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09/05/2007

05/04/2007

**ABSTRACT**

The study was included the determination of the antioxidants levels of heavy duty workers in Mosul city (Workers in vegetable and fruit markets, Building workers and Grinder workers). The antioxidants investigated were: Vitamin E, Vitamin C, Vitamin A, Folic acid, Celuroplasmin (Cp.), Selenium, Glutathione (GSH), Malondialdehyde (MDA) and Uric acid. Heavy duty workers (74) and control group with the same age (37) were included in the research .

The results showed that there were significant decrease ( $p \leq 0.05$ ) in: vitamin E, vitamin A, vitamin C, and GSH, but, there were significant increase for folic acid and MDA for heavy duty workers when compared to control group. Moreover the antioxidants levels were decreased significantly in heavy duty smoker workers as compared with control group for the parameters: vitamin E, vitamin A, vitamin C, and GSH. On the other hand, there was a significant increase ( $p \leq 0.05$ ) for selenium, Cp. and MDA. Moreover, with increasing the period of working, the results showed a significant decrease in vitamin E, vitamin A, vitamin C, and GSH, but, a significant increase in folic acid, selenium and MDA.

Conclusion drawn for the study, that high oxidative stress was occurred for the heavy duty workers leading to a significant decrease in the measured antioxidants. This might affect by producing several diseases, especially smoking workers.

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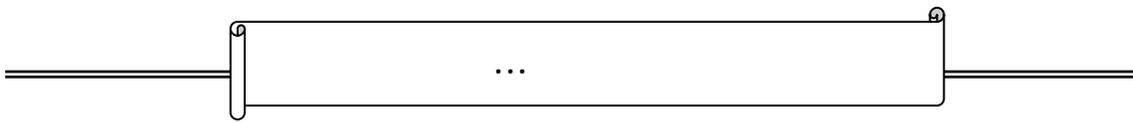
(

A C E :  
(MDA) (GSH)

(74)

.(37)

GSH C A E :



.MDA

GSH C A E :

.MDA

E :

.MDA

GSH C A

Rebecca

(1954)

Daniel L. Gilbert Gershman

(1)

)

(

(Reactive oxygen species(ROS))

(2,3)

(Antioxidants)

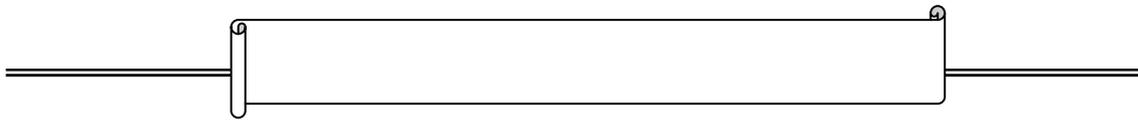
(4)

(Oxidizable substrate)

(Prooxidants)

Antioxidant )

(5,6) (defense system



%(2-1)

((O<sub>2</sub><sup>-</sup>) Superoxide anion radical )

Hydrogen peroxide)

Singlet )

(Hydroxyl radical)

((H<sub>2</sub>O<sub>2</sub>)

.<sup>(1.7)</sup>(oxygen

.<sup>(8)</sup>

( )

:

(2006)

(1 )

):

(

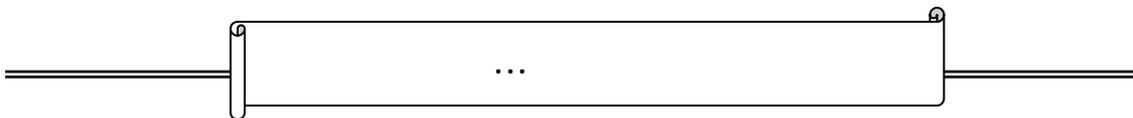
(Venous blood)

(20-)

(10)

(1500 xg)

.<sup>(9)</sup> (Hemolysis)



:1

(N=74)	(N=37)	
1.57 <sub>±</sub> 31.61	2.4 <sub>±</sub> 32.07	( )
2.1 <sub>±</sub> 76.14	2.1 <sub>±</sub> 72.35	( )
1.49 <sub>±</sub> 167.7	7.2 <sub>±</sub> 169.2	( )
2.81 <sub>±</sub> 27.3	2.01 <sub>±</sub> 25.38	( <sup>2</sup> / ) (BMI)

