

A controlled evaluation of the influence of ortho silicic acid (Silidyn) on vitamin and mineral status of patients measuring HMA (hair mineral analysis)

Josling PD, Herbal Research Centre and Watkins K, Mineral Check Limited

Abstract

This was a multi-centre study looking at head hair mineral analysis in volunteers who completed a general health assessment questionnaire and supplied hair samples before and after treatment with 8-10 ortho silicic acid drops daily (**Silidyn**) to determine whether mineral imbalances could be altered and lead to improved health and well being over a 12 week period.

Patients generally reported an improved subjective assessment of their health status especially in being more relaxed and able to sleep better with a modest improvement in joint mobility and flexibility.

The mineral analyses showed that all patients reduced bound sulphur content significantly indicating a better utilisation in the tissue and thereby enhancing further production of collagen used in the body to stimulate good quality hair, skin and nails as well as an improvement in muscle tone and joint mobility. This also indicates a reduction in oxidation levels in all patients.

Overall toxic metal ratios were significantly improved in all patients indicating an enhanced ability to detoxify these compounds (Lead, Mercury, Antimony, Arsenic and Aluminium) – this improvement was small but the trend analysis shows that continued supplementation with ortho silicic acid could lead to a very strong detoxification without any side effects. Unlike other popular detoxification products Silidyn is actually very gentle on the stomach because it shows increased biological absorption compared to other forms of silicon dioxide.

The levels of sodium and potassium improved significantly in all patients indicating a reduction in stress levels and improved sleeping patterns. This also indicates a general benefit to the adrenal glands which is especially important in older patients. Patients subjective assessments were very positive and noted benefits to the hair, skin and nails and a modest improvement in joint mobility and levels of relaxation.

Introduction

Silicon makes up approximately 28% of the total earth's crust and after oxygen, is the most abundant atom in the world. Silicon does not occur in nature as a free atom but it occurs in the form of sand, flint, rock, quartz, granite and clay. Until the 1970's Silicon was not considered to be important in human metabolism and only small concentrations of Silicon were measured in the tissues. It is now thought that even these very small amounts of Silicon are essential for good health, which is the reason why Silicon is now recognised as an essential trace element in food. The first signs of Silicon deficiency are generally found in the skin, hair and nails. The skin and hair lose their strength and elasticity and the nails become brittle and fragile. This mainly occurs with ageing, when the silicon levels fall naturally. Adding extra Silicon to the diet restores the skin and nails and improves hair growth and strength. Silicon is also thought to aid in the growth of new bone cells and also inhibits bone breakdown. In addition, it stimulates the calcium metabolism. Lower Silicon concentrations are a factor found in cases of osteoporosis and Silicon also has a positive effect on collagen in the bone matrix. From the start of evolution, Silicon has occurred in plant and animal life; many plants and animals had an external Silicon dioxide skeleton. After these organisms died, the silica shells remained, occurring in layers known as diatomaceous earth. The role of Silicon in human metabolism has only partly been elucidated. Until recently, many experiments failed because almost all Silicon compounds in food consist of long chains of polymers, generally SiO_2 compounds. These compounds are scarcely or never absorbed by the body. Only a special hydration of SiO_2 results into a Silicon form that is absorbed by the body and can cross the cell wall. This specially hydrated SiO_2 is called (ortho) Silicic Acid and has the chemical formula $\text{Si}(\text{OH})_4$. A disadvantage is that until recently (ortho) Silicic Acid was an unstable substance, which was rapidly converted into other compounds and therefore not absorbed by the body. Although minute amounts of Silicic Acid are formed from the SiO_2 compounds in the stomach, they are insufficient for the daily requirement of Silicon. In nature, (ortho) silicic acid occurs in small amounts in the soil and surface waters. However, because of intense agriculture, virtually all the (ortho) Silicic Acid has disappeared from the soil as well as from surface water. Less and less (ortho) Silicic Acid is present in the natural environment, so that the body absorbs less and less Silicon. Supplementation with (ortho) Silicic Acid may restore the lost balance and the beneficial effects of Silicon to humans. Recently a new method has been developed which stabilises the previously unstable Silicic Acid, so that it no longer converts to biologically non-absorbable polymers, which are not absorbed by the human body. This stabilised (ortho) Silicic Acid is biologically active and is readily absorbed by the body. Importantly the biological availability increases because the (ortho) Silicic Acid is water soluble. The effects of Silicon in humans have shown that, nails and hair become stronger, while various skin disorders disappear when the body absorbs Silicon¹. Joint complaints such as arthritis (worn joints) and arthritis, as well as painful complaints such as osteoporosis (bone decalcification) generally decrease significantly². In addition, the substance appears to inhibit inflammation and strengthens the action of the immune response system⁴. Our study looked at using both subjective assessment in patients (general health questionnaire) and an objective Hair Mineral Analysis before and after treatment with the most biologically available ortho silicic acid found in Silidyn drops (Vedax International BV).

