



## Assessment of Some Trace Elements , (MDA) and Protein Levels in Infertile Men

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**Abstract :** This study was performed on human semen specimens obtained from Asthenospermic patients (35 specimens) Normospermic males (40 specimens) , and (20 specimens ) Fertile Control group, who were attending to the laboratories of Fertility center in ALSader medical city of AL-Najaf AL-Ashraf city during the period extended from 1-9-2013 to 30-1 - 2014 .

The aim of present study was to estimate the levels of some Trace element (Lead, Copper, Cobalt, Chromium, , and Cademium) concentrations in Asthenospermia and Normospermia. by atomic absorption method , and compersion with control (Fertile) .Estimate concentration of (MDA) Malondialdehyde ,Total protein concentration in semen specimens .Also relationships between mentioned components and some semen parameters .

The results revealed significant increase ( $P < 0.05$ ) in the concentration of examined trace elements in Asthenospermia and Normozoospermia when compersion with control , and the study was appeared significant increase ( $P < 0.05$ ) in total protein concentration , also in MDA concentration in semen specimens.

It was concluded that found increase in concentration of trace elements and it influence on blance and parameter of seminal fluid , also the Correlation between trace element and Protein in semen . All of this lead to arise of cases of Asthenospermia and Normospermia infertile patients .

**Key World:** Trace elements , Asthenospermia , Normospermia , Seminal fluoride .

**Introduction:** Asthenozoospermia is defined as a sperm motility of less than 50 percent with forward progression (categories a & b) or less than 25 per- cent with rapid progressive motility (category a movement)(1).

Approximately 15% of couples are infertile and half of these couples are diagnosed with male factor infertility (2 ). Many studies on male infertility have been focused on oxidative stress-related mechanisms of sperm damage (3,4 , 5, 6, 7 ).

Trace element is a dietary mineral that is needed in very minute quantities for the proper growth, development, and physiology of the organism (29 ). In geochemistry, a trace element is a chemical element whose concentration is less than 1000 ppm or 0.1% of a rock's composition. The seminal plasma has the important function as avehicle for the transportation of the spermatozoa through the epididymis, the vas deference, and urethra and into the vagina (30 ). Recent studies showed that long-term moderat exposure to Pb can considerably reduce semen quality in men (31 ). Human exposures to environmental cadmium are primarily the result of fossil fuel combustion, phosphate fertilizers, natural sources, iron and steel production, cement production and related activities, nonferrous metals production, and municipal solid waste incineration. ( 32 ). The role of copper in male reproductive capacity appears to be largely unknown issue. Copper is a naturally occurring trace element that is essential for some metabolic processes. Copper depletion affects male reproduction in different species (33 ).



When taken in a long periods of time, cobalt can cause over-production of red blood cells, and damage the heart muscles as well as the thyroid gland. (34 ). reproductive toxicity of chromium has been underplayed since the report of (35 ).

Semen consists of a mixture of sperm and seminal plasma , which carried and feed and provide them with protection , and borne in currents and swimmers are to reach the uterus (8 ) and represents a seminal plasma more than 90% of the volume of semen projectile , and is characterized by fluid particularity chemicals , which are used indicator of the functional status of the glands attached to , and semen is homogeneous in the concentration of sperm , and by this gives the assay sample fragmented erroneous results ,

first part of the seminal fluid , which originating from the testes , and culverts , and the vas deferens , the prostate is more concentrated in the sperm of the second part , which arises from the seminal vesicles , and this is an established fact in 95 % of cases , while longer opposite 5 % of cases, no second part richest of sperm (1 ) and lead exposure to environmental toxic compounds or active substances in life or drugs or other harmful factors to changes in some of the chemical characteristics of the semen , which affects the quality and functionality of sperm in general (9 ). Be semen normal fresh The appearance of gray - homogeneous , and high- viscosity , a thrombus Coagulum, Liquefaction time during 60 minutes at room temperature automatically under the influence of enzymes originating prostatic to form a viscous liquid, transparent with alkaline minor ranges pH 7.4 - 8.0 (10 ) the semen change the acidity of the vagina making it neutral and that any change in the value of

pH of semen adversely affect the sperm and cited one study to change pH to pH 4.6 by adding hydrochloric acid which caused the loss of sperm susceptibility to motion after one minute and after ten minutes have killed all of them , and the percentage of sperm murdered directly proportional to the concentration of ion hydrogen negative (11 ) observed a decrease in the pH, and the volume of ejaculate (12 ).