±

-

: (2)

(Manual methods)

:2

Emmerie-Engel <sup>(10)</sup>	E	1
2,4-dinitrophenylhydrazine derivatization method <sup>(11)</sup>	C	2
Needld-Pearson method <sup>(12)</sup>	A	3
Microbiological assay <sup>(13)</sup>		4
p-Phenylenediamine oxidase method <sup>(14)</sup>		5
Selenium-orthophenylenediamine complex <sup>(15)</sup>		6
Modified procedure utilizing Ellman`s reagent <sup>(16)</sup>		7
Thiobarbituric acid method <sup>(17)</sup>		8
Phosphotungstic acid method <sup>(18)</sup>		9

(Body Mass Index (BMI))

(<sup>(19)</sup>(<sup>2</sup> )<sup>2</sup> / ( ) ) :

(Pentium IV)

(SPSS for windows 11.1)

Standard )

(Mean(x))

(ANOVA)

(t-test) (t)

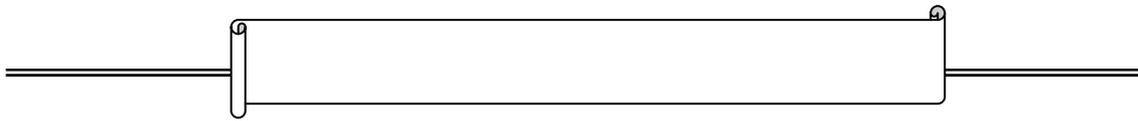
(Deviation (SD))

(Significant)

(P≤ 0.05)

(<sup>(20)</sup>(Non Significant)

(P>0.05)



: ( )

(3)

E : ( )  
 (0.033) GSH (0.032) C (0.02)

C E .Cp.

C E

(H<sub>2</sub>O<sub>2</sub> OH<sup>-</sup> O<sub>2</sub><sup>-</sup>)

(22 21)

<sup>(23)</sup> (GPx)

)

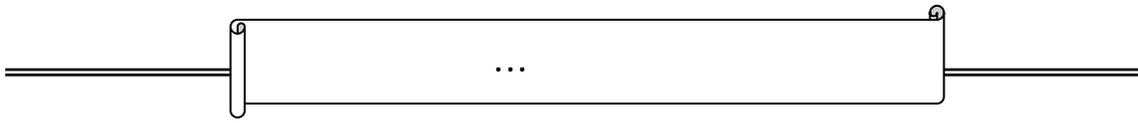
:3

.(

(P)	( ) (N=51)	(N=37)	
0.08	3.5 <sub>-</sub> 28.94	2.4 <sub>-</sub> 32.07	( )
0.074	2.71 <sub>-</sub> 24.73	2.01 <sub>-</sub> 25.38	( <sup>2</sup> / ) (BMI)
0.02	0.07 <sub>-</sub> 0.99	0.06 <sub>-</sub> 1.11	( 100/ )E
0.45	11.04 <sub>-</sub> 61.62	5.49 <sub>-</sub> 60.58	( 100/ )A
0.032	0.04 <sub>-</sub> 0.97	0.03 <sub>-</sub> 1.18	( 100/ )C
0.048	1.64 <sub>-</sub> 8.93	0.42 <sub>-</sub> 6.25	( / )
0.07	2.5 <sub>-</sub> 32.5	1.45 <sub>-</sub> 28.83	( 100/ )
0.45	12.77 <sub>-</sub> 71.48	8.39 <sub>-</sub> 74.9	( 100/ )
0.033	0.97 <sub>-</sub> 12.68	0.43 <sub>-</sub> 17.09	( / )
0.037	0.27 <sub>-</sub> 5.49	0.15 <sub>-</sub> 4.96	( / )
0.35	0.23 <sub>-</sub> 4.65	0.2 <sub>-</sub> 4.18	( 100/ )

±

-



(0.048)

.

