UNIVERSITI PUTRA MALAYSIA

LEAD CONCENTRATION IN INSTANT NOODLES AND HEALTH RISK ASSESSMENT AMONG STUDENTS IN UNIVERSITI PUTRA MALAYSIA

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BY

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ABSTRACT

LEAD CONCENTRATION IN INSTANT NOODLES AND HEALTH RISK ASSESSMENT AMONG STUDENTS IN UNIVERSITI PUTRA MALAYSIA

NURUL FADZILAH BINTI HAMID

Introduction: One of the important food that consumed by Asians is instant noodles. Nowadays, food contamination on heavy metal in foods is a big issue especially when it gives health impact to consumers. Instant noodles might be contaminated with heavy metal such as lead. However, lead contents in instant noodles still in investigation. **Objectives:** The study was conducted to determine the lead concentration in instant noodles and health risk assessment among two groups of students namely Foundation of Agricultural Sciences and undergraduate students in UPM. **Methodology:** A cross-sectional comparative study was conducted among 200 students (100 from Foundation of Agriculture Science and 100 from undergraduates) at UPM. A set of pre-tested questionnaire was used to collect the socio demographic information, instant noodles frequency intake and the influencing factors of instant noodles consumption. Seven different brands of instant noodles were purposely sampled from respondent most preferred brands. The samples were prepared triplicate by using wet digestion method and lead concentration was analysed using Inductively Coupled Plasma Mass Spectrophotometer (ICP-MS). The Provisional Tolerable Weekly Intake (PTWI) was used to determine the maximum amount of lead that the respondents can be exposed per week over a lifetime without an unacceptable risk of health. The health risk was determined by calculating Hazard Quotient (HQ) of respondents. **Results and Discussion:** Majority of the respondents consumed instant noodles less than three times per week. Easy to prepare was the most influencing factor for consuming instant noodles among all respondents. Easy to get and no food were the factors which showed significant difference between the groups of respondents. Economic status was not associated with the frequency intake of instant noodles because the middle family were the least to consumed instant noodles. The range of lead concentration in instant noodles were between 0.0953 mg/kg to 0.0117 mg/kg while for seasoning the lead concentration were <0.002 mg/kg to 0.00108 mg/kg. All these level were below the standard of Malaysia Food Regulation (1985) which is 2 mg/kg. The PTWI of the respondents also not exceeded the limit of 0.025 mg/kg due to the low intake of instant noodles per week. The calculated HQ of less than 1 indicates no significant health risk is likely to occur due to consumption of contaminated instant noodles and its seasonings. **Conclusion:** Low concentration of lead was detected in all samples of instant noodles and its seasoning. The PTWI of the respondents were below the standard of 0.025 mg/kg/week as well as the HQ <1 which indicates no significant of non-cancer risk will likely to occur.

Keywords: Instant noodles, Lead, Provisional Tolerable Weekly Intake, Hazard Quotient, ICP-MS

ABSTRAK

KEPEKATAN PLUMBUM DALAM MI SEGERA DAN PENILAIAN RISIKO KESIHATAN DI KALANGAN PELAJAR DI UNIVERSITI PUTRA MALAYSIA

NURUL FADZILAH BINTI HAMID

Pengenalan: Salah satu makanan penting yang dimakan oleh orang Asia ialah mi segera. Pada masa kini, pencemaran makanan oleh logam berat dalam makanan adalah satu masalah besar terutama apabila memberikan kesan kesihatan kepada pengguna. Mi segera mungkin tercemar dengan plumbum. Walau bagaimanapun, kandungan plumbum dalam mi segera masih dalam siasatan.**Objektif:** Kajian ini telah dijalankan untuk menentukan kepekatan plumbum dalam mi segera dan penilaian risiko kesihatan di kalangan pelajar Asasi Sains Pertanian dan pelajar sarjana muda di UPM. **Metodologi:** Satu kajian perbandingan keratan rentas dilakukan dalam kalanagn 200 orang pelajar (100 orang pelajar Asasi Sains Pertanian dan 100 pelajar sarjana muda) di UPM. Set soal selidik yang telah dipra-uji digunakan untuk mengumpul maklumat sosio-demografi, kekerapan pengambilan mi segera dan faktor yang mempengaruhi penggunaan mi segera. Tujuh jenis mi segera yang berbeza telah dipilih berdasarkan jenama yang paling disukai oleh responden. Persedian sampel telah dilakukan secara tiga salinan menggunakan kaedah *wet digestion*. Analisis kepekatan plumbum dalam sampel dilakukan menggunakan *Inductively Coupled Plasma Mass Spectrophotometer* (ICP-MS). PeruntukanPengambilan Mingguan yang Dibenarkan (PTWI) digunakan untuk menentukan jumlah plumbum dalam mi segera yang dibenarkan diambil oleh responden dalam seminggu tanpa menyebabkan risiko kesihatan. Kemudian, risiko kesihatan ditentukan dengan mengira Bahaya Hasil Bahagi (HQ) untuk responden. **Keputusan dan Perbincangan:** Majoriti responden makan mi segera kurang daripada tiga kali seminggu. Mudah untuk disediakan adalah faktor yang paling mempengaruhi pengambilan mi segera dalam kalangan semua responden. Faktor mudah untuk didapati dan tiada makanan adalah faktor yang menunjukkan perbezaan yang signifikan antara kedua-dua kumpulan responden. Status ekonomi tidak tidak menunjukkan perkaitan yang signifikan dengan frekuensi pengambilan mi segera kerana responden dari kalangan keluarga berpendapatan sederhana adalah mereka yang paling kurang mengambil mi segera. Kepekatan utama dalam mi segera adalah antara 0.0953 mg/kg hingga 0.0117 mg/kg manakala untuk perisa kepekatan utama ialah -<0.002 mg/kg hingga 0.00108 mg/kg Semua bacaan tersebut menunjukkan paras di bawah piawaian Peraturan Makanan Malaysia (1985) iaitu 2 mg / kg. PTWI responden juga tidak melebihi batas 0.025 mg / kg disebabkan oleh pengambilan mi segera yang rendah setiap minggu. Nilai kiraan HQ kurang daripada 1 menggambarkan kemungkinan tiada risiko kesihatan dengan pengambilan mi segera yang tercemar dengan plumbum dalam kajian ini.**Kesimpulan:** Tahap kepekatan plumbum yang rendah dikesan dalam semua tujuh sampel mi segera dan perasa dan tidak melebihi tahap yang dibenarkan. PTWI responden berada di bawah paras 0.025 mg / kg / minggu dan HQ <1 menunjukkan tidak ada kemungkinan akan mendapat risiko kesihatan bukan kanser.

Kata kunci: Mi segera, Plumbum, Peruntukan Pengambilan Mingguan yang Dibenarkan, Bahaya Hasil Bahagi, ICP-MS

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Pb	Lead
ADD	Average Daily Dose
ATSDR	Agency Toxic for Substance and Disease Registry
PTWI	Provisional Tolerable Weekly Intake
FAO	Food and Agriculture Organization
HRA	Health Risk Assessment
HQ	Hazard Quotient
RfD	Reference Dose
ICP-MS	Inductively Coupled Plasma Mass Spectrophotometer
JECFS	Joint FAO/WHO Expert Committee on Food Additives
USEPA	United States Environmental Protection Agency
mg/kg	Milligram per kilogram
ppm	Part per million
C	Concentration of lead
IR	Ingestion Rate
EF	Exposure Frequency
ED	Exposure Duration
BW	Body Weight
AT	Average Time
ADD	Average Daily Time

CHAPTER 1

INTRODUCTION

1.1 Background

People currently have greater concern about the safety of their diet due to rapid economic development with a rather dramatic change in dietary patterns and the globalization of the food market. Therefore, chemical safety in term of food contaminants is a big problem due to the fact many report show up on heavy metal in foods. The accumulation of heavy metal can have short term and long term health effect (Nnorom, Osibanjo and Ogugua ,2007). Heavy metals such as lead are released into the environment either from natural and anthropogenic sources. Because of that, food production or process will contaminate with heavy metal which start with harvesting the raw material and additionally its storage. However there would be some food that contain heavy metal but nevertheless in low investigation such as instant noodle. According to World Instant Noodles Association (2016), one of the most vital food that consumed by Asians is instant noodles which now integrated into diets of many different countries. From the statistic of Global Demand of Instant Noodles, 270 million servings of instant noodles are eaten every day. Instant noodles are eaten around the world 43.7 billion servings annually. It show that people enjoy instant noodle without thinking of side effect of

consuming instant noodles. No surprise that noodles can be regarded as the second staple after rice in Asian country.

According to World Instant Noodles Association (2016), Malaysia was ranked at the 13th place of instant noodles consumption. Consumption of instant noodles increases year by year. There are a few factors why people consume instant noodles such as they do not have to spend a lot of time to prepare it (Habib. Dardak and Zakaria, 2011). Previous research also stated that many people love to eat instant noodle because it is cheap. Therefore, there is a need to conduct a research to determine the concentration of heavy metals such as lead in instant noodle so that consumer aware about the risk of the instant noodle intake.

1.2 Problem statement

Number of instant noodles consumption increase year by year especially in students. According to Muslim Volunteer Malaysia Association (2016), 41% of undergraduate students in Malaysia consume instant noodles. That statistics ignite curiosity on why almost half of student consume instant noodles. Even most of them know the risk of eating instant noodles to health, they still consume instant noodle. Is it due to instant noodles intake give long term effect which they cannot see simultaneously, therefore, they not afraid to eat instant noodles?

Based on previous study by Jothi and Uddin (2003), there was lead contamination found in the instant noodle. Because of that, the greatest concern of heavy metal in instant noodle is raised. Furthermore, the sources of contamination of heavy metal in instant noodles not surely identified either from plantation of raw materials, manufacturing of instant noodles or during packaging.

Any bad substances that enter the body will give negative impact to the body. Therefore, accumulation of heavy metals such as lead can produce acute and chronic effect even in small quantity. People should know and aware the effect of prolong eating instant noodles because heavy metal are generally toxic and tend to bio-accumulate in the body (Jaishankar et al., 2014). Based on increasing number of instant noodles consumption, it assumed that there is less awareness among people about the bad impact of eating instant noodles which contain heavy metals. Therefore, this study was conducted to determine the lead concentration in instant noodles and to assess health risk.

1.3 Research justification

It is important to conduct the continuously health risk assessment in food so that all food product are safe to eat. According to Paracelsus (1493-1541) is referred to as the 'Father of Toxicity'; everything is poison, and no thing is without poison. Therefore, this study was conducted in order to determine the lead concentration in instant noodles and health risk assessment among students in UPM and the frequency

intake of instant noodles between two groups of students namely; Foundation of Agricultural Science and undergraduate students. Many factors that related to the instant noodles intake are considered. Since only a few research regarding heavy metal in instant noodles and health risk assessment had been done, it necessary to carry out this study especially it involved students in Malaysia. Other than that, this study will help researchers to identify the safe level of instant noodles consumption.

This study is very essential because according to Codex Committee for Food Additive and Contaminants (2007), dietary intake of lead needs to be assessed in a regular basis together with the public concern (Lee et al.,2005). Daily intake of lead and cadmium in children and adult exceeded the safe limits (Huang et al.,2013). Hence, heavy metals concentration in instant noodles is necessary to be detected (Jothi and Uddin, 2003).

According to WHO (2016), lead is toxic metal which is cumulative toxicant that give multiple affect to body function. Lead toxicity show effectively more to children even in small amount and when they become adult, the accumulation of lead still stored in the body. Thus, they will pose chronic or long term effect. Others, some of them showed no symptoms because their immune system can adapt to the behaviour and surrounding even though they have consume frequently instant noodles. Therefore, heavy metals that expose to human through ingestion should be identified together with human health risk.

1.4 Research Question

This study is aimed to answer the following question:

i. What is the socio-demographic information between two groups of respondents?

ii. What is the instant noodles frequency intake between two groups of respondents?

iii. What are the influencing factors of instant noodles consumption between two groups of respondents?

iv. What is lead concentration in instant noodles and in the seasoning?

v. What is the association of socioeconomic status and frequency intake of instant noodles between two groups of respondents?

vi. What is the Provisional Tolerable Intake (PTWI) of lead between two groups of respondents?

vii. What is the health risk indicated by Hazard Quotient (HQ) between two groups of respondents?

1.5 Research Objective

General objective:

To determine the lead concentration in instant noodles and health risk assessment among foundation of Agricultural Science and undergraduate students of Universiti Putra Malaysia.

Specific objectives

i. To compare the socio-demographic information between the two groups of respondents.

ii. To compare the instant noodles frequency intake between the two groups of respondents.

iii. To compare the influencing factor of instant noodles consumption between the two groups of respondents.

iv. To compare the lead concentration in instant noodles and in the seasoning.

v. To determine the association of socioeconomic status and frequency intake of instant noodles among the respondents.

vi. To compare Provisional Tolerable Weekly Intake (PTWI) of lead of respondents between the two group.

vii. To compare the health risk indicated by Hazard Quotient (HQ) between the two groups of respondents.

1.6 Research Hypothesis

i. There is a significant difference of socio-demographic information between the two group of respondents.

ii. There is a significant difference of instant noodles frequency intake between the two group of respondents

iii. There is a significant difference in term of influencing factors of instant noodles consumption among the two group of respondents.

iv. There is a significant difference of lead concentration in instant noodles and in the seasoning.

v. There is a significant association between socioeconomic status and frequency intake of instant noodles among respondents.

vi. There is a significant difference of Provisional Tolerable Weekly Intake (PTWI) of lead between the two group of respondents.

vii. There is a significant difference of Hazard Quotient (HQ) between the two groups of respondents.

1.7 Definition of Terms

1.7.1 Conceptual Definition

Lead: Lead is a bright silvery metal and slightly bluish in a dry atmosphere (WHO,2010).

Instant noodles: Instant noodles are product that made of wheat flour, rice flour or other flour and starch as the main ingredient, with or without addition of other ingredients. The instant noodles can be packed with seasonings (World Instant Noodles Association, 2016).

Seasoning: Seasoning is the flavouring that usually in a separate packet, although in the case of cup noodles the flavouring is often loose in the cup. This seasoning are made up from variety of ingredients and the main ingredients will be the taste to the instant noodle.

Health Risk Assessment: Health risk assessment is a process of estimating the nature and probability of health effects in human who may exposed to chemicals that have been contaminated, now or future (USEPA, 2015).

Students : According to Cambridge Dictionary (2017), student is a person who is learning at college or university.

Provisional Tolerable Weekly Intake (PTWI) : Maximum amount of contaminant the person can be exposed per week over a lifetime without an unacceptable risk of health (Bhupander and Mukherjee, 2011).

1.7.2 Operational Definition

Lead: The lead concentration in instant noodle is measured by using ICP-MS. The unit of lead concentration is ppb.

Instant noodles: Instant noodles were chosen from seven preferred instant noodles brands and were analyzed separately with seasoning to identify the amount of lead.

Seasoning: Seasoning is analyzed separately with instant noodles to identify the amount of lead.

Health Risk Assessment: Health risk assessment for this study is non-carcinogenic risk which is determined by Hazard Quotient.

Students: The students from Thirteenth and Fourteenth College, Universiti Putra Malaysia are the respondents in this study.

Provisional Tolerable Weekly Intake (PTWI): Maximum amount of lead that the students can be exposed per week over a lifetime without an unacceptable risk of health. The PTWI was calculate based on the amount of lead in instant noodles and frequency intake of instant noodles.

1.8 Variables

The independent and dependent variables in this study are:

1.8.1: Independent variables: Lead concentration in instant noodles.

1.8.2: Dependent Variables: Health risk assessment among students.

1.9 Conceptual Framework

The possible contamination sources of lead in instant noodles can be schematically represented as in Figure 1.1. There are several of heavy metal such as lead, arsenic, cadmium and mercury that can be exposed to human by occupational and environmental exposure. Lead contamination can be found in water and wheat flour. Students that constantly consumed instant noodles are at high risk to acute and chronic effect of lead contamination.

