



**KMI Zeolite Inc.**  
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## SOIL AMENDMENT

### BUILD HEALTHY LIVING SOIL WITH KMI ZEOLITE

**Environmental sustainability:** KMI Zeolite is 100% natural OMRI listed for organic use. Combined with soil it enhances fertilizer coverage and effect.

While NPK nutrients stimulate plant growth, they also contribute to water pollution. Zeolite is an all natural product that improves fertilizer quality and productivity by trapping more nutrients in the root zone of the soil before leaching into the environment.

Zeolite will improve fertilizer efficiency by holding the nutrients and minerals in the root zone until the plant is ready to utilize them.

**Aeration, anti-compaction & infiltration:** Zeolite prevents soil compaction, increases infiltration, and improves the aeration of deep root systems due to its relative density, helictical molecular structure high surface area and channeled micro-porosity.

KMI Zeolite does not float. It will not rise in to the surface of the soil after heavy rain or watering. Our zeolite has a very high spread efficiency and it will remain low in the soil around the root zone.

**Fish & wildlife safe.** Zeolite does not float. Clinoptilolite zeolite is approved by the FDA for use as a feed additive for animals. Some studies have shown that feeding clinoptilolite to fish can have a beneficial effect.

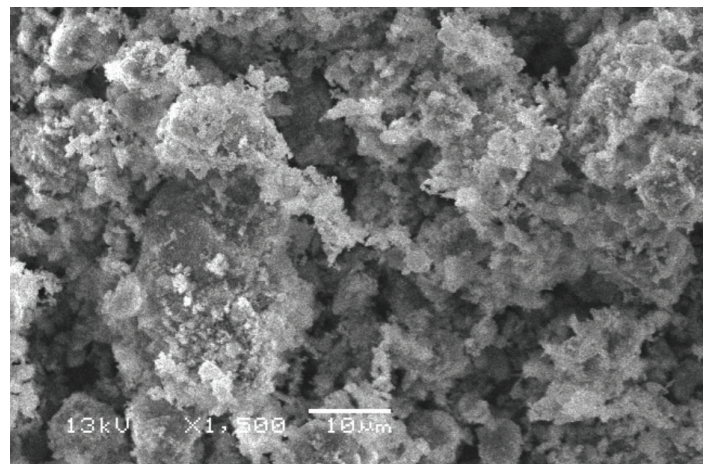
For this reason our zeolite can be used in open fields, on hillsides or beds, and in composting. Zeolite has been shown to reduce levels of ammonium nitrate in liquids which can have a positive impact on rivers over-saturated with excess fertilizer.

**Increase Nutrient Availability:** Zeolite serves as a natural, non-toxic carrier of fertilizers. When applied to gardens at the beginning of a vegetation period, soil and plants benefit from a consistent fertilizing effect throughout the entire growth period.

Zeolite locks essential nutrients and compounds into its honeycomb structure, releasing them gradually into the soil and root system of plants. (Rehakova et al., 2004)

**Improve fertilizer efficiency:** Our extremely pure clinoptilolite zeolite improves the efficiency and the consistency of fertilizers and nutrients when added to soil blends at a rate as low as 5% powdered zeolite to soil.

Zeolite helps maintain the availability of nutrients in soil by holding and storing them on the surface of the zeolite and by exchanging cations with naturally formed nutrients and added fertilizers. (Polat et. al 2004)



Ill. 1 clinoptilolite zeolite zoom x 1,500.

**Cation exchange capacity:** KMI Zeolite has a very high cation exchange capacity. Moisture, oxygen and nutrients are attracted by the zeolite and stored on the surface of the zeolite and within its honeycomb structure. Positive cations like Calcium, Magnesium, Potassium and Ammonium are attracted and bonded to the surface of the zeolite.

Nutrients held in the growth zone by the zeolite are plant accessible but not water-soluble. This means more nutrients will remain in place through rain and watering, without leaching into the environment.