Present study aimed to investigate some Trace element (Lead, Copper, Cobalt, Chromium, , and Cademium) concentrations in Asthenozoospermia and Normozoospermia. and compersion with control (Fertile) To investigate malondialdehyde concentration And total protein concentration in Asthenozoospermia and Normozoospermia. and compersion with control .

## Material and methods :

**Table(1) : Frequencies of infertile men groups and control.**

Subjects	group	No.	Total
Patients	Asthenozoospermia	35	75
	Normozoospermia	40	
Control	Fertile	20	20
Total		95	95

### Seminal Plasma Preparation :

The seminal fluid specimens of Asthenozoospermia Normozoospermia and control were centrifuged at 3000 rpm for 5 minutes to semen specimens for obtaining the seminal plasma , divided in many abendrof tubes, and stored frozen (- 40 c°) until the time of biochemical tests .

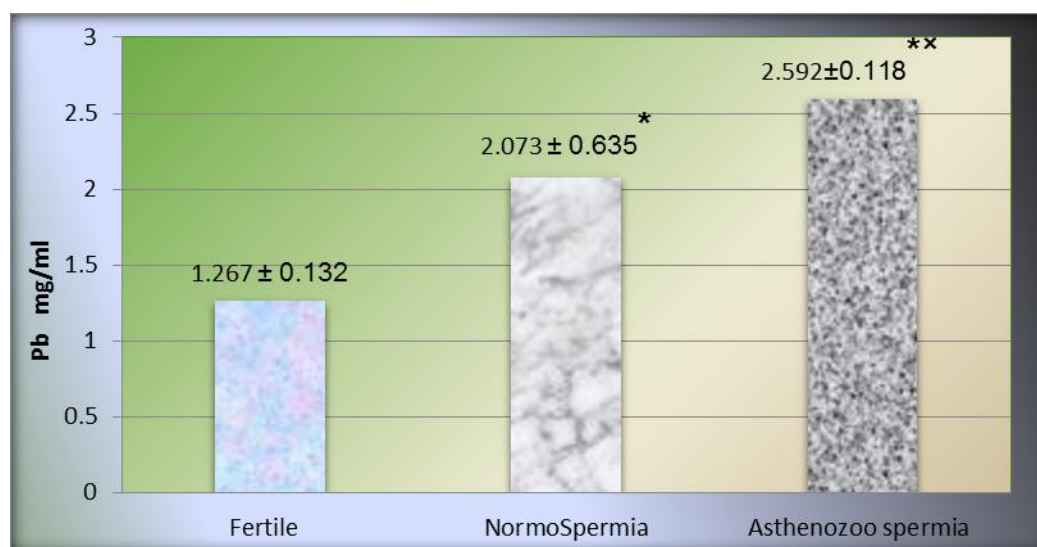
### Measurement of the Trace element concentration :

The liquefied seminal plasma was diluted 1:10 by adding deionized water to the samples at room temperature , and. they were run in 1,2,3,4,and 5 ppm to obtaining stock stander for trace elements( Pb, Cd, Cu,Co,and Cr ) and assayed with an atomic absorption spectrophotometer (AAS) – Varian model spectra AA 300/400, Germany ) All the trace element stock standers ( of concentration 1000 ppm ) were obtained from Fluka Chemica Switzerland , and the results were calculated as mg / ml .(13) .

### Results :

#### Trace element concentration in Asthenospermia and Normospermia Patients compersion with Fertile (control group)

The study was showed significant deffernts  $P < 0.05$  in all trace elements which observed signifceant increase in ( Lead Pb , Coper Cu, Cadmium Cd , Chromium Cr , Cobalt Co ) comparsion with control group as the following figures (1), (2), (3) ,( 4) and (5).

