

# Advanced TRS - ZEOLITE IN A COLLOIDAL SUSPENSION

The need for this product is summarized in the following graphic



(SOURCE: WORLD HEALTH ORGANISATION REPORT 2008)

Since this data was collected the numbers of deaths have gone up yearly.

25 MARCH 2014 | GENEVA - In new estimates released today, WHO (World Health Organization) reports that in 2012 around 7 million people died - one in eight of total global deaths - as a result of air pollution exposure. This finding more than doubles previous estimates and confirms that air pollution is now the world's largest single environmental health risk. Reducing air pollution could save millions of lives. The answer is a healthy way of ridding the body of toxins via Advanced TRS

## Why we need Advanced TRS

In our increasingly industrialized world, the issue of toxic environmental exposure is coming to the forefront as an issue of public health and safety. In the 2009 the "Fourth National Report on Human Exposure to Environmental Chemicals" (prepared jointly by the Department of Health and Human Services, Centers for Disease Control and Prevention and the National Center for Environmental Health updated 2011) gives a comprehensive look at what the human exposure is in a cross section of Americans. To understand the depth and severity of what the average American is exposed to on a daily basis you can read the full report here: [www.cdc.gov/exposurereport/](http://www.cdc.gov/exposurereport/), including updated tables for 2012.

## What is a Zeolite?

Zeolites are crystalline, hydrated aluminosilicates of alkali and alkaline earth metals, having infinite, three-dimensional atomic structures. They are further characterized by the ability to lose and gain water reversibly and to exchange certain constituent atoms, also without major change of atomic structure.

Along with quartz and feldspar minerals, zeolites are three-dimensional frameworks of silicate (SiO<sub>4</sub>) tetrahedra in which all four corner oxygen's of each tetrahedron are shared with adjacent tetrahedra. In zeolite structures, some of the quadri-charged silicon is replaced by triply-charged aluminum, giving rise to a deficiency of positive charge ions. The charge is balanced by the presence of singly- and doubly-charged atoms, such as sodium (Na<sup>+</sup>), potassium (K<sup>+</sup>), calcium (Ca<sup>2+</sup>), and magnesium (Mg<sup>2+</sup>), elsewhere in the structure. The empirical formula of a zeolite is of the type:  $M_{2/n}O \cdot Al_2O_3 \cdot xSiO_2 \cdot yH_2O$ , where M is any alkali or alkaline earth atom, n is the charge on that atom, x is a number from 2 to 10, and y is a number from 2 to 7. The chemical formula for Advanced TRS, a common commercially available zeolite is AlMgNaO<sub>9</sub>Si<sub>3</sub>.

## Mechanism of Action

For Advanced TRS, cations (charged metal atoms) are known as structural atoms, because with oxygen they make up the rigid framework of the structure. This is why the form of aluminum in zeolites is completely inert and does not react or release in the body in any way. Sodium and magnesium are known as exchangeable ions, because they can be replaced (exchanged) more or less easily with other cations in aqueous solution, without affecting the aluminosilicate framework. This phenomenon is known as ion exchange, or more commonly cation exchange. The exchange process involves replacing one singly-charged exchangeable atom in the zeolite by one singly-charged atom in a solution or replacing two singly-charged exchangeable atoms in the zeolite by one doubly-charged atom in a solution. The magnitude of such cation exchange in a given zeolite is known as its cation-exchange capacity (CEC) and is commonly measured in terms of moles of exchangeable cation per gram (or 100 grams) of zeolite or in terms of equivalents of exchangeable cations per gram (or 100 grams) of zeolite.

While the ratio of exchange for ions is fixed, the effectiveness of cation exchange is directly related to the particle size of the zeolite. The smaller the zeolite particle is, the greater the available negatively-charged surface area. A large surface area provides a greater ability to attract positively-charged ions for cation exchange.

## The ability of Advanced TRS to attract and trap positively-charged toxins

Advanced TRS has a cage-like structure, with pores and channels running through the crystal. The cage and surrounding mineral carries a net negative charge, making it one of the few negatively charged minerals. Because of its cage-like structure and negative charge, Advanced TRS has the ability to draw and trap within and on itself positively charged heavy metals and other toxic substances. The negative charges of the AlO<sub>9</sub> units are balanced by the presence of four-exchangeable, positively charged metals known as cations. These cations usually consist of calcium, magnesium, sodium and potassium. These ions are only loosely held and can be readily displaced by other substances, such as toxic heavy metals or other organics. This phenomenon

is known as cationic exchange, and it is the very high cationic exchange capacity of zeolites, which provides for many of their useful properties. Another special aspect of this structure is that the pore and channel sizes are nearly uniform, allowing the crystal to act as a molecular sieve.

Advanced TRS seems to be highly specific for the heavy metals. Research has shown that the smaller the diameter of the metal and the higher the charge of the metal, the greater the affinity it has for the zeolite. Higher charges simply increase the strength of binding with higher binding characteristics. The small size allows for deeper access into the zeolite pores with more points of coordination. As an example of this phenomenon, arsenic has a charge of +3 and an atomic radius of approximately 1.8 angstroms, while potassium has a charge of only +1 and an atomic radius of approximately 2.8 angstroms. The arsenic binds with very high affinity for the zeolite while the potassium has no affinity whatsoever. The Advanced TRS binds a variety of toxins. This includes heavy metals (Lead, Cadmium, Mercury, etc.), nitrosamines, and others.