Methodology

Volunteers were recruited and instructed to complete a modified HAQ (health assessment questionnaire) based on the Stanford University model³ adopted by all joint trials over the last decade. Following recruitment each participant was asked to supply a sample of hair from the back of the neck for analysis at entry. Each volunteer was then instructed to take 8-10 drops of Ortho silicic acid each morning for the 12 week study period. The drops have a pleasant flavour but may be added to a juice drink to make them even more palatable. Patients with expressed joint problems ranging from mild to moderate disease were included. Following a final visit to the clinic the HAQ was be updated and a further hair sample taken. Patients under 18 years old or over 80 years old were excluded as were any multi-drug users, multi supplement users and any patients showing a sensitivity to any Silidyn ingredients would be replaced. This however did not happen throughout the study period as the test substance was extremely well tolerated.

Mineral measurements:

Hair analysis was used to measure the cellular levels of a wide variety of minerals. Conventional blood tests for patients to determine mineral deficiency was considered but rejected as method of analysis as blood tests determine the concentration found in blood and not what is found between the body cells. The blood and serum contain minerals but they may not be completely representative of the body's mineral storage⁵. In many cases, the serum level of minerals are maintained at the expense of the tissue concentration. Serum concentrations fluctuate and excess accumulation of minerals is often undetected in the serum due to their removal from the blood for deposition into the tissues. Because of the human body's homeostatic mechanisms that are in place this means that blood tends to be a poor diagnostic for certain mineral⁶.

Hair analysis

Hair mineral analysis (HMA) is an established technique and laboratory procedure, and, most importantly research to support findings shows this to be highly reliable⁷. Hair is a very metabolically active tissue and as it forms, provides a permanent record of activity occurring within the body during its period of growth. The first 3 to 4 cm closest to the scalp can give a good indication of the nutritional and toxic mineral exposure over the previous six to eight weeks. Hair analysis is routinely used in occupational, environmental and natural healthcare as a method of investigation to assist screening and/or diagnosis. HMA is an analytical test that assays the mineral composition of the hair. As a screening test, it is able to provide indications of imbalances, deficiencies and excesses of many essential and toxic minerals and can provide a comprehensive picture upon which to base the most effective nutritional therapy. For this study, it enabled the researchers to look at the pre-supplementation levels of a variety of minerals- and to compare them post supplementation with ortho silicic acid.

All analyses were undertaken by Mineral Check Limited. The laboratory uses ICP (inductively coupled plasma mass spectrometry) to test the mineral content of hair. It is a valuable screening tool as hair is during the growth phase, metabolic activity exposes the hair to the internal environment. As the hair reaches the surface of the skin, its outer layers harden, locking in the metabolic products accumulated during this period of hair formation. The laboratory test requires 150 milligrams (approximately a teaspoonful) of hair and, by testing the 2 – 3 centimetres closest to the scalp, the test results give an indication of the metabolic environment in the previous 30-60 days. The laboratory is able to routinely test for 29 minerals and 9 toxic minerals, a full test was conducted to allow the researchers to look in detail at the mineral content changes in all patients.

Hair is a useful medium for testing, it is hygienic, painless to sample and has an easy storage protocol. Whilst the laboratory test is a hair test, research shows us that hair mineral levels reflect mineral levels in other body tissues.

All mineral measurements are recorded as milligrams percent (milligrams per one hundred grams of hair). One mg% is equal to ten parts per million (ppm) of the mineral. The subjects were tested for cellular mineral levels via hair analysis before the trial commenced. Hair was collected under required 'clean' conditions and no mineral related products were allowed to be used during the trial.

All patients showed significant differences pre and post trial in sulfur levels (Figure 1) indicating a better utilisation in the tissue and thereby enhancing further production of collagen used in the body to stimulate good quality hair, skin and nails as well as an improvement in muscle tone and joint mobility. This also indicates a reduction in oxidation levels in all patients. These observations were backed up by the patient HAQ results that reported better quality hair skin and nails and a slight improvement in joint flexibility and mobility.

