

# THE ZINC TASTE TEST

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## SCIENTIFIC BASIS FOR THE ZINC TASTE TEST

As you may know, the Zinc Taste Test (ZTT) is supposedly a non-invasive method of determining a patient's physiological zinc status. This is generally presented as a functional assessment of zinc status as opposed to a quantitative assessment, such as a serum/plasma zinc study. The question we will address in this paper is: Is this test for real, is it in fact a reliable assessment of physiological or functional zinc status with scientific basis? Or is it just another gimmick to sell product?

## OTHER METHODS OF BODY ZINC ASSESSMENT—HOW RELIABLE?

*Serum/Plasma Zinc studies*—Please note the following from Zinc Deficiency in Human Subjects, pp 171-182, ©1983 Alan R. Liss, Inc.; “At present, there is no single laboratory parameter that indicates the body status of zinc. Plasma and serum zinc levels, however, are the most widely used laboratory criteria for assessing the body concentration of this element. Determination of plasma or serum zinc is a simple, fast and inexpensive method, hence its popularity. Plasma zinc levels, however, may not be a good indicator of zinc status because nearly 98% of the total body zinc is intracellular. Moreover, a low level of zinc in the plasma is not always indicative of a zinc deficiency.” Serum or plasma zinc levels are such a poor assessment of body zinc stores that clinical signs of zinc deficiency are not usually observed until plasma levels fall below 0.6 ug/dl for extended periods! Considering a generally accepted laboratory range of 70-150ug/dl as “normal”, we can see how poor these laboratory parameters are at assessing a patient's zinc status. Also, specimen contamination is a major problem with this type of test, rubber stoppers and gaskets on vacutainers are well known for causing this.

*Zinc Metalloenzyme studies, i.e., Alkaline Phosphatase; LDH; Carbonic Anhydrase, etc.*

It's true that the above enzymes as well as others in the body are zinc dependent. Over the years a number of health care practitioners have erroneously used serum levels of these enzymes as a means of assessing patient body zinc status. Since a number of factors other than zinc deficiency can cause serum levels of these enzymes to be decreased, they cannot be generally used to evaluate patient zinc status. Decreased serum metalloenzyme levels may indicate zinc need, but it is an extrapolation at best. Further investigation is warranted to confirm or rule-out this diagnosis.

*Red Cell (erythrocyte) Zinc studies*—A number of researchers have shown that most zinc in the human body is stored intracellular. Only about 15% of the total body zinc is found in the plasma. Therefore **ANY** cellular zinc assessment is more accurate than the methods already discussed. However, the highest zinc concentration in the human body is not contained in the red cell.

*White Cell (leukocyte) Zinc studies*—Leukocytes contain about 25% more zinc than a comparable number of erythrocytes. Recent findings indicate that leukocyte zinc may serve as a useful parameter for assessing zinc status. Liver, kidney and muscle are the highest zinc-containing tissues in the body. For routine purposes, obtaining biopsy samples of these tissues is not practical, leaving white cell zinc evaluation the simplest, accurate method of assessing patient zinc status.

## THE ZINC TASTE TEST

As surprising as it may seem based on what we have written so far, the Zinc Taste Test (ZTT) is a valid assessment of patient zinc status with a basis in biochemistry. In 1981 Shatzman and Henkin published results of their research regarding gustin concentration in patients with hypogeusia in the *Proc Natl. Acad. Sci.*, Vol. 78, No 6, pp. 3867-3871, June. Gustin is a zinc dependent polypeptide found in saliva that is thought to be a taste bud growth factor. These researchers found saliva gustin levels in patients with hypogeusia to be as low as 1/5 that of controls! These patients exhibited maximal changes in taste acuity after 12 days of zinc sulfate supplementation.

In 1984 information appeared in the *Lancet* (Aug 11, p. 350; Nov 17, p. 1162) regarding the use of the Zinc Taste Test (ZTT) in patients with anorexia and depression. This test was developed and used because plasma and serum zinc levels were considered unreliable measures of zinc status. Test procedure is given in the Nov 17 letter as well as the finding that patients failing the test may be expected to respond favorably to supplementation with zinc sulfate.

Schauss, A., Costin, C., *Am J. Nat. Med.*, Vol. 4, No 10, Dec. 1997. The authors point out that zinc deficiency can directly cause a loss of taste acuity and appetite as was first demonstrated in 1934. Studies have found that gustatory sensitivity (or lack thereof) may be an indicator of the “functional” availability of zinc. This was the premise for the development of a non-invasive test for zinc deficiency, the Zinc Taste Test (ZTT). The first peer-reviewed recommendation that the ZTT be used as an assessment method for zinc deficiency was in the *British Medical Association’s British National Formulary*, in 1988.

Schauss and Costin have found that a percentage of patients presenting zinc deficiency are also deficient in vitamin B6 and magnesium as well. We know that zinc, B6 and magnesium are synergistic. When B6 is not present in adequate amounts, the ability of zinc and magnesium to transfer to the cells can be impaired. We recommend that patients failing the ZTT also be evaluated for vitamin B6 and magnesium status, especially those who do not respond to zinc sulfate therapy as expected. A final note here. The authors recommend the use of liquid zinc sulfate initially with patients failing the ZTT. We whole heartedly agree, due to the fact that HCl production is also zinc dependent, therefore tableted zinc may not be absorbed at optimum levels due to hypochlorhydria.

## ZTT PROTOCOL

Patient should refrain from eating, drinking or smoking for at least a half-hour. Have the patient place 1 to 2 tsp. of Aqueous Zinc in their mouth swirling it for 10 seconds and then swallow it or spit it out. After 30 seconds the patient is asked to describe the taste and their response should be graded based on the following parameters:

- 1)Optimal zinc levels—An immediate, unpleasant, obviously adverse taste, at which the patient normally grimaces.
- 2)Adequate Zinc Levels—A definite but not strongly unpleasant taste is noted immediately and tends to intensify with time.
- 3)Quite Zinc Deficient—No taste noted initially, but develops in 10-15 seconds.
- 4)Very Zinc Deficient—Tasteless or “tastes like water”.

## SUPPLEMENTATION: Available from Viotron International, Ltd (800) 437-1298

Level 3 or 4 failure—Aqueous Zinc at 3 – 6 tsp. daily until patient begins to taste it. Then begin supplementation with Zn Zyme at 4 tablets daily for 60 days. At this time redo ZTT. For patients presenting a level 3 or 4 failure, we recommend evaluating vitamin B6 and magnesium status, and if indicated supplementing with B6 Phosphate at 3 tablets daily and Mg Zyme at 4 tablets daily at bedtime.