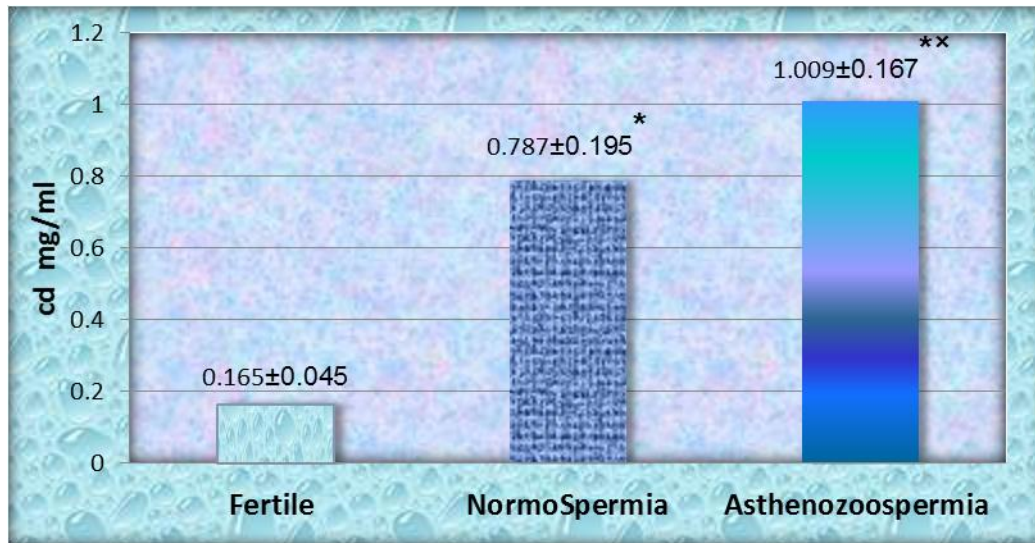


**Figure (1) The comparison of Pb concentration mg/ml in semen between Asthenospermia , Normospermia with fertile men semen (control )**

(\*) Significant difference  $p < 0.05$  between Normospermia and Asthenospermia compersion with Control group men .

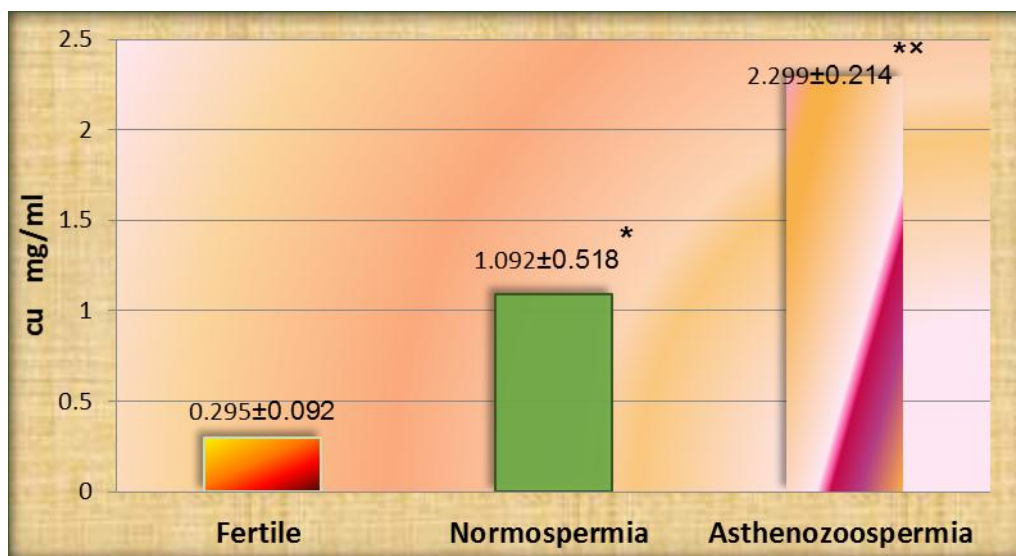
(\*) Significant difference  $p < 0.05$  between Normospermia and Asthenospermia men semen when compersion between them only .

n =20 (control group ) , n =40 (Normospermia ) ,n =35 (Asthenospermia ) .



