



Soil augmentation with Xcelbio bio stimulation for crops & soil



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Effectiveness of Xcelbio Bio Stimulator on soils and root structures

Unique ability to degrade various substance, we have many types of Crenarchaeota, (the core base of Xcelbo. Since nutrients are very inevitable competitors for each microorganism, it is difficult to understand the fact that relation of many microorganisms is commensal or interdependent. Although a type of microorganism may have the possibility to degrade recalcitrant food source before others, every microorganism uses a little to produce additional substances for food of other fastidious microorganisms. They are interactive and It is a intrinsic property in Crenarchaeota. They are symbiosis with various bacteria included able to dispose many pollutants without particular special use microorganism to choose.

We can see various other soil microorganisms in rich soil. Chemical fertilizer (insecticides, germicides, herbicides etc.,) farm, influence negatively on soil microorganisms. The bio-augmentation is a method that artificially revises a number of exhausted microbes by adding it. In fact, chemical fertilizer in soil, as effectiveness of Xcelbio, prevents the nitrogen loss to leachate and denitrification, as well as of expensive fertilizer and underground water pollution by helping properly degrade ammonium or urea etc.

Soil compaction (Hardpan) is the result of both chemical and physical stresses on soil. These stresses also have an adverse affect on the soil's microbiological functioning and the combination of all of these factors can severely restrict plant growth.

** Michael Kim, the author of this paper is Korean and we have minimised the gramtical changes to his written text.*

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Several interacting factors can contribute to soil chemical stress, including the natural chemical make-up of the soil, use of high salt index fertilizers, broad-spectrum fumigants and low soil moisture. Sodium (and other chemical salts) can break down soil structure by displacement of calcium - one of the important, molecular "building blocks" of healthy soil aggregates. As microaggregates and macroaggregates break down, the soil structure can collapse - reducing pore spaces for air and water and reducing microbial activity. Broad-spectrum fungicides can further reduce the level of microbiological activity.

Physical stress on the soil is caused by heavy equipment and tillage practices. Heavy farming equipment crushes soil particles into small, compacted layers. This can also occur below the soil surface at certain depths by tillage equipment. The results are very similar to chemical compaction with the destruction of soil structure and harm to plant growth.

These combinations of soil are generated from short capacity of oxygen and water and evaporating by filling pores with soil molecules. Because nutrient of water and plants on firm land is combined with soil molecules, it is impossible to use nutrient of plants. It may limit root growth by hardpan.

The first line of defense is to rebalance the soil's chemistry. Xcelbio reduces the soil's sodium and total salt content; in turn promoting the re-formation of micro aggregates. Xcelbio process helps to loosen up the soil permitting an improved movement of air and water. Enhanced microorganisms quickly respond to the air and water and are encouraged to function, which further contributes to the soil structure building process. Plant roots then gain better access to air, water and nutrients with a resultant improvement in growth and yield.

Hardpan can also become anaerobic and soggy, or dry and crusted. In either case, such conditions are harmful to plant growth.

Plant growth response is the best indicator of soil improvement, but we can also measure physical changes within the soil itself. A penetrometer (you can purchase via internet) will per square inch (psi). In many cases, within 6 weeks of Xcelbio application, the penetrometer is able to push (like plant roots) deeper into the soil before reaching the 300-psi limit.

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Xcelbio eliminates solid layer for the long or short term. Improved the soil quality by just spraying on land. Microbes air into the land and increase soil capacity. So free water and nutrients movement to plants thru loosen soil particles. The advantage of Xcelbio increases humus soil, improved water holding capacity and pores in the soil. Increasing of microbes in soil by useful bacteria affect rich humus soil contains more enzyme, hormone and antibiotic etc. produced naturally.

Therefore, mixing special microbes (refer to far below) makes in Xcelbio working mutually degrades soil and water pollutants. Xcelbio is natural mixture. Genetic microbes are not included. Xcelbio grow under starved condition, it has prominent effectiveness degrading recalcitrant.

How to use Xcelbio Bio Stimulant

Xcelbio proliferates indigenous microbe and bacteria in soil watering, spraying on leaf as natural soil microbe additives, and has prominent effectiveness to thrive root as well as resolve and constitute one layer of soil.

Xcelbio prevents overgrowing plants, increasing gloss and sugar. So tolerances become strong, proliferates flowering, harvest and fat.

Xcelbio effectiveness for physiological defects such as lack of sunlight, cold and storm etc., by having strong growth.

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Cautions Before Spraying Xcelbio

Must be great care mixing with Bordeaux and other agricultural medicine.

- Using after complete clean remaining agricultural medicine within sprinkler, can or bottle.

Xcelbio for each plant

- Spraying diluted Xcelbio - 1l: water 200l, five days, soaked, before seeding. (Additional spraying after 7~8 days)
- Only when compost is that of bull, after spraying before rotary, spraying Xcelbio after soil 60% wet.

We find as below so far, from our substrates. Researching is still undergoing by Prof Whang, Mok Won University, Tae Jon, funded by BB.

Zoogloea sp. MER-5: Degrade organic and toxic substances. Utilize acetic acid compound structured of **aroma oxide tribe** 유기물 및 독성 물질을 분해하는 균. **acetic acid**의 산화·방향족 구조를 갖는 화합물 이용.