A

(0.037)

MDA

E,A,C : )

(24)

(GSH

MDA

(GSH E,A,C : )

(27 26 25)

)

(

(28)

:

( )

(4)

A (0.042)

E :

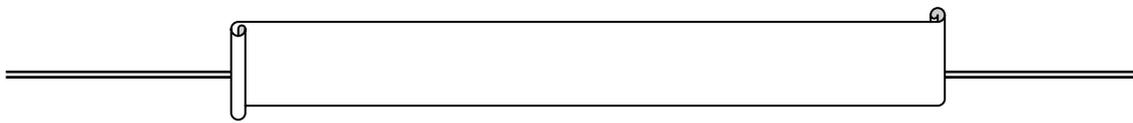
(0.0001)

GSH (0.003)

C

(0.028)

(2)



.( )

:4

(P)	( ) (N=23)	(N=37)	
0.13	1.65+32.81	2.4+32.07	( )
0.059	2.24+26.73	2.01+25.38	( <sup>2</sup> / ) (BMI)
0.042	0.11+0.95	0.06+1.11	( 100/ )E
0.028	4.69+49.79	5.49+60.58	( 100/ )A
0.003	0.12+0.78	0.03+1.18	( 100/ )C
0.35	0.07+6.57	0.42+6.25	( / )
0.041	2.59+36.51	1.45+28.83	( 100/ )
0.006	18.75+114.83	8.39+74.9	( 100/ )
0.0001	0.77+10.07	0.43+17.09	( / )
0.029	0.29+7.25	0.15+4.96	( / )
0.13	0.43+4.73	0.2+4.18	( 100/ )

± -

Cp. (0.041)

(0.029)

MDA (0.006)

(30 2.29)

(32 31)

(5)

A :

(0.013)

C (0.05)

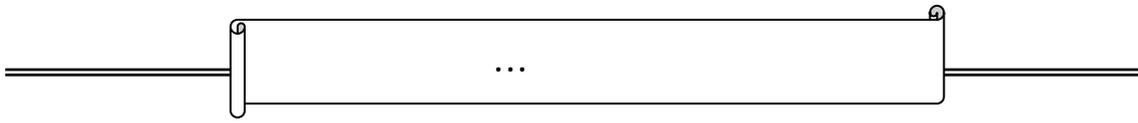
.E (0.05)

GSH (0.038)

Cp. (0.041)

(0.023)

MDA (0.048)



:5

(P)	( ) (N=23)	( ) (N=51)	
0.08	1.65 $\pm$ 32.81	3.5 $\pm$ 28.94	( )
0.074	2.24 $\pm$ 26.73	2.71 $\pm$ 24.73	( <sup>2</sup> / ) (BMI)
0.17	0.11 $\pm$ 0.95	0.07 $\pm$ 0.99	( 100/ )E
0.05	4.69 $\pm$ 49.79	11.04 $\pm$ 61.62	( 100/ )A
0.013	0.12 $\pm$ 0.78	0.04 $\pm$ 1.24	( 100/ )C
0.038	0.07 $\pm$ 6.57	1.64 $\pm$ 8.93	( / )
0.24	2.59 $\pm$ 36.51	2.5 $\pm$ 32.5	( 100/ )
0.048	18.75 $\pm$ 114.83	12.77 $\pm$ 71.48	( 100/ )
0.05	0.77 $\pm$ 10.07	0.97 $\pm$ 12.68	( / )
0.023	0.29 $\pm$ 7.25	0.27 $\pm$ 5.49	( / )
0.27	0.43 $\pm$ 4.73	0.23 $\pm$ 4.65	( 100/ )

$\pm$

-

DNA

(34 33)

Cp.

Cp.

(36 35)

: ( )

(6)

(0.032)

E

:

(0.047)

C

(0.05)

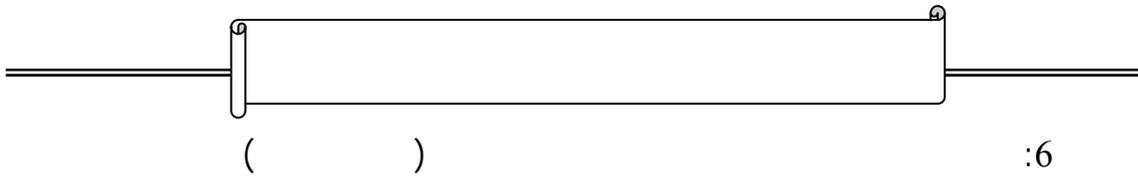
A

. Cp.