**Figure (2) The comparison of Cd concentration mg/ml between Asthenospermia , Normospermia with fertile men semen (control ) .**

(\*) Significant difference  $p < 0.05$  between Normospermia and Asthenospermia comparison with Control group men semen . (\* ) Significant difference  $p < 0.05$  between Normospermia and Asthenospermia men semen when compersion between them only .

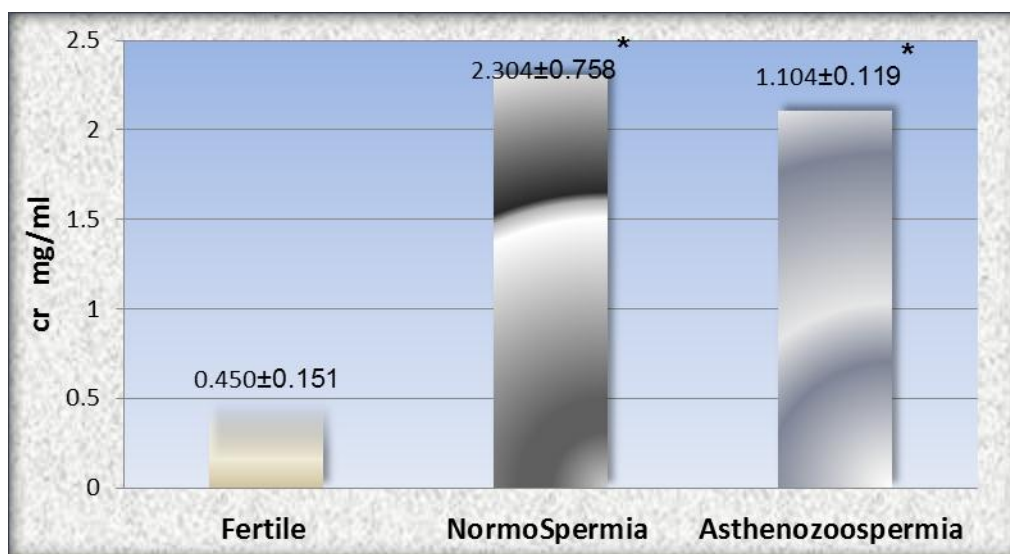


**Figure (3) The comparison of Cu concentration mg/ml between Asthenospermia , Normospermia with fertile men semen (control ) .**

(\*) Significant difference  $p < 0.05$  between Normospermia and Asthenospermia comparison with Control group men semen .

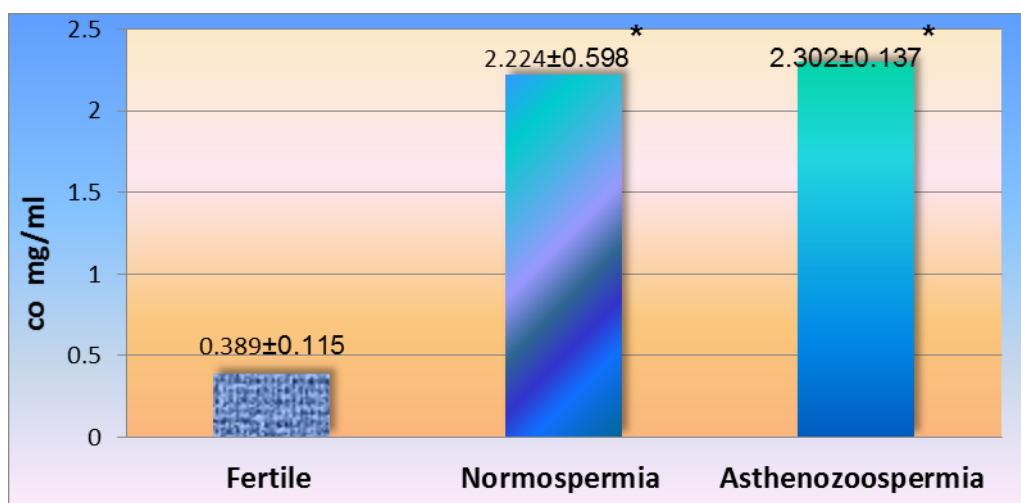
( \* ) Significant difference  $p < 0.05$  between Normospermia and Asthenospermia men semen when compersion between them .

n =20 (control group ) n =40 (Normospermia ) n =35 (Asthenospermia ) .



