بسم الله الرحمن الرحيم

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HONOUR. DEGREE INCHEMISTRY LABORATORIES

Charred materials in bread

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الاستهلال

قال تعالى:

{وَأَوْفُوا الْكَيْلَ إِذَا كِلْتُمْ وَزِنُوا بِالْقِسْطَاسِ الْمُسْتَقِيمِ ذَلِكَ خَيْرٌ وَأَحْسَنُ تَأْوِيلاً (35) وَلا تَقْفُ مَا لَيْسَ لَكَ بِهِ عِلْمٌ إِنَّ السَّمْعَ وَالْبَصَرَ وَالْفُؤَادَ كُلُّ أُولَئِكَ كَانَ عَنْهُ مَسْؤُولاً (36) وَلا تَمْشِ فِي الأَرْضِ مَرَحًا إِنَّكَ لَنْ تَخْرِقَ الأَرْضَ وَلَنْ تَبْلُغَ الْجِبَالَ طُولاً (37) كُلُّ ذَلِكَ كَانَ سَيِّئُهُ عِنْدَ رَبِّكَ مَكْرُوهًا (38)}

صدق الله العظيم

[سورة الإسراء: الآيات 35- 38]

Dedication

This project is dedicated to our parentsfor their

Countless sleepless nights filled with prayers for our success in our life, the least we can do is to dedicate the fruit of our efforts for the most two influential people in our life, this is for you.

Our professors and teachers who have given us all their renewed support with singularly honest, Thank you for bring us to this stage.

Our colleagues who gave us those wonderful moments in the arena of scientific, socialand Cultural.

To all those with whom we have shared life difficulties, we will never really find those perfect words to thank you.

ACKNOWLEDGEMENTS

First and foremost we thanks Almighty ALLAH for blessing us with the strength and the ability needed to finish this thesis and present it in the best possible form.

Finally we want to express our appreciation and gratitude to our doctor ELMUGDADAHMED ALI for his supervision, guidance and endless support until the completion of this project, we would like to extend our thanks and recognition to our teachers and the staff of Faculty of the science for offering their assistance and aid whenever needed.

Abstract

This study was conducted to measure the concentration of some heavy metals such as Chromium, Lead and Nickel in the material in the charred bread. Samples taken from the State of Khartoum and Took the Particular Sample. And the primary conducted processors, Then Measure the Concentration of Some Heavy Metals which Chromium, Lead and Nickel and Measure Absorptivity, The Analysis included Samples of the Charred Material in the Bread Machine and Municipal,Analysis Laboratories have been the Department of Chemistry _ Faculty of Science _Sudan University of Science and Technology and Central Laboratory _Faculty of Science in Khartoum University.

مستخلص البحث

اجريت هذه الدراسة لقياس تركيز بعض العناصر الثقيلة وهي الكروم والرصاص والنيكل في المواد المتفحمة في الخبز.اخذت العينات من ولاية الخرطوم وتم اخذ وزنة معينة من العينة وتم اجراء المعالجات الاولية ومن ثم قياس تركيزبعض العناصر الثقيلة وهي الكروم والنيكل والرصاص وقياس الامتصاصية عن طريق جهازالامتصاص الذريتضمن التحليل عينات من المواد المتفحمة في الخبز الالي والبلدي. تم التحليل بجامعة السودان للعلوم والتكنولوجيا والمعمل المركزي بجامعة الخرطوم قسم الكيمياء.

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Chapter one

Chapter one

Introduction

1.1-bread:-

1.1.1-definition:-

Bread is a staple food prepared from a dough of flour and water, usually by baking. Throughout recorded history it has been popular around the world and is one of humanity's oldest foods, having been of importance since the dawn of agriculture. There are very many combinations and proportions of types of flour and other ingredients, and also of different traditional recipes and modes of preparation of bread. As a result, there are a wide varieties of types, shapes, sizes, and textures of breads in various regions. Many non-cereal ingredients may be included, ranging from fruits and nuts to various fats. Commercial bread in particular, commonly contains additives, some of them non-nutritional, to improve flavor, texture, color, or shelf life. Charred materials and conjoined floor furnace consists of bread and drinking water and heat 300, these materials when exposed to heat several times it charred and stick with floor furnace therefore difficult to clean materials normal and accumulate on the floor of the oven , which threatens adhesion dough before maturity to become bread intake people .Black spots produced by combustion of materials like lead, cadmium, chromium, zinc and arsenic which leads to a defect in the formation of hemoglobin in the blood and tissue cells of the body, brain disease , memory impairment and drowsiness, brittle bones disease and cancer.

