



DETERMINATION OF LEAD ELEMENT CONCENTRATION IN COATING HOMES IN LOCAL MARKETS

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ABSTRACT

Were studied (8) samples of a house painter and available in the local markets in the city of Baghdad and from different brands to determine the concentration of lead element in the risks to humans and the Global Campaign to replace it with other compounds for humans and the environment. In this study lead determined by using the atomic absorption spectrometer and found that the concentration of more than 600 ppm, a limit and according to the international standard by which states are trying to gradually of the lead element in the paint and a private house painting and replacing it with other materials.

KEYWORDS: lead, paint, atomic spectrometer, cumulative material, children's health and acute poisoning.

INTRODUCTION

Lead is a heavy chemical element found in nature and it is one of the oldest metals used throughout history. It is a soft, flexible, easy-casting element. Its low melting point has resistance to corrosion and heat and electrical conductivity, so it is used in many industries including batteries and benzene to improve its properties. It is used in the manufacture of pipes, Glass, rubber and paint of all kinds, toys, jewelry, cosmetics and others^[1]. Despite the benefits of lead has risks and disadvantages on the environment and human lead is known as a toxic substance that affects the brain, nervous system, liver, kidneys, bones and teeth and precipitates. The symptoms of lead poisoning for adults are fatigue, stress and migraine headaches and pain in the joints and kidney failure and weak gums (For children, which is more dangerous as the children's body absorbs from a certain source at a rate of 4 to 5 times what the adult body absorbs lead^[2]). The symptoms of lead poisoning in children are low IQ and psychological disorders and health problems in the hearing either in the case of poisoning lead in children lead to mental retardation and behavioral disorder and aggressive and neurological and behavioral damage does not cure them^[3]. The World Health Organization (WHO) considered the lead element to be one of ten chemicals (WHO 2012) that raise fundamental concern about public health, oblige member states and take measures to protect human beings. In view of the constant exposure to paint and lead-containing houses, WHO has organized with the United Nations Environment Program In order to form a global coalition for the elimination of lead paint, a work plan was prepared on 24/8/2012 To stimulate efforts to phase out lead-based coatings and as an important means of implementing paragraph 57 of the World Summit on Sustainable Environment, contained in II/48 of the Strategic Approach to International Chemicals Management, on the disposal of lead-containing paint. Recommendations are to be paint-free in the world by

2020. Therefore, the International Week for the Prevention of Lead Poisoning is held annually in October. This year was held for the period (23-29 / 10/2016) under the slogan "Beware of lead paint." Statistics indicate that only 62 governments have taken measures and binding laws on paint containing lead. PbO_2 , Pb_3O_4 , $Pb(OH)$ and $PbCrO_4$ are the most important salts used in the coating. The selected models from the available coatings are digested in the market and the atomic absorption spectrometry there is no safe concentration of the lead level in human blood to the low level of $5 \mu g / dL$ which is safe. Studies have shown that it is not safe to measure the concentration of lead in the human body by measuring its concentration in blood and urine^[5].

Lead paint

Paint containing lead as pigment, lead (II) chromate ($PbCrO_4$, "chrome yellow"), Lead (II,IV) oxide, (Pb_3O_4 , "red lead"), and lead (II) carbonate ($PbCO_3$, "white lead") are the most common forms. Lead is added to paint to speed up drying, increase durability, maintain a fresh appearance, and resist moisture that causes corrosion. It is one of the main health and environmental hazards associated with paint. In some countries, lead continues to be added to paint intended for domestic use^[6]. Whereas countries such as the U.S. and the U.K. have regulations prohibiting this, although lead paint may still be found in older properties painted prior to the introduction of such regulations. Although lead has been banned from household paints in the United States since 1978, paint used in road markings may still contain it. Alternatives such as water-based, lead-free traffic paint are readily available, and many states and federal agencies have changed their purchasing contracts to buy these instead. Lead white was being produced during the 4th century BC; the process is described by Pliny the Elder, Vitruvius and the ancient Greek author Theophrastus. The traditional method making the pigment was called the stack process. Hundreds or thousands of earthenware pots containing

vinegar and lead were embedded in a layer of either tan bark or cow feces. The pots were designed so that the vinegar and lead were in separate compartments, but the lead was in contact with the vapor of the vinegar. The lead was usually coiled into a spiral, and placed on a ledge inside the pot. The pot was loosely covered with a grid of lead, which allowed the carbon dioxide formed by the fermentation of the tan bark or the dung to circulate in the pot. Each layer of pots was covered by a new layer of tan, then another layer of pots. The heat created by the fermentation, acetic acid vapor and carbon dioxide within the stack did their work, and within a month the lead coils were covered with a crust of white lead. This crust was separated from the lead, washed and ground for pigment. This was an extremely dangerous process for the workmen. Medieval texts warned of the danger of "apoplexy, epilepsy, and paralysis" from working with lead white^[7].