(0.02)

GSH

(0.02)



ANOVA (P)	( 16) (N=13)	(15-6) (N=17)	(5-0) (N=21)	
0.032	3.13 <sub>+</sub> 38.7	6.94 <sub>+</sub> 37.0	3.9 <sub>+</sub> 26.46	( )
0.05	3.4 <sub>+</sub> 28.11	4.1 <sub>+</sub> 27.97	2.22 <sub>+</sub> 23.43	( <sup>2</sup> / ) (BMI)
0.032	0.07 <sub>+</sub> 0.81	0.06 <sub>+</sub> 0.91	0.09 <sub>+</sub> 1.07	( 100/ )E
0.05	3.4 <sub>+</sub> 44.32	2.7 <sub>+</sub> 49.75	13.77 <sub>+</sub> 64.58	( 100/ )A
0.047	0.1 <sub>+</sub> 0.89	0.133 <sub>+</sub> 0.97	0.05 <sub>+</sub> 1.25	( 100/ )C
0.02	1.83 <sub>+</sub> 6.27	1.96 <sub>+</sub> 9.82	1.04 <sub>+</sub> 10.29	( / )
0.041	2.9 <sub>+</sub> 38.2	2.2 <sub>+</sub> 34.8	2.35 <sub>+</sub> 26.61	( 100/ )
0.42	10.21 <sub>+</sub> 64.2	11.28 <sub>+</sub> 55.8	14.1 <sub>+</sub> 78.8	( 100/ )
0.02	0.06 <sub>+</sub> 11.91	0.04 <sub>+</sub> 13.48	1.16 <sub>+</sub> 16.24	( / )
0.016	0.38 <sub>+</sub> 5.88	0.49 <sub>+</sub> 4.39	0.33 <sub>+</sub> 3.93	( / )
0.25	0.62 <sub>+</sub> 5.99	0.48 <sub>+</sub> 5.16	0.25 <sub>+</sub> 4.47	( 100/ )

±

-

MDA

(37)

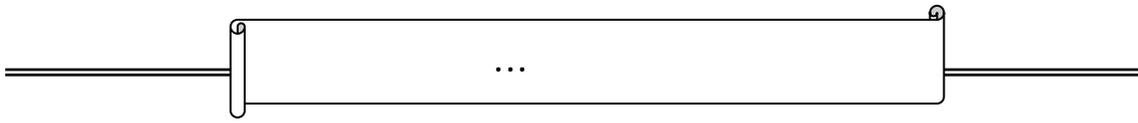
(38)

A,E,C

C

E

(39)



A

(40)

(Fatigue)

(42 41)

(Mutation)

DNA

(43)

(43 33)

:

)

(0.016)

MDA (0.04)

.(6)

MDA

MDA

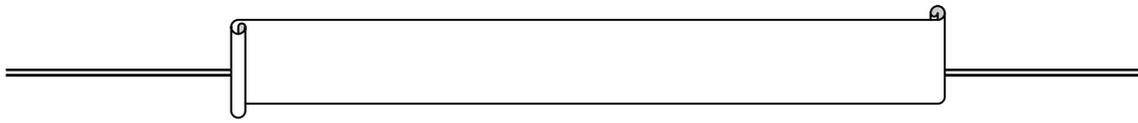
(44)

(45)

(E,A,C )

(46 39)

( )



(47)

:

( )

(RDA)

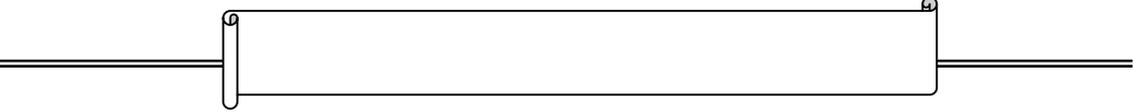
(48.3)

(50 49)

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