1.2-Burning food:-

What's wrong with burnt food?

We often hear about the effects of carcinogens from charred or burnt food, and the relationship between carcinogens and cancer.

What are carcinogens?

Carcinogens are a range of substances, organic and inorganic, that are directly involved in causing cancer. The list of substances "carcinogenic to humans" is ominously long, then there's a list below that one of "known to be human carcinogens", followed by another list of substances "probably carcinogenic to humans" plus (as if the first three lists weren't enough to worry about!) there are all the substances presently classified as "reasonably anticipated to be human carcinogens It's important to realize that not all carcinogens are man-made. They occur frequently and naturally in the environment; like sunlight shines on your skin. Too much can kill. Need I say more? So there are natural and unnatural carcinogens in the air we breathe, in our soils, and in the water we drink or need to irrigate our crops. Therefore, carcinogens come with the food we eat, either as natural or unnatural components of the food. So what?Practically anything can lead to cancer," some say. "Why worry if there's nothing you can do about it? The point is you can do something about it. It's called risk management, or risk minimization. And some strategies could be life-savers for people with a high cancer risk as a result of their genetic predispositions, lifestyle habits, occupational hazards, or all of the above

1.2.1-Recap:-

So far, you know that there is a base load of dietary carcinogens, and that base load is related to your food selection and the environmental factors prevailing over your food. From its source to your kitchen, including whatever happens to that food during transportation and storage. Now, I should tell you that you're going to add carcinogens to that base load by cooking your food, but the amount you add (how many types of carcinogens) and the concentrations that you will add (more carcinogen per serve of food) are influenced by the *way* you cook that food. For example, a study was done on duck breasts to show that smoking the flesh resulted in the highest concentrations of carcinogens (which is most probably because of the smoke contribution as a rule smoke will contain carcinogens). Next in

line came charcoal grilled duck breasts without skin, and then charcoal grilling with skin, then came roasting, followed by steaming.

1.2.2-Cooking and the Millard reactions:-

These are the wonderfully tangible results of a complex series of chemical reactions called Millard reactions. What's happening is amino acids (chemical compounds that are essential to life) react with reducing sugars (any sugar like glucose, fructose, and lactose but not sucrose) in the presence of heat in excess of 155 °C (310 °F) to produce a range of poorly characterized molecules responsible for those flavors we love to chase. But the Millard reaction stage is both a delicious and delicate time.

Prolonged heat or temperatures too high will quite suddenly change those precious golden browns to tarry black. Then, you have burnt food. And you know by the acrid smelling smoke, without even peeking into the oven, that you've overdone it.

1.2.3-Risk minimization:-

Here are seven tips to reduce your intake of burnt food toxins:

a. Reduce the base load of carcinogens in your food by selecting types of food that are less prone to contain carcinogens and environmental contaminants
b. Cook with steam as often as possible, and cook quickly
c. Avoid smoked foods including ham, bacon, salmon etc.
d. Avoid using excessive heat during roasting, grilling, toasting, frying etc.
e. Remove your meal from heat as it reaches a light golden brown color rather than waiting until its black - burnt food.
f. Avoid char-grilled or otherwise heat-blackened meals and, while you are at it, avoid inhaling fumes from burnt food or the smoke from burning food
g. If you must salvage accidentally burnt food; excise, cut out, remove, or scrape off all visibly blackened bits before you eat it - otherwise keep on overcooking it – you may qualify it for an exhibit at the Museum of Burnt Food.