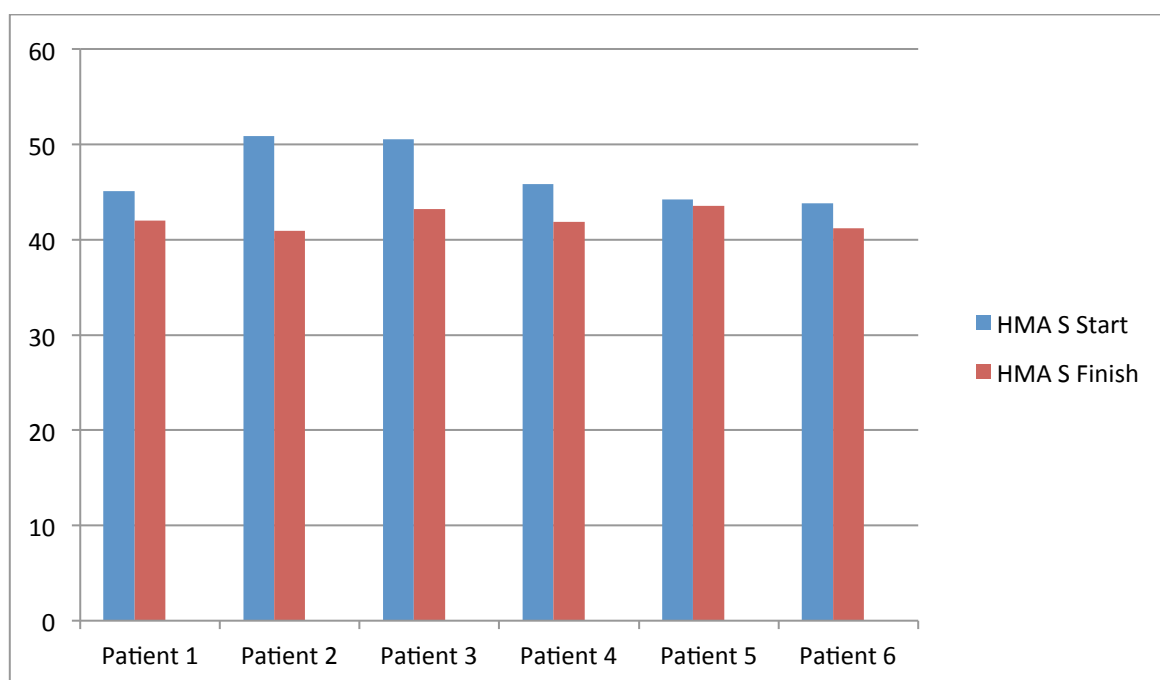


Figure 1 All patients showed significant differences in bound sulfur during the study period

HMA also indicated that overall toxic metal ratios were significantly improved in all patients (Figure 2) indicating an enhanced ability to detoxify these compounds (Lead, Mercury, Antimony, Arsenic, Uranium, Beryllium, Cadmium and Aluminium) – The ratios that indicate how overloaded the patient is with heavy metal contamination are Ca/Pb, Fe/Pb, Fe/Hg, Se/Hg, Zn/Cd, Zn/Hg, S/Hg, S/Pb. All these important ratios improved over the course of the study and although this improvement was small the trend analysis shows that continued supplementation with ortho silicic acid could lead to a very strong detoxification without any side effects. Unlike other popular detoxification products Silidyn is actually very gentle on the stomach because it shows increased biological absorption compared to other forms of silicon dioxide. Significant reductions in the levels of Cadmium, Mercury and Arsenic were seen in the majority of patients and this is a clear sign that with continued use of ortho silicic acid these major contaminants can be eventually cleared from the system. An interesting observation was that those patients who started with the highest levels of toxic metal ratio scores showed the biggest falls over the treatment period and it would be useful to look at longer term treatment to see if these significant drops can be maintained.

Patients showed an improved S/Hg ratio and increased Sodium and Potassium levels indicating that this may lead to a reduction in stress levels and an overall improved adrenal activity. A reduction in stress was recorded by most patients in the questionnaire.

All patients showed a modest reduction in Zinc and Copper levels indicating that these elements were being better utilised by the body. Finally 60% of patients also showed a significant improvement in magnesium levels. Magnesium is needed for more than 325 biochemical reactions in the body. It helps to maintain normal muscle and nerve function, keeps heart rhythm steady, and is important for bone health as well⁷.

