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PREPARATION OF ORTHO-SILICIC ACID

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Understanding the role of detoxification in eliminating heavy metals from the body.

Please find below the information about how heavy metals affect human health.

Detoxification can help remove the heavy metals from the body, minimizing their impact. One of the significant substances that act as detox is ortho-silicic acid, which releases silicon that limits aluminum's uptake from the digestive system, making it unavailable for digestion.

Silicon.

Silicon, Si, is the second most plentiful component present in the Earth's outside layer. Some of the applications of silicon and its derivative, Ortho-silicic acid, include treating Alzheimer's disease, improving the immune system and controlling other conditions or pharmacological impacts. Besides, H_4SiO_4 helps in bone mineralization and the healthy atherosclerosis of the skin, hair, and nails. H_4SiO_4 is an unmistakable helpful medical agent to people.

Clinoptilolite.

One of the significant ways for Ortho-silicic acid preparation demands the use of Clinoptilolite. Clinoptilolite has been broadly utilized in substance and food businesses. Besides, it has found application in agribusiness and natural advances. The substance is used as adsorbents, sponges, adsorbent channel helps. Additionally, aluminosilicates are used as particle exchangers, impetuses, dynamic restorative and drug fixings, soil improvers (Jurkić et al., 2013).

Furthermore, non-toxic characteristic clinoptilolite influences tumour cell multiplication in vitro. It might go about as an adjuvant in disease treatment affirmed that

clinoptilolite impacts cell reasonability, cell division and cell stress reaction that outcomes in insect proliferative impact and apoptosis acceptance in vitro (Jurkić et al., 2013). Likewise, Clinoptilolite demonstrated antiviral impacts in vitro and potential in antiviral treatment either for nearby skin application against herpesvirus diseases or oral treatment of adenovirus or enterovirus contaminations.

Steps for Preparation of Ortho-silicic Acid.

Cold Clinoptilolite, aluminosilicates, were blended with 3liters of glycerol to obtain a homogeneous mixture. Add one liter of cold concentrated HCl to the solution and stir at nine degrees Celcius to decrease the pH (André, 2021). Add solid calcium carbonate during mixing until the pH of 3 forms. Carbon (IV) Oxide forms by continuous addition of calcium carbonate (André, 2021). Mix half a liter of concentrated Ortho-silicic acid with 200g of cellulose. Blend the resultant paste until it became homogenous (André, 2021). The paste was then dried in a vacuum; the resulting compound contained 1% elemental silicon (André, 2021). Regular admission of 0.5 g for two months contributed to improved nail and hair quality in different people.

During the preparation of Ortho-silicic acid, the researcher has to stabilize it to prevent it from polymerizing into poly-silicic acids that later changes to silicic gel. Such changes result in diminished silicon bioavailability (Ekpe, 2021). The pharmaceutical technology applies choline chloride in glycerol solution in the aqueous form to reduce the bioavailability of silicon. The resultant chemical is Ch-OSA, choline-stabilized Ortho-silicic acid (Ekpe, 2021). The compound is a complex H_4SiO_4 with many hydrogen bonds between the two chemically bonded compounds (Ekpe, 2021). The mixture is non-toxic and therefore recommended for human application and

consumption as supplements. Ch-OSA lethal doses surpass 5000mg/kg body weight in individuals and exceed 6640mg/kg body weight in wildlife. Today, Ch-OSA is the best bioavailability source of elemental silicon (Ekpe, 2021). During breastfeeding, parents can share high silicon concentrations with their children when they consume them as supplements. According to studies, excellent bioavailable silicon resulting from Ch-OSA does not affect some minerals in the blood.

Preparation of Ch-OSA.

A type of ortho-silicic acid includes Ch-OSA, as a particular drug plan of H_4SiO_4 . The choline chloride is reacted with hydrochloric acid and OSA to form Ch-OSA (a mixture of Ortho-silicic acid and choline chloride). Water is then added. The neutralization reaction is then conducted using sodium hydroxide by adding the base into Ch-OSA (Ekpe, 2021). The solution is then concentrated using vacuum distillation. After distillation, glycerol is added. Microcrystalline cellulose is added to the concentrated mixture to form Ch-OSA pellets (Ekpe, 2021). Water is again added, mass extruded, and pellets dried. Ch-OSA can be in both pellet or liquid form. Its silicon content should be between 1.7 to 2.39 percent (w/v) for type 35 and 0.6 to 1.0 percent (w/v) for type 39 (Ekpe, 2021). The compound has a rich and stable supply of silicon into the human body when consumed. Those with a high need of silicon in their body should use the Ch-OSA supplement to gain the mineral's needed quantity. Besides, since Ch-OSA is a non-toxic compound, it is recommendable to consume it to add silicon into the body.

Effects of Heavy Metals.

Heavy metals are dangerous to the body as they cause diseases that affect a person's health and well-being. Some of the ways heavy metals enter the body include exposure to environmental pollutants, certain vaccinations, and dental fillings (Rehman et al., 2018). Other ways that introduce heavy metals into the bloodstream comprises household commodities, tattoos, polluted water, and exposure to farmed fish (Rehman et al., 2018). Some of the harmful heavy metals include mercury, lead, uranium, and nickel. The heavy

metals implant themselves into the bones and CNS for years affecting the victim psychologically and mentally (Rehman et al., 2018). Heavy metals cause heart illnesses, depression, birth deaths, anemia, neurological conditions, and Alzheimer's disease (Rehman et al., 2018). However, detox can help remove the heavy metals from the body, minimizing their impact on the victim's health (Rehman et al., 2018). One of the regular detoxes that can help in detoxification is ortho-silicic acid, which reduces aluminum levels in the bloodstream, eliminating the chances of contracting Alzheimer's illness.

How Detoxification Helps to Remove Heavy Metals.

Ingestion of moderately high quantities of ortho-silicic acid reduces the uptake of aluminum from the alimentary canal. Accordingly, it lowers the accumulation of aluminum into the brain tissues (Kraljević et al., 2018). Besides, ortho-silicic acid down-regulates endogenous antioxidant enzymes that administrate aluminum and control mRNA expression (Kraljević et al., 2018). The mechanism that reduces aluminum's bioavailability encompasses the association between ortho-silicic and aluminum particles producing insoluble hydroxyaluminosilicates (Kraljević et al., 2018). The described cycle makes aluminum inaccessible for ingestion.

