning of life since its

beginning, can be observed even in the smallest units of living organisms, i.e. the smallest living cells. The survival of mankind depends on the quality of the DNS. The incredibly complicated, tiny molecule contains the instruction for the generation of the whole human being. Nature gave us an organism perfectly designed and highly operational. But, when chemical substances penetrate into the ecological system, the chains of enzymes in the soil products, as well as in the whole ecological system, get completely mixed up. Widely respected doctors warn us about the fact that the purity of food, water and air is no longer guaranteed and that our immune system is going to break down. The English doctor John Lester reports in his book "Nutrition and Psyche": "Since for many people the central nervous system is the organ responsible for allergies, we feel horrified when we imagine where these people, doctors and politicians, our leaders, will take us." We are not only what we eat, but also what we create, from our food's energy!

Over a 40 year time span a person eats approximately 42 000 meals. One of the most important principles is that everything we eat will become a part of our body - for better or worse.

Man is what he eats!

The substratum of which we live is the earth, the Mother Earth. Everything that is produced and consumed on this earth finally returns to the earth. Thus we will soon find all toxic and waste Substances in our bread and butter. All chemicals are foreign to our metabolism and therefore detrimental. Industrialized agriculture enforces the depletion of trace elements in the soil, which are indispensable for life, and enriches the soil with toxic substances. Our food reflects this fact very well.

We should take care not to continue as before in order to avoid diseases caused by environmental pollution.

Dr. Lester states: "We, doctors with the power of judgment, will have to think about the question of whether we are intelligent or, on the contrary, lethargic, unaware, and perhaps even foolish! This would be more or less a consequence of the food which we consume in all its forms and with all its additives. Prof. Warning alerts us to the ticking time bomb which will raise serious existential questions for the human body. It is clear that we have arrived at a critical point. The new order of our state of health – in my opinion – begins with humus, which means that health originates from the soil.

To learn more about compost, humus and building healthy soil

or

to order a copy of the book:

The Secrets of Fertile Soils (English edition) by: Erhard Henning

contact:

PENERGETIC INDIA

+91 22 32400072

info@penergetic.in