Cationic exchange is an entirely passive process—when the zeolite is in close proximity to these high-affinity compounds, they will be drawn to the zeolite and either absorbed into the cage or adsorbed onto the surface of the zeolite. There is no chemical activity in this process. The zeolite will not be drawn to compounds in an effort to ‘rip’ metals away from them. Organics (Non Volatile and Volatile) are also removed by Advanced TRS. Organics are not trapped or exchanged in or onto the surface as in heavy metals, but rather are absorbed into and onto the Advanced TRS using a combination of ionic attraction rather than exchange. This attraction is based on the overall charge of the organic compound with preference given to positive charge points on the molecule itself. Thus, a large molecule such as ammonium citrate will still be removed even though its size is much larger than the particle of zeolite. There are many studies ongoing today to take advantage of this effect. While Advanced TRS is mostly known for heavy metal removal, the ability to, positively affect, the removal of potentially toxic organic compounds at the same time cannot be ignored.

## **Why a Colloidal form of Zeolite**

Advanced TRS is a liquid suspension of zeolite Clinoptilolite in pure water.

A colloidal suspension allows for particles sized so small they can remain suspended inside water molecules, providing a delivery mechanism for Advanced TRS zeolite throughout the body with increased surface area. \*\* These statements have not been evaluated by the Food and Drug Administration. Our products are not intended to diagnose, treat, cure or prevent any disease.

## **What is a Colloid?**

A system in which finely divided particles, which are approximately 10 to 10,000 angstroms in size, are dispersed within a continuous medium in a manner that prevents them from being filtered easily or settled rapidly. Advanced TRS is sized in the nanometer range which forms a very stable suspension and is a true colloidal solution. In effect, the zeolite particles are small enough to fit inside the water molecules, creating a suspension that is colorless, odorless and tasteless.

This offers two distinct advantages: smaller size and increased surface area. With the smaller particle size, it is a logical assumption that the smaller the particle the more efficient it is in getting in the more inaccessible parts of the cellular structure. This smaller size increases the effectiveness in being able to remove toxins from all parts of the body. This includes the more dense muscle tissues, parts of the lungs, and other organs that due to enzymatic barriers restrict larger particles of zeolite from entering. A colloidal suspension will have a greater impact for detoxification by being able to go where the finest capillaries flow at a true cellular level.

## **Safety of colloidal minerals**

The safety of colloidal minerals is well studied. Nature supplies colloidal minerals to us in our water supply and foods every day. The safety of colloidal zeolite in the size range Coseva is producing has been as well studied in vitro and in vivo.

The colloidal zeolite has been shown to be biologically inert even at the small size it takes to form a colloidal solution. The main characteristics of zeolite are still in place.

- The zeolite Clinoptilolite, as used in Advanced TRS, has been recognized as safe, having been granted GRAS status by the FDA (Generally Recognized as Safe).
- Additionally, Advanced TRS zeolite has a documented affinity (or preference) for positively-charged heavy metals and toxins and will not remove beneficial nutrients.
- The proprietary processing for Advanced TRS removes any existing environmental pollutants from the zeolite cages, and fills the cage-like structures with the exchangeable ions calcium, magnesium, potassium and sodium, which in effect, Advanced TRS will always swap out one of its beneficial ions in exchange for positively-charged heavy metals and toxins.
- The Advanced TRS zeolite is totally produced within the United States of America.
- Advanced TRS zeolite is not stored in the body, and is excreted via the kidneys within 4-6 hours of ingestion.
- Given the natural hydrophilic nature of zeolites and the increased surface area of Advanced TRS, increasing water intake is suggested to facilitate the body's ability to remove toxins.
- The manufacturing and bottling facilities for Advanced TRS all follow cGMP (Good Manufacturing Practices) in the handling of both the raw materials and the finished product.

## **The effectiveness of colloidal zeolite**

In addition to the safety of colloidal zeolite, its effectiveness has also been well studied. This directly relates to the small size of the colloidal zeolite particles. The cationic exchange efficiency (CEC) is directly related to the number of aluminum interchanges and cages exposed. In other words, the smaller the zeolite particle is, the greater the number of cages available for heavy metal and toxin removal.

- While it is logical to assume the smaller particle is more effective, the research shows a marked increase in efficiency and amount of heavy metal removal with the reduction in particle size.
- Advanced TRS undergoes proprietary processing to reduce the zeolite particle size to the nanometer range.

- The small particle size creates a vast surface area in every serving, delivering an effective cellular detoxification with every spray.

## **Who can benefit from Advanced TRS?**

The colloidal Advanced TRS works differently than the standard zeolite product. With Advanced TRS, 100 percent of the zeolite will enter the bloodstream.

## **Summary**

1. Clinoptilolite zeolite is safe and effective, proven in numerous trials involving both people and animals, and is granted GRAS (Generally Recognized as Safe) status with the FDA (Food and Drug Administration).
2. The zeolite Clinoptilolite is proven safe through its years of safe usage as a supplement for the general population including children.
3. Advanced TRS is bringing to the market the very best that technology and nature can produce, with a zeolite sized to access the body on a cellular level
4. Safety and effectiveness of Advanced TRS is instilled through the stringent protocols.
5. With an average size of 0.9 nanometers and an estimated surface area of 5.2 million square feet per ounce Advanced TRS has the greatest surface area for the most effective method of action of any product on the market today.