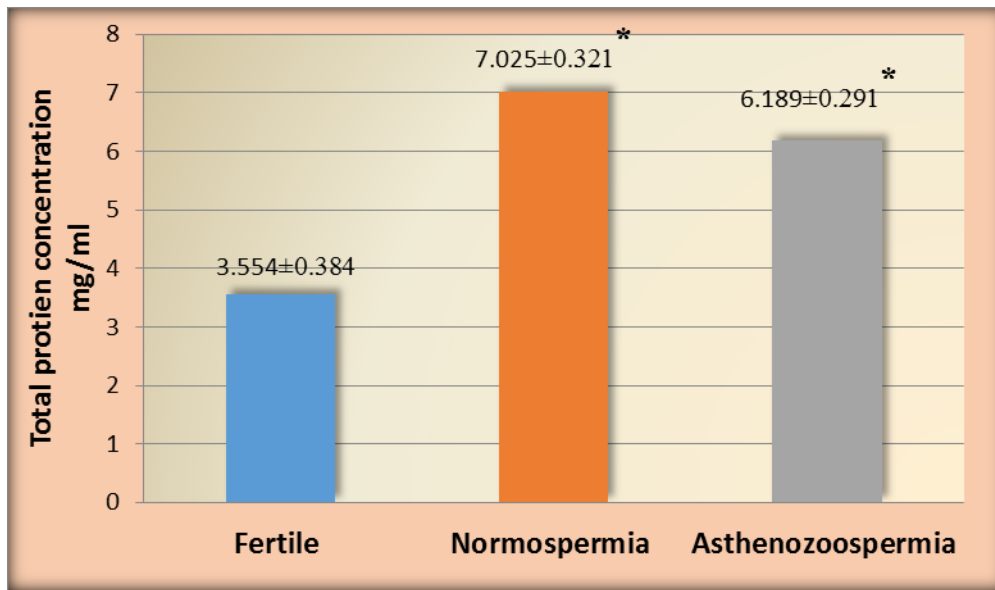
**Figure (4) The comparison of Cr concentration mg/ml between Asthenospermia , Normospermia with fertile men semen (control ) .**

(\*) Significant difference  $p < 0.05$  between Normospermia and Asthenospermia comparison with Control group men semen .  
 n =20 (control group) , n =40 (Normospermia) , n =35 (Asthenospermia) .

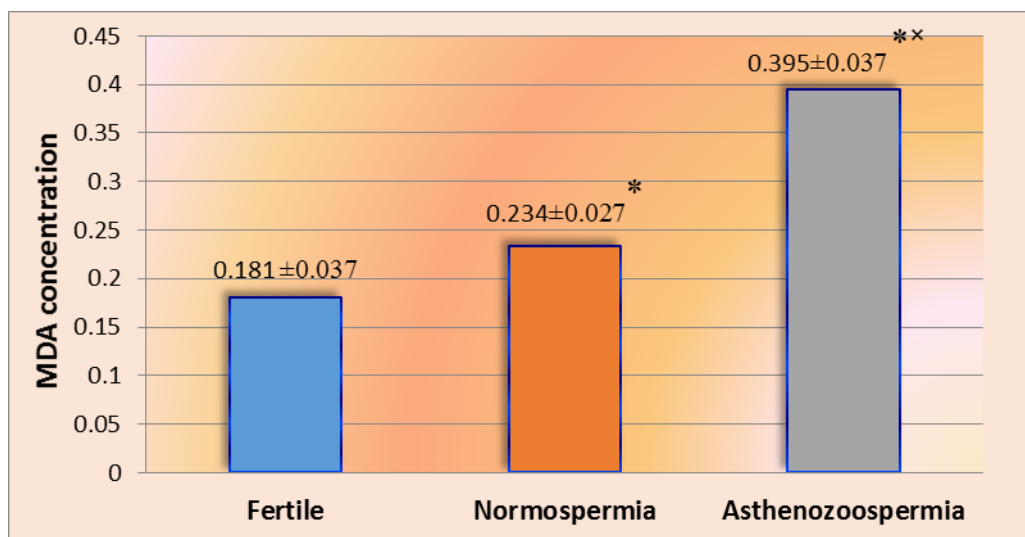


**Figure (5) The comparison of Co concentration mg/ml between Asthenospermia , Normospermia with fertile men semen (control) .**

(\*) Significant difference  $p < 0.05$  between Normospermia and Asthenospermia comparison with Control group men semen .  
 n =20 (control group) n =40 (Normospermia) n =35 (Asthenospermia) .