Sphingomonas sp. MER-7: Generally isolated from polluted soil and sludge. Degrade recalcitrant benzene, ring compounds, etc. 보통 오염된 흙이나 **sludge** 등에서 분리. 난분해성 물질, 벤젠 ring 등의 화합물 분해.

Burkholderia MER-9: Produce antibiotic active substance. Soil biological treatability, included aromatic compound. Benzene treatability, pollutant reducibility. 항균활성이 있는 물질 생산. 방향족 화합물이 포함된 토양의 생물학적 처리기능. **Benzene** 분해능. 오염물 감소능력을 가지고 있음.

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Azospirillum sp. MER-10: Combination in soil or root, turf, plants leaf and protuberance, essential microbe to fix nitrogen. Growth speeding hormone, promotes nutrient uptake. 토양이나 농작물의 뿌리, 잔디 등 식물의 잎 또는 식물의 돌기에서 결합. 질소고정에 필수적인 균. 식물생산촉진 호르몬의 생장으로 영양흡수를 촉진함.

Pseudonocardia MER-11: Grow well in putrefying compost. Degrade human pathogen THF. 썩고 있는 퇴비에서 잘 성장. THF라는 사람의 건강을 해치는 물질을 분해.

Sphingomonas sp. MER-12: Degrade recalcitrant such as Toluene, Naphthalene, and Ethereal solution. Treat, in situ, polluted with oil, ocean, soil and field. Neutralize toxic insecticides,

germicides, and herbicides etc. 방향족화합물과 난분해성물질을 분해하는 균. 기름오염, 토양, 해양, 작업장 등에 적용가능. 2,4-D라는 독성농약을 중화 시킬 수 있는 균.

Nordella MER-13: BB discovered this archaea, from our substances. No report to academic world and commercial fields, till now. What is this doing? Still unknown. 현재까지 학계나 시장에 발표되지 않는 균으로 연구가치가 높은 균.

Staphylococcus MER-15 : Extreme halophile (control eutrophication Anabacna Cylidrica) 고도 호염균 (부영양화를 일으키는 Anabacna Cylidrica를 제어하는데 활용)

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Bacillus MER-16: Extreme halophile. 고도 호염균

Bacillus-1 MER-17: Extreme halophile. 고도 호염균

Bacillus-2 MER-18: Extreme halophile. 고도 호염균

Bacillus-3 MER-19: Extreme halophile. 고도 호염균.

Bacillus-4 MER-20: Extreme halophile. 고도 호염균

Aureobacterium MER-21: Medium halophile. 중도 호염균

Arthrobacter-1 MER-22: Medium halophile. (good for denitrification, radiation substance plutonium friendly) 중도 호염균(탈질에 효과적인 미생물이며 방사선 물질인 플루토늄과도 친화성이 아주 높은 미생물임)

Bacillus-4 MER-24: Medium halophile. 중도 호염균

Rhodococcus-1 MER-25: Medium halophile (applicable phenol and dioxin wastewater plant.) 중도 호염균(폐놀하수처리에 이용, 다이옥신 함유 폐수처리에 이용가능함)

Rhodococcus-2 MER-26: Medium halophile. 중도 호염균

Streptomyces sp. MER-28: Medium halophile(applicable cr. Wastewater treatment, has very strong special quality to reduce chrome) 중도 호염균(크롬환원에 강한 특성을 지니고 있어 크롬 함유 중금속폐수처리에 좋음)

Bacillus-5 MER-29: Medium halophile (known as **Bacillus subtilis**, **metabolize anaerobically** various sugar as starch, glucose to most of traditional fermented food, such as soybean malt, chung-guk-jang (Korean

food, you will never like it). (degrade organic matter) 중도 호염균 (고초균으로 알려짐. 포도당과 같은 다양한 당류 전분 등을 혐기적으로 대사하여 메주, 청국장과 같은 발효식품 제조에 이용됨. 유기질 분해균)

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Bacillus-6 MER-30 : Medium halophile 중도 호염균

Bacillus-7 MER-31 : Medium halophile 중도 호염균

Bacillus-8 MER-32 : Medium halophile 중도 호염균

Streptomyces MER-33 : Medium halophile 중도 호염균

Bacillus-9 MER-34 : Medium halophile 중도 호염균

Streptomyces MER-36 : Medium halophile 중도 호염균

Bacillus-10 MER-37 : Medium halophile 중도 호염균

Bacillus-11 MER-39 : Medium halophile 중도 호염균

Spreptomyces MER-40 : Medium halophile 중도 호염균

Bacillus-12 MER-43 : Medium halophile 중도 호염균

Bacillus-13 MER-44 : Medium halophile 중도 호염균

Bacillus-14 MER-45: Medium halophile (has solubility non soluble phosphate. High survival rate, form spore. Soil compound granule.) 중도 호염균(난용성 인산 염 가용화를 가 지고 있음. 포자를 형성하기에 생존율이 높음. 토양의 입단화)

Spreptomyces MER-46 : Medium halophile 중도 호염균

Bacillus-15 MER-47 : Medium halophile 중도 호염균