The United States' Consumer Product Safety Commission (CPSC) banned lead paint in 1977 in residential properties and public buildings (16 CFR 1303), along with toys and furniture containing lead paint. The cited reason was "to reduce the risk of lead poisoning in children who may ingest paint chips or peelings"^[8]. For manufacturers, the CPSC instituted the Consumer Product Safety Improvement Act of 2008, which changed the cap on lead content in paint from 0.06% to 0.009% starting August 14, 2009. In April 2010 the U.S. Environmental Protection Agency required that all renovators working in homes built before 1978 and disturbing more than six square feet of lead paint inside the home or 20 square feet outside the home be certified. EPA's Lead Renovation, Repair and Painting Rule (RRP Rule) lowers the risk of lead contamination from home renovation activities. It requires

that firms performing renovation, repair, and painting projects that disturb lead-based paint in homes, child care facilities and pre-schools (any child occupied facility) built before 1978 be certified by EPA and use certified renovators who are trained by EPA-approved training providers to follow lead-safe work practices^[9]. Lead paint is not prohibited in India. A 2015 study found that over 31% of household paints in India had lead concentration above 10,000 parts per million (ppm), which far exceeds the BIS standard of 90 ppm for lead in paint^[10].

MATERIALS & METHODS

In this research^[8] of paint (paint houses) were collected and available in local markets in Baghdad. They are from various Iraqi, Turkish, German, Chinese, and white colors. Forms digestion: The coating models were digested in the method used in the source as follows^[6]: Add 1 ml of concentrated nitric acid and 1 ml of hydrogen peroxide (30%) into a jar and place in a microwave oven. After heating, allow to cool for 10 minutes. The samples are transferred to plastic tubes and reduced to 10 g (total weight). Then they are placed in the centrifuge to separate the solids. The liquid layer is measured by the atomic absorption spectrometer.

Standard solutions

Prepare a standard solution concentration of 1000 ppm and come from it and also with the same dilution used in the preparation of the above models and bring it from this standard solution of different solutions of different concentration, the sample were measured by the Atomic Absorption Spectrometer (AA-7000) in laboratory of Market research center and consumer protection/University of Baghdad The results were as in the following table:

TABLE 1: the concentration of lead in paints

NO.	product	Pb/ppm	Volume	Colure
1	Iraq	850 ± 25	1kg	White
2	Iraq	780 ± 20	1kg	White
3	turkey	800 ± 20	20 kg / powder	White
4	china	980 ± 22	20 kg / powder	White
5	china	900 ± 23	20 kg / powder	White
6	Iran	800 ± 25	1kg	White
7	germane	650 ± 25	1kg	White
8	turkey	700 ± 25	20 kg / powder	White

RESULTS & DISCUSSION

Despite the risks, the pigment was very popular with artists because of its density and opacity; a small amount could cover a large surface. It was widely used by artists until the 19th century, when it was replaced by zinc white and titanium white^[11]. From the results obtained in this research, we conclude from the above table that most types of paint in the market contains lead compounds and high concentration, especially that the local market contains too many types in the market and from different niches and I think that this study included only some of them. The dangers of lead paint were considered well-established by the beginning of the 20th century. In the July 1904 edition of its monthly publication, Sherwin-Williams reported the dangers of paint containing lead, noting that a French expert had deemed lead paint

"poisonous in a large degree, both for the workmen and for the inhabitants of a house painted with lead colors"^[12]. As early as 1886, German health laws prohibited women and children from working in factories processing lead paint and lead sugar^[13].

Lead poisoning

Lead paint is hazardous. It can cause nervous system damage, stunted growth, kidney damage, and delayed development^[14]. It is dangerous to children because it tastes sweet, therefore encouraging children to put lead chips and toys with lead dust in their mouths. Lead paint is dangerous to adults and can cause reproductive problems in men or women. Decreases in sperm production in men have been noted. Lead is considered a possible and likely carcinogen. High levels may result in death^[15].

RECOMMENDATIONS

1. Awareness campaign for the dangers of lead, especially the paint of homes and the health risks, especially on children.
2. Encouraging the local industry to manufacture or import raw materials free of lead as a basic material and can be determined in the form of impurities only.
3. Establishment of workshops or seminars and local conferences in the world work week for the elimination of lead paint, which is held globally in late October each year.
4. Conducting other research by taking samples of paint and inside houses, especially old houses and study the impact on the residents with a health card for them.

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