



physiological effects of lead on the blood of some Iraqi workers and its binding with some prepared chelating agents

A Thesis

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جمهورية العراق
وزارة التعليم العالي والبحث العلمي
جامعة النهرين
كلية العلوم
قسم الكيمياء

التأثير الفيسيولوجي للرصاص على دم بعض العمال العراقيين وارتباطه مع بعض المركبات الكلابية المحضرة

رسالة

مقدمة الى كلية العلوم- جامعة النهرين

وهي جزء من متطلبات نيل درجة الماجستير في علوم الكيمياء

من قبل

زينب نعمان عيادة

بكالوريوس علوم كيمياء/كلية العلوم للبنات/جامعة بغداد

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المشرف

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Abbreviations

<i>Symbol</i>	<i>Terms</i>
<i>ALAD</i>	<i>Amino levulinic acid dehydrtase</i>
<i>ALAS</i>	<i>Delta-aminolevulinic acid synthetase</i>
<i>BLL</i>	<i>Blood lead level</i>
<i>B-Pb</i>	<i>Blood lead</i>
<i>BP</i>	<i>blood pressure</i>
<i>BAL</i>	<i>British Anti Lewisite</i>
<i>BASO</i>	<i>Basophils and Basophils Count</i>
<i>CNS</i>	<i>Control nervous system</i>
<i>DTPA</i>	<i>Pentetic acid or diethylenetriaminepentaacetic acid</i>
<i>DMPS</i>	<i>2,3-Dimercapto-1-propanesulfonic acid</i>
<i>DMSA</i>	<i>Dimercaptosuccinic acid or succimer</i>
<i>EDDC</i>	<i>Ethylenediamine-N,N'-disuccinic acid</i>
<i>EDTA</i>	<i>Ethylene diamine tetra acetic acid</i>
<i>ECG</i>	<i>Electrocardiography</i>
<i>ESO</i>	<i>Eosinophils and Eosinophil Count</i>
<i>F.T.I.R</i>	<i>Fourier transforms infrared spectrophotometers</i>
<i>GIT</i>	<i>Gastrointestinal tract</i>
<i>HTN</i>	<i>hypertension</i>
<i>HGB</i>	<i>Hemoglobin</i>
<i>HCT</i>	<i>HEMATOCRIT</i>
<i>LYM</i>	<i>Lymphocyte and Lymphocyte Count</i>
<i>MCV</i>	<i>Mean Corpuscular Volume</i>
<i>MCH</i>	<i>Mean Corpuscular Hemoglobin</i>
<i>M.Wt</i>	<i>Molecular weight</i>
<i>MCHC</i>	<i>Mean Corpuscular Hemoglobin Concentration</i>
<i>MONO</i>	<i>Monocyte and Monocyte Count</i>
<i>MPV</i>	<i>Mean Platelet volume</i>
<i>NEU</i>	<i>Neutrophils and Neutrophil Count</i>
<i>NS</i>	<i>Non-significant</i>
<i>PLT</i>	<i>Platelet Count</i>
<i>PM</i>	<i>Particulate Matter</i>
<i>PPM</i>	<i>Part per million</i>
<i>TEMED</i>	<i>Tetramethylethylenediamine</i>
<i>U.S</i>	<i>United state</i>
<i>**</i>	<i>Highly significant</i>
<i>*</i>	<i>significant</i>

<i>WBC</i>	<i>White Blood Cell Count aka Leukocyte count</i>
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الاهداء

إلهي لا يطيب الليل إلا بشكرك ولا يطيب النهار إلا بطاعتك .. ولا تطيب
اللحظات إلا بذكرك
الله جل جلاله

إلى من بلغ الرسالة وأدى الأمانة .. ونصح الأمة .. إلى نبي الرحمة ونور العالمين
سيدنا محمد صلى الله عليه وسلم

إلى من كآله الله بالهيبة والوقار .. إلى من أحمل اسمه بكل افتخار ..
والدي العزيز

إلى بسمه الحياة وسر الوجود.. إلى من كان دعاؤها سر نجاحي وحنانها بلسم جراحي

أمي الحبيبة
إلى من به أكبر وعليه أستند .. إلى شمعة متقدة تنير ظلمة حياتي
زوجي الغالي

إلى من حملته وهنا على وهن إلى من تبتسم لي الحياة بعينيها

ولدي الحبيب

إلى من أرى التفاؤل بعينهم .. والسعادة في ضحكاتهم .. إلى من بوجودهم اكتسب قوة
ومحبة لا حدود لها
أخوتي واصدقائي..