1.3-Carbon and charcoal:-

Charcoal is a light black residue consisting of carbon, and any remaining ash, obtained by removing water and other volatile constituents from animal and vegetation substances. Charcoal is usually produced by slow pyrolysis, the heating of wood or other substances in the absence of oxygen. Common charcoal is made from peat, coal, wood, coconut shell, or petroleum. "Activated charcoal" is similar to common charcoal, but is made especially for use as a medicine. To make activated charcoal, manufacturers heat common charcoal in the presence of a gas that causes the charcoal to develop lots of internal spaces or "pores."

1.4-Acrylamide:-

Acrylamide (or acrylic amide) is a chemical compound with the chemical formula C_3H_5NO. Its IUPAC name is prop-2-enamide. It is a white odorless crystalline solid, soluble in water, ethanol, ether, and chloroform. Acrylamide decomposes in the presence of acids, bases, oxidizing agents, iron, and iron salts. It decomposes non-thermally to form ammonia, and thermal decomposition produces carbon monoxide, carbon dioxide, and oxides of nitrogen. Acrylamide is prepared on an industrial scale by the hydrolysis of acrylonitrile by hydrates. Most acrylamide is used to synthesize polyacrylamides, which find many uses as water-soluble thickeners. These include use in wastewatertreatment, gel electrophoresis (SDS-PAGE), papermaking, ore processing, tertiary oil recovery, and the manufacture of permanent press fabrics. Some acrylamide is used in the manufacture of dyes and the manufacturer of other monomers. Acrylamide is a known lethal neurotoxin and animal carcinogen. Its discovery in some cooked starchy foods in 2002 prompted concerns about the carcinogenicity of those foods.

1.4.1-Molecular biology laboratories:-

Polyacrylamide was first used in a laboratory setting in the early 1950s. In 1959, independently published on the use of polyacrylamide gel electrophoresis to separate charged molecules.The technique is widely accepted today, and remains a common protocol in molecular biology labs.

1.4.2-Uses:-

The majority of acrylamide is used to manufacture various polymers. The proportionately largest use of these polymers was in water treatment.Additional uses include as binding, thickening or, cement, sewage/wastewater treatment, pesticide formulations, cosmetics, sugar manufacturing, soil erosion prevention, ore processing, food packaging and plastic products.

1.4.3-Toxicity and carcinogenetic:-

Some evidence suggests exposure to large doses can cause damage to the male reproductive glands. Direct exposure to pure acrylamide by inhalation, skin absorption, or eye contact irritates the exposed mucous membranes, incontinence, nausea, myalgia, speech disorders, numbness, paresthesia, and weakened legs and hands. In addition, the acrylamide monomer is a potentneurotoxin.

1.4.4-Discovery of acrylamide in foods:-

Acrylamide has been found to occur in many cooked starchy foods and is of concern as a possible carcinogen. Acrylamide was accidentally discovered in foods in April 2002 by scientists in Sweden when they found the chemical in starchy foods, such as potato chips (potato crisps), French fries, and bread that had been heated to over 120 °C (248 °F). It was not found in food that had been boiled or in foods that were not heated.Acrylamide levels appear to rise as food is heated for longer periods of time. Though researchers are still unsure of the precise mechanisms by which acrylamide forms in foods. In fried or baked goods, acrylamide may be produced by the reaction between asparagine and reducing sugars (fructose)Human cancer risk of acrylamide exposure from food.Acrylamide causes cancer in rats when administered orally in high-dose experiments, increasing tumors in the nervous system, oral cavity, peritoneum, thyroid gland, mammary gland, uterus, and clitoris.To determine the human cancer risk from acrylamide, several studies have been conducted using food frequency data to estimate acrylamide intake and its effect on cancer risk. A Swedish study using 1,525 patients failed to find a link between acrylamide in food and liver, kidney and bowel cancers.

1.5-Lead:-

This article is about the metal. For other uses, see Lead (disambiguation).