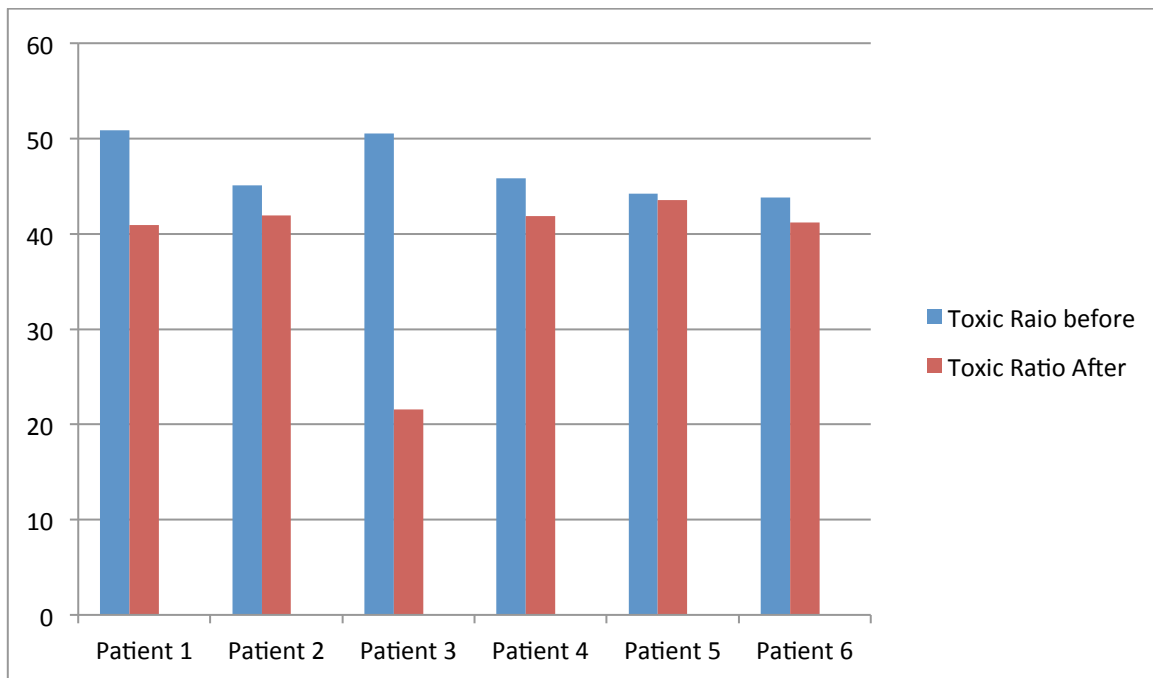


Figure 2 Toxic ratio averages show significant improvement in all patients

Discussion

Overall the product was exceptionally well tolerated with no withdrawals from treatment, it was described as easy to use and pleasant to take when mixed with a juice drink in the morning. Hair mineral analysis showed a series of significant improvements particularly in reduction of toxic metal contamination and factors involved in the crucial production of collagen which is vital to give strength to various structures of the body and also protects structures like the skin by preventing absorption and spreading of pathogenic substances, environmental toxins, micro - organisms and cancerous cells. Collagen protein is the cement that holds everything together and clearly in this study the use of ortho silicic acid (Silidyn) was beneficial in the production of collagen. Also present in all the smooth muscle tissues, blood vessels digestive tract, heart, gallbladder, kidneys and bladder holding the cells and tissues together, collagen is also the major component of the hair and nails. This observation may show a further methodology for the use of ortho silicic acid in every day supplementation for the majority of our population as this compound is very well tolerated and showed no propensity to cause any side effects. Continued use may even improve patients overall health and well being further still and it could therefore be used as a preventative treatment.

References

1. Expert Group on Vitamins and Minerals 2003 ISBN 1-904026-11-7
2. McCance and Widdowson (1940) *The Chemical Composition of Foods*, 1st Edition, Special Report Series No: 235, Published by Medical Research Council.
3. Niculescu T, Dumitru R, Botha V, Alexandrescu R, Manolescu N. Relationship between the lead concentration in hair and occupational exposure. *Br J Ind Med*. 1983 Feb;40(1):67-70.
4. Watts DL *Trace Elements and other Essential Nutrients* 1995 B-L-O-C-K.
5. Bass DA, Hickok D, Quig D, Urek K. Trace element analysis in hair: factors determining accuracy, precision, and reliability - Statistical Data Included. *Altern Med Review* 2001;6(5):472-481.
6. Hopps, H. C.: *The Biological Bases for Using Hair and Nail for Analysis of Trace Elements. Trace Substances In Environmental Health VIII*. Hemphill, D.D., ed. University of Missouri, Columbia. 1974
Federal Drug Administration 358C38305 Administration through the dermal layer of the skin to the systemic circulation by diffusion.
7. Watkins K, Josling PD, A Pilot Study to determine the impact of Transdermal Magnesium treatment on serum levels and whole body Ca/Mg Ratios: *European Journal of Nutraceutical Research*; April 2010.