

JOHN'S CORNER

Soil Amendments - Zeolite

By John Ferguson

A few years ago when a colleague of mine known as the "Dirt Doctor" and I were writing the book *Organic Management for the Professional*, a discussion on the merits of Zeolites came up. I then decided to learn a lot more, so that summer my wife and I drove to New Mexico and visited several of the Zeolite mines up in the mountains (a great way to beat the heat of a late July summer in Houston).

Zeolites are secondary minerals known as aluminosilicates that are formed from igneous rocks that had been exposed to steam or hot water which caused many of the minerals like feldspar to change. Basically Zeolites are made up of interlocking tetrahedron structures of SiO_4 and AlO_4 minerals with open pores.

This unique porous structure allows Zeolites to be used in many applications, with the largest usage in making detergents. Zeolite has the ability to absorb water even under dry conditions, or absorb huge amounts of gas and or minerals and keep them readily available for plants.

It is often used as cat litter as it absorbs odors and as an ingredient in animal feed. When used as a soil amendment it increases the CEC (cation exchange capacity) of soilless media. Over 48 types of Zeolites have been found in the USA all with similar properties.

The name Zeolite comes from the Greek "Zeo" (meaning to boil) and "Lithos" (meaning stone). In gardening the unique structure allows Zeolites to:

- absorb and release water molecules (strong capillary action) and holds water up to 26% by volume
- hold and release plant nutrients since it has a high cation exchange capacity (CEC)
- improves porosity (aeration)
- support microbial activity



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- buffer pH
- reduce clay clumping
- absorb odors
- absorb ammonium (NH₄⁺), hence used in composting when using fresh manures as it keeps nitrogen from escaping into the air or leaching
- since a natural mineral it is 100% organic
- readily available and relatively inexpensive as it is found all over the world in large quantities
- typically applied at the rate of 30-100 pounds per 1,000 square feet

It is also used in the following products:

- detergents
- animal feed
- golf course greens and tees
- potting soils
- cat litter (several brands are 100% Zeolite, so read the label)
- used in soil wetting agents
- air and water purification
- spill absorbents
- absorbs heavy metals hence used to detoxify
- crude oil cracking
- pharmaceuticals and cosmetics
- water softeners
- filter media in aquariums.