**Figure (6) The comparison of Total protein concentration concentration mg/ml between Asthenospermia , Normospermia with fertile men semen (control).**  
 (\*) Significant difference  $p < 0.05$  between Normospermia and Asthenospermia compersion with Control group men semen .  
 n =20 (control group ) , n =40 (Normospermia ) , n =35 (Asthenospermia ) .



**Figure (7) The comparison of MDA concentration Mmol/L between Asthenospermia , Normospermia with fertile men semen (control).**  
 (\*) Significant difference  $p < 0.05$  between Normospermia and Asthenospermia compersion with Control group men semen .  
 ( \*) Statistically Significant difference  $p < 0.05$  between Normospermia and Asthenospermia men semen when compersion between them .  
 n =20 (control group ) , n =40 (Normospermia ) , n =35 (Asthenospermia ) .



### **Discussion :**

The present study showed a significant difference in the concentrations of trace elements when compared with the control group (fertile), especially elemental cadmium, lead, and were similar with studies (14 ),( 15 ) and( 16 ). the presence of Pb and Cd in the reproductive tract of men attending infertility clinics may be related to a moderate alteration of their seminal parameters (17 ).

According to researchers on the concentration of cadmium and lead on body fluids controversial and clear in terms of their impact and presence. Benoff et al., said there is no relationship between the concentration of cadmium in blood plasma and seminal plasma in three populations of men that were studied. Hernandez-Ochea *et al.*, (18) , as well as when they studied the concentration of lead in the 68 infertile men in Region Lagunera ( Mexico) did not find any relationship to the concentration of lead in the blood and seminal plasma, blood and spermatozoa , seminal plasma and spermatozoa .Several studies have reported declines in semen quality associated with both lead and cadmium concentrations in blood ( 19 ,20 ,21 ,22 ,23 ).

However ,noticed no significant relationship between blood levels of heavy metals and any semen parameters . moreover ,and coordinated with our finding,several reports have shown an associated between impaired sperm motility and Cd and / or Pb concentrations in sperm or seminal fluid(24 , 18 ,20 , 25 ).

The current study also showed a significant increase(  $p < 0.05$ ) in Asthenospermia and Normospermia when compared with the control group in the concentrations of copper, chromium, and cobalt the results of our study were similar with Bassey *et al.*,(2013)(26) , and disagreed with the study Hussain *et al.*,(2011)(27) in terms of copper only.Copper is an essential trace element that plays an important role in several enzymes such as cytochrome oxidase ,ferroxidase ,superoxide dismutase and spermin oxidase . Therefore, any increase or decrease in the concentration of copper may cause an imbalance in the quality of semen.Human spermatozoa are particularly susceptible to peroxidative damage because they contain high concentrations of polyunsaturated fatty acids and also possess a significant ability to generate a reactive oxygen species (ROS),mainly superoxide anion and hydrogen peroxide and exactly superoxide dismutase (Cu-metalloenzyme) protects human spermatozoa from this peroxidative damage (28 , 29 ).

### **Conclusion :**

Infertile men showed lower sperm concentration ,lower motility, lower proportions of normal sperm morphology than fertile control. Within patients groups differences in these parameters are prominent also. A significant increase of malondialdehyde concentration in Asthenospermia specimens compared to Normospermia specimens and opposite significantly correlation between MDA with sperms motility percent while positive correlation with Concentration of Trace elements (Pb , Cd , Cu , Cr and Co) . Element concentrations in seminal plasma of Asthenospermia were in the order  $Pb > Co > Cu > Cd > Cr$  .



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