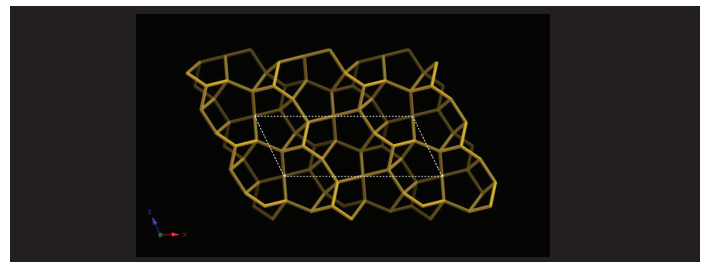
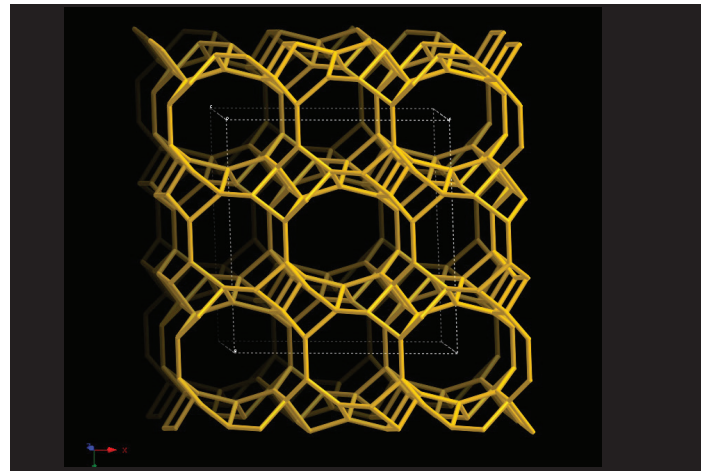
The high capacity cation exchange of this mineral compared to the soil (157 meq/100 g zeolite vs. 26 meq/100 g soil) allows the soil to increase nutrient retention by more than five times, which can act as a storehouse of nutrients available to crops.

**Balance pH:** The unique attributes of KMI Zeolite act like a powerful pH balancing agent, it is dense yet highly porous with a molecular sieve structure. Since the molecule is of a negative molecular charge and pH neutralizing it holds moisture longer than soil, clay, sand perlite, coco-coir, etc. while also buffering the soil and deterring root-rot.

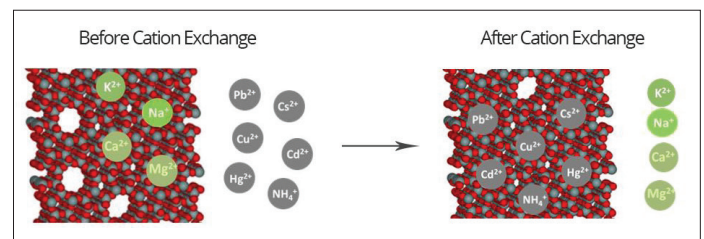
**Treat contaminated soil:** "Natural clinoptilolite can absorb VOC's and heavy metals into its cavities and channels by ion exchange, blocking the reception of heavy metals in plants, and reducing the absorption of toxic substances." "Adding pure natural zeolite of the clinoptilolite type leads to significant decrease of the content of heavy metals and PCB in plants." (Rehakova et. al. 2004)

**Micro-porosity:** Zeolite's unique crystalline lattice structure contains millions of pores and channels allowing oxygen to flow in and out of the mineral while also trapping and storing the oxygen. Zeolite improves the availability of oxygen to the roots and the aeration of the soil in general helping to prevent anaerobic bacteria, stagnation and root-rot.

**NPK retention:** Researchers found that the addition of zeolite increased the availability of N, P, K, Ca and Mg to plants, followed by a significant improvement in yield and other physiological parameters.



Ill. 2 & 3 clinoptilolite zeolite molecular structure.



Ill. 4 clinoptilolite zeolite cation exchange.

#### References:

M. Rehakova, S. Čuvanova, M. Dziva, J. Rimar, Z. Gavalová **Agricultural and agrochemical uses of natural zeolite of the clinoptilolite type** Department of Chemistry, Faculty of Science, University P.J.Safařík, 04154 Košice (2004)

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