

**THRESHOLD SENSITIVITY OF
TASTE PERCEPTION &
THE ROLE OF SALIVA & ZINC
LEVEL IN SOME PHYSIOLOGICAL
& PATHOLOGICAL CONDITIONS**

A Thesis

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ABSTRACT

Background: Decreased taste acuity to the four basic tastes is closely related to health problems (diseases & medications), aging, and smoking and this relation has been observed in many research studies.

The Aims of the Present Study were: to evaluate taste acuity in some physiological and pathological conditions by determining their taste detection and recognition thresholds to the four basic tastes and compare them with group of healthy volunteers, determine saliva flow rate, serum and saliva zinc levels of the groups included in the study and compare them with the control group, as well as to find the relationship between the taste thresholds, and each of the measured parameters, the saliva flow rate and the zinc levels in serum and saliva, and then compare between the strength of effect of serum and saliva zinc levels in relation to taste acuity.

Materials & Methods: The study include 218 individuals (35–80) years old of both sexes divided into six groups; the control group, aging group (subjects over the age of 60 years), smoking group, diabetes mellitus group, haemodialysis patients with chronic renal failure group, and medication group (hypertensive patients on chronic use of captopril), who were attending Ibn – Seena Teaching Hospital during the period from February/ 2007 to August/ 2007.

The information from each individual were recorded in a special case sheet, the participants were subjected to clinical examination of taste acuity and biochemical assay of zinc levels as well as calculating their saliva flow rate.

The taste detection and recognition thresholds of sweet, salty, sour, and bitter tastes were determined by using a series of concentrations of sucrose, sodium chloride, citric acid, and quinine hydrochloride respectively, and the least noticeable differences (Test of Limits) method, which was proceeded by collection of unstimulated (resting) saliva and serum samples and calculating the saliva flow rate, at least two hours after meal.

Zinc concentration was assessed in serum and saliva by using flame atomic absorption spectrophotometer (AAS) in the department of Civil Engineering / College of Engineering at Mosul University.

Results: The present data analysis demonstrated, a significant increase in the taste detection and recognition thresholds of the four basic tastes of the groups included in the study in comparison to the control group, except the salty taste thresholds of the haemodialysis group and the salty taste detection threshold of the diabetes group, which exhibited non significant differences from the control group.

Other measured parameters as, the saliva flow rate, serum and

saliva zinc levels decreased significantly at $p < 0.001$ in the groups included in the study as compared to the control group, the only non significant difference from the control group was the serum zinc level of the diabetic group.

The test of correlation showed a significant inverse relationship between the taste thresholds and each of, the saliva flow rate and the saliva zinc level, an inverse relationship between the taste thresholds and the serum zinc level, which was significant for sweet, salt taste detection thresholds, and sour taste detection and recognition thresholds and inverse non significant to the other taste thresholds, and also a significant direct relationship between the saliva flow rate and each of serum and saliva zinc levels, a non significant positive relationship between serum and saliva zinc levels.

The test of regression showed that, saliva zinc concentration had a significant effect on the taste detection and recognition thresholds of the

four basic tastes, while serum zinc concentration affected significantly on sweet and salty taste detection thresholds, and sour taste detection and recognition thresholds only, with no significant effect on the other taste thresholds.

Saliva zinc concentration had more effect on sweetness detection threshold than serum zinc concentration, with equal effect for both of them on saltiness detection threshold, however, serum zinc concentration had a stronger effect than saliva zinc concentration on sourness detection and recognition thresholds.

Conclusions: From the results of the present study, it can be concluded that the taste acuity was impaired in aged subjects, smokers, diabetics, haemodialysis patients with chronic renal failure, and hypertensive patients on chronic use of captopril. Saliva flow rate, serum and saliva zinc level decreased significantly in all the groups as compared to the control group, except serum zinc level of the diabetics group, which exhibited a non significant difference from the control group. Decreased saliva flow rate and saliva zinc concentration could be causative factors for hypogeusia, while serum zinc level affected on some taste modalities. Saliva zinc level had a potential effect over serum zinc level on taste acuity.