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وَمَا تَوْفِيقِي إِلَّا بِاللَّهِ عَلَيْهِ تَوَكَّلْتُ وَإِلَيْهِ أُنِيبُ

صدق الله العلي العظيم

سورة هود - الآية ٨٨

Abstract

This study aimed determination of lead in sera, and studying the effect of lead on red blood cell and hemoglobin, it is included (64) men working at gas station, generator and painters in Baghdad city with age of (18-53) year. The results were compared with other (30) healthy men non-workers or non-attachment with petroleum derivatives .

- The first part of this study included studying evaluation the hemoglobin statins through, measurement of: -red blood cell count, hemoglobin concentration, and the blood film. The results showed the following points:-

1. A significant increase in lead level in the blood of workers group in comparison with that of the non-workers group ($p < 0.01$).
2. A significant decrease in red blood cell count for workers group with compare with non-worker group ($p < 0.01$).
3. A high significant decrease in hemoglobin (Hb) concentration for workers group with compare that of non-worker group. This decrease was found related to blood lead level ($p < 0.01$).
4. The fuel workers had lead level more than generator workers and painters

- The second part of this study involved preparation of chelating agent with lead metals.

1. A (2-mercapto-4-amino-5-carbethoxypyrimidine) and B (2-mercapto-4-hydroxy-5-cyanopyrimidine).
2. C (6-amino-2mercapto-5-nitrosopyrimidin-4-ol).

Investigation the mount of reducing lead concentration due to the prepared chelating agents

In conclusion for this work , it seen that lead acting as poisons element and it could reduce its concentration by the prepared chelating compounds. In other word sulfa hydal removed pb element.

الخلاصة

تهدف هذه الدراسة الى تقدير مستوى الرصاص في المصل ودراسة تأثيره على كريات الدم الحمراء ، في مص (64) رجل يعملون على تشغيل مولدات الديزل وفي محطات الوقود وكذلك الصباغين في مدينة بغداد وتتراوح اعمارهم بين (١٨-٥٣) سنة وهذه النتائج قورنت مع مجموعة الغير عاملين التي تتضمن (٣٠) رجل بنفس الاعداد.

• تضمنت المرحلة الاولى من الدراسة تقدير مستوى الرصاص بالدم و قياس كريات الدم الحمراء وتقدير تركيز الهيموغلوبين بالدم وعمل صورة للدم (blood film) وكانت النتائج كالآتي:-

- ١- ارتفاع مستوى الرصاص في مصل العمال بالمقارنة مع مجموعة غير عاملة ($p < 0,01$).
 - ٢- وجود انخفاض معنوي ($p < 0,01$) في كريات الدم الحمراء في مجموعه العاملة بالمقارنة مع المجموعة الغير عاملة
 - ٣- انخفاض تركيز الهيموغلوبين (Hb) في دم العمال ويزداد هذا الانخفاض مع زيادة مستوى الرصاص بالدم ($p < 0,01$).
 - ٤- عمال محطات الوقود لديهم الرصاص مرتفع بالمقارنة مع عمال المولدات واصحاب الطلاء.
- تضمنت المرحلة الثانية من الدراسة تحضير مركبات كلابية لها القابلية على الارتباط مع عنصر الرصاص واهم هذه المركبات هي :-

1- A(2-mercapto-4-amino-5-carbethoxypyrimidine) and B(2-mercapto-4-hydroxy-5-cyanopyrimidine)

2- c (6-amino-2mercapto-5-nitrosopyrimidin-4-ol)

في ختام هذا العمل ، يرى بان الرصاص يعمل كعنصر سام ويمكن تقليل تركيز الرصاص بواسطة تحضير مركبات كلابية