Lead $_{82}$Pb

General properties	
Name, symbol	lead, Pb
Pronunciation	/ˈlɛd/ ***LED***
Appearance	metallic gray
Atomic number	82
Standard atomic weight	207.2(1)
Element category	post-transition metal
Group, period, block	group 14 (carbon group), period 6, p-block
Electron configuration	[Xe] $4f^{14}$ $5d^{10}$ $6s^2$ $6p^2$ per shell: 2, 8, 18, 32, 18, 4
Physical properties	
Phase	solid
Melting point	600.61 K (327.46 °C, 621.43 °F)

1.6-chromium:-

This article is about the chemical element. For other uses,

Chromium	
$_{24}$**Cr**	
Appearance	
silvery metallic 	
General properties	
Name, symbol, number	chromium, Cr, 24
Pronunciation	/ˈkroʊmiəm/ ***KROH**-mee-əm*
Element category	transition metal
Group, period, block	6, 4, d
Standard atomic weight	51.9961(6)
Electron configuration	[AR] $3d^5\ 4s^1$ 2, 8, 13, 1

1.7-Nickel:-

General properties	
Name, symbol	nickel, Ni
Pronunciation	/ˈnɪkəl/ ***NIK**-əl*
Appearance	lustrous, metallic, and silver with a gold tinge
Atomic number	28
Standard atomic weight	58.6934(4)
Element category	transition metal
Group, period, block	group 10, period 4, d-block
Electron configuration	[Ar] $3d^8\ 4s^2$ or [Ar] $3d^9\ 4s^1$ (see text) per shell: 2, 8, 16, 2 or 2, 8, 17, 1
Physical properties	
Phase	solid
Melting point	1728 K (1455 °C, 2651 °F)
Boiling point	3003 K (2730 °C, 4946 °F)
Density (near r.t.)	8.908 g·cm^{-3} (at 0 °C, 101.325 kPa)
Liquid density	at m.p.: 7.81 g·cm^{-3}
Heat of fusion	17.48 kJ·mol^{-1}
Heat of vaporization	379 kJ·mol^{-1}
Molar heat capacity	26.07 J·mol^{-1}·K^{-1}
Atomic properties	
Oxidation states	4,[1] 3, **2**, 1,[2] −1 (a mildly basic oxide)
Electronegativity	1.91 (Pauling scale)

1.8-Hazards of lead:-

High concentrations of lead have a future risks where airborne lead, concentrations ranged from bread by laboratory results between 0.1 and less than 0.59 ppm .It within the permitted rates and are therefore safe, but the results showed that concentration ratios were high on the floor of bakeries ranged between 1.4 and 27.6 ppm, Afraid experts from increased rates of lead accumulation on the case over the years and increase the danger of toxicity, which is reflected diseases afflicting people Especially following the accumulation of lead in the bones, the proportion of lead non- organic in the body up by world standards to 80 micrograms per 100 millimetres of blood, and if in excess of this limit lead to poisoning the body high proportions of heavy metals, especially lead in bread leads to the occurrence of chronic poisoning symptoms early show in loss of appetite, headache, weakness and lack of indifference is also concern and constipation, The symptoms of advanced defect of the brain, vision disorder, high blood pressure, emotional instability, cramps and psychology satisfactory. Study suggests the possibility if injury to infants with mental retardation and the emergence of autism spectrum have difficulty pointing to the discovery of lead in the blood after accumulation on the body for many years because it is deposited in the bones and weaken.

1.9- Hazards of chromium:-

A person is exposed to chromium metal through respiration, food or drink or by contact of the skin or chrome metal compounds. Rates of chromium in the water or the air in general, but very few wells contaminated water containing (chromium +6). Most of the per capita intake of this mineral through foods, chrome 3 is available naturally in fruits, vegetables, meat, yeast and grain. And when storing and iron chromium in cans, for example, the concentration may rise. (Chromium +6) is harmful to human health and pose a risk to workers in the steel industry, textiles. Cigarettes contained large proportions of it and (chromium +6) also because skin rashes in some people cause an agitation and breathing nose and bleeding them.

1.9.1-Risk:-

Rash, stomach disorders, poor efficiency of the immune system, atrophy of the liver, kidney, chance in the genetic materials, lung cancer and death. Breathing through the air hole is causing the mucous membrane of the nasal barrier, agitation throat and laryngitis, bronchitis and shortness of breath.

1.10-Hazards of Nickel:-

It is known for the fat and chocolate because they contain high amounts of nickel metal, increase the rates of consumption when dealing with large amounts of vegetables grow in contaminated soil by it. Resides in the detergent and cigarettes where the rates it big lead to health risks such as increased. Also cause lung cancer and cancer of the nose and throat, prostate cancer, feeling dizzy, respiratory failure, birth defects to the foetus and the crisis of asthma and bronchitis heart disorder, skin rashes and pneumonia. Nickel has been classified according to the international agency for research on cancer in two groups

- Group (A) nickel compounds are carcinogenic in humans and there is sufficient evidence
- Group (B) one of the factors likely to contribute to cancer.

1.11-Bread making:-

Step 1: what you will need.
You will need

- Yeast - 2 Tbsp
- Hot – ash* water – 2 cups
- Bread flour – 5 cups total, 2 for the sponge and 3 for later (not regular flour)
- Sugar – 2 Tbsp
- Salt – 2 Tsp
- Oil – 2 Tbsp
- 3 loaf pans
- Quick – read thermometer
- Oven pre – heated to 375

Hot – ash* means between 95 and 115 degrees F, much colder and it won't activate, much warmer and it will kill the little guys.

Step 2: Make the sponge

This recipe uses what I call a "sponge." The sponge will activate the yeast and get things started, getting the yeast warm, happy and ready to go. Start by mixing the hot water and the flour. Then, add 2 Tbsp. sugar, 2 Tbsp. oil, 2 Tbsp. yeast and 2 tsp. salt. Let this sit for about 8 or 10 minutes. Assuming your water was hot enough,

Step 3: Add some flour and knead it

Now you need to add about 3 more cups of flour. I added a little less this time, it really depends on the humidity and how exact your measurements were in the sponge step. Once it gets too tough to stir, flip it onto a clean floured surface. Now, knead away, adding flour as you do so. Knead the dough for 8 or 9 minutes.It should be the texture of your earlobe when it's done kneading. When you finish this part put it back in the bowl and cover it with a slightly damp towel.

Step 4: Let it rise...

Let the dough rise in a warm place for about 45 minutes to an hour. The dough should be about doubled in size by the time it's finished.

Step 5: Into the pans

Punch the dough down (Yes, punch it. Beat the heck out of it. Just don't make a mess), then divide it into 3 parts. Spray the pans and put the dough in. Let it rise again in the pans (covered) until it looks like the second picture.

Step 6: Into the oven

Preheat your oven to 375 F and put the loaves in. Bake them for about 25 minutes. Your quick read thermometer should read between 180 and 190 degrees. Pull the loaves out and place them on their sides on a rack, after a few seconds slide them out of the pans and onto the rack. Let them cool.

Percent	weight
White flour 100%	0.580 kg
Water 70%	0.406 kg
Instant yeast 0.7%	0.004 kg
Salt 2%	0.012 kg
Total	1 kg

1.12-Dough preparation:-

a) Mixing

Mixing is the first step in the bread making process, it blends the ingredients in the dough and traps air bubbles (gas) inside. To mix by hand, place the dry ingredient in along bowl, pour in the warm liquid as you stir, adding only as much liquid as necessary to form a rough, shaggy dough, to mix in an electric mixer, place the dry ingredients in the mixer bowl and add the warm liquid as you beat with the paddle attachment until the dough gathers around the paddle, Water is the primary liquid for making bread.

b) Kneading

Kneading (which like mixing, can also be done by hand, in an electric mixer, or in a food processor) allow the proteins and the water in the dough to connect and form gluten.

c) Fermentation

Much bread was leavened by yeast. The yeast used for leavening, bread is saccharomyces cerevisiae, the same species used for brewing alcoholic beverages. This yeast ferments carbohydrates in flour, including any sugars, producing carbon dioxide. Baker's yeast plays a key role in bread dough fermentation .Amylases present in flour, break down starch into a smaller sugar, maltose. The reaction starts as soon as water is added to the flour and stops during baking. The reaction of the flour amylases is completed by an enzyme of yeast. The maltase which splits maltose into two glucose.

d) Shaping

If kneading is best done vigorously to encourage the formation of gluten, shaping is best done gently to leave as many air bubbles intact as possible. Once the dough is shaped, leave it at Rome Tempe ration, covered, to rise as the recipe specifies. Don't allow shaped loaves to over rise before baking, or they will fail to rise as they should be in the oven; loaves usually need to increase by half there volume and after shaping

e) Baking

There are three rules to baking bread preheating the oven the minimum of 30 minutes before baking using a baking stone crisp crust , and misting with water during the first 10 minutes of baking (also for sake the crust) . In

general, breads should be backed (as high Tempe ration as high 550 degrees in some cases) when the bread sound hollow on the bottom.

1.12.1- Constituent of flour:-

- Starch 69%
- Moisture 15%
- Gluten forming protein 11%
- Sugar 2.5%
- Soluble protein 1%
- Fat 1%
- Mineral salts or (ash) 0.5%
- Vitamin (B) 0.3%

1.13-Chemistry of bread making:-

The baker combines flour, yeast, liquid, and salt in a bowl, shapes it all into a dough, lets the dough rise, and bakes it in a hot oven. Flour, which gives bread its structure, is made by milling cereal grains such as wheat, barley, or rye. In this process, the grain seeds are crushed, releasing starch and proteins. Starch molecules are long, gangly polymers of simple sugars linked head to tail by chemical bonds. Proteins are more complex--a single protein may contain hundreds of amino acids strung together like beads on a necklace. Gliadin and gluten, two proteins found in flour. When flour is added to water and kneaded, these proteins swell up like sponges and form a tough elastic substance called gluten. That gas comes from the leavening action of tiny one-celled fungi called yeast. When you combine yeast with flour and water, you'll end up with a sticky white dough. Inside the dough, fermentation is occurring and molecules are on the move. Enzymes from the yeast cells attack starch, breaking it down into glucose. Other enzymes transform glucose molecules into carbon dioxide and ethanol. The carbon dioxide (CO_2) gas then bubbles up through the mixture, causing the dough to rise. The yeast cells grow under anaerobic conditions and cannot convert glucose molecules completely to gas. Some sugar molecules get sidetracked and are converted into alcohols, acids, and esters--substances which add to bread's flavor. Salt strengthens gluten by slowing down the enzymes which catalyze the breakdown of proteins. If you add too little salt, the dough is tough and sticky. If you add too much, water flows out of yeast cells by osmosis. Heat causes pockets of gas in the dough to expand. Eventually the crust becomes toasty brown--and soon you're enjoying a slice of warm, home-baked bread.

Chapter two

Chapter two

2.1-Objective:-

Determination of some heavy metals (lead, chromium and nickel) in charred materials in bread.

2.2-Sampling:-

Samples taken from the Rumaila bakery located in the state of Khartoum after kilometers from the university, then the samples were taken from trays placed them bread and trays that scratch the surface with a sharp object (melgat), also use the tool that cleans out trays, samples were taken from different areas of the center and included trays parties, the articles focused on the outskirts of the charred materials trays as a result of high temperatures in the pot to save the sample was clean and well dried before use. And we took 3.00 g from it.

2.3-Materials:-

- Samples were collected
- Hydrochloric acid (concentrated)
- Distilled Water

2.4-Appliance and tools:-

- Atomic absorption(Shimadzu AA6800 Atomic Absorption spectrophotometer)
- Furnace
- Oven
- Porcelain crucible
- Glass rode
- Beaker (50 ml)
- Beaker (100 ml)
- Volumetric Flask (50 ml)

- Funnel
- Benzene Burner

2.5-Sample Pretreatment:-

2.05 g of sample was dried at oven for 2 hours, 2.03g of dry sample burned by furnace gradually at 650C for 2 hours and determine of some heavy metals.

2.6-Preparation of Solution:-

0.23 g of burned sample was weighed into 50 ml of beaker, dissolved by 20 ml of hydrochloric solution (1:1) and the mixture component heated by benzene burner For 10 minutes and filtered into volumetric flask (50ml) and washed by hot distilled water and completed to the mark with hot distill water.

Chapter three

3.1-Results:-

Tablet explain weight of dried sample:

weight of crucible empty /g	weight of crucible + sample after drying /g	weight of sample after drying / g
32.73	**34.76**	**2.03**

Tablet explain weight of burned sample:

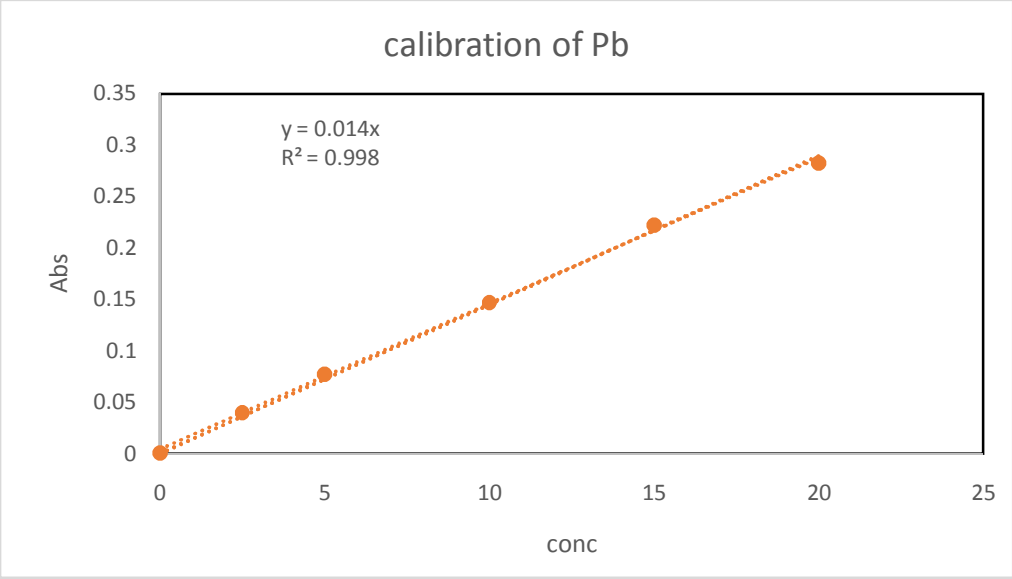
weight of crucible empty/g	weight of crucible + sample after burning /g	weight of sample after burning /g
32.73	**32.96**	**0.23**

3.2- Quantitative Analysis:-

3.2.1- The concentration of Lead is 0.7528 ppm at 0.0109 by Atomic Absorption:-

Concentration of Standard (ppm)	Absorbance
0.00	0.0006
2.50	0.04
5.00	0.0774
10.00	0.147
15.00	0.222
20.00	0.2825

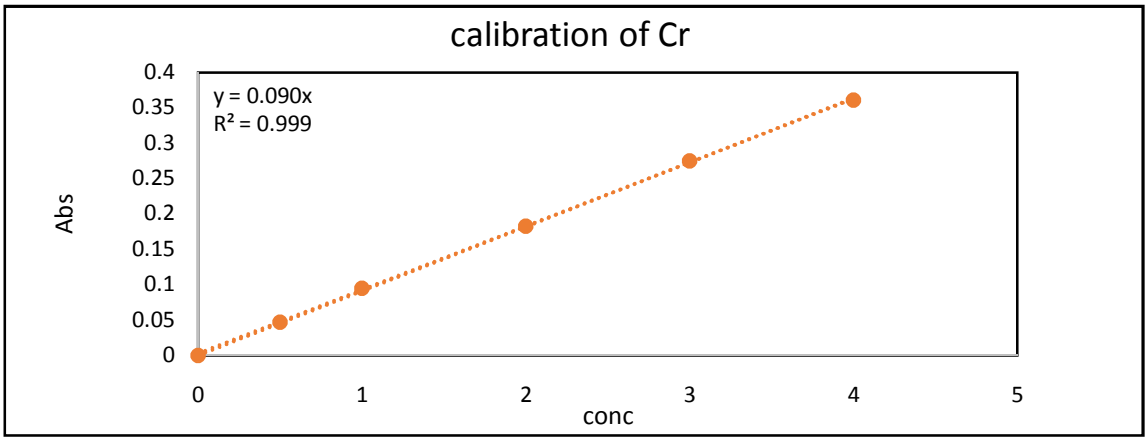
Calibration Curve ofLead:



3.2.2-The concentration of Chromium is 0.3497 ppm at 0.318 by Atomic absorption:-

Concentration of standard (ppm)	Absorbance
0.00	**0.0002**
0.5	**0.0476**
1.00	**0.0948**
2.00	**0.1828**
3.00	**0.2746**
4.00	**0.3607**

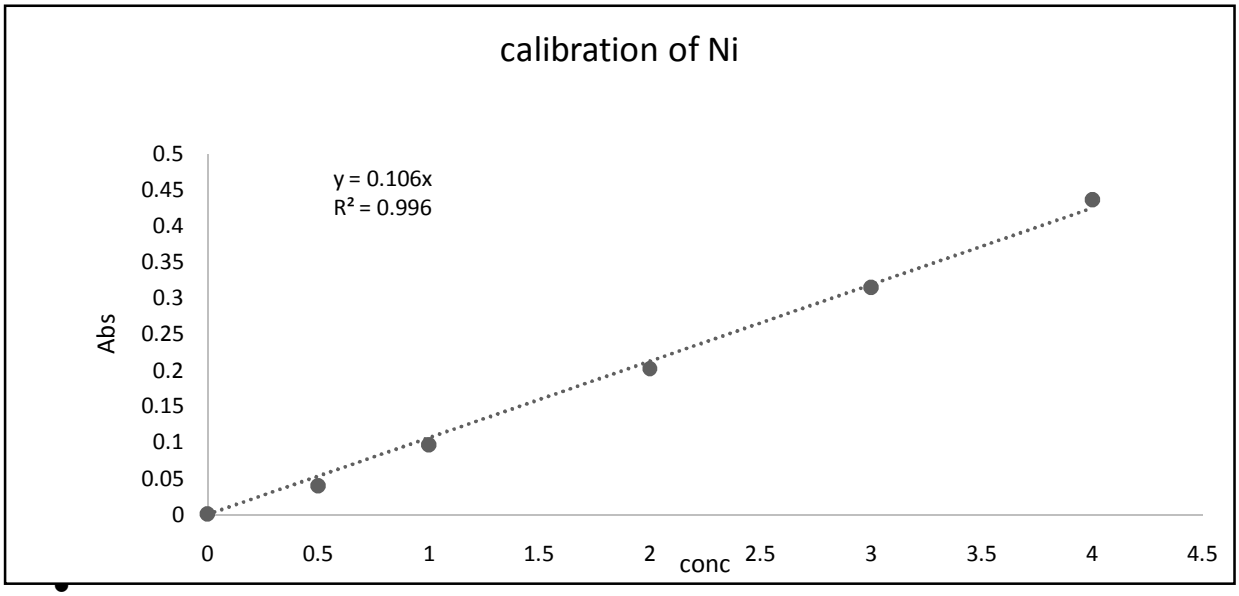
Calibration Curve of Chromium:



3.2.3-The concentration of Nickel is 0.3599 ppm at 0. 0299 by Atomic absorption

Concentration of standard (ppm)	Absorbance
0.00	0.0014
0.5	0.0402
1.00	0.0975
2.00	0.2028
3.00	0.3152
4.00	0.4372

Calibration Curve of Nickel:



3.3- Conclusion:-

3.3.1-Discussion:-

In this study, the analysis of samples from the bread by atomic absorption and estimate the concentration of some heavy metals found that the concentration of lead at 0.0109 absorbance equal to 0.7528 ppm and the concentration of chromium at 0.0318 absorbance equal to 0.3497 ppm and the concentration of nickel at 0.0299 absorbance equal to 0.3599 ppm. Observing the concentration of this minerals found that the lead concentration is the highest, then nickel, then chrome.

3.3.2-Recommendation:-

- Exclude any black spot appears on the baking trays
- The importance of cleaning floor bakers On an ongoing basis to get rid of hazardous waste in a safe manner
- Intensify regulatory Campaigns to protect citizens.

- 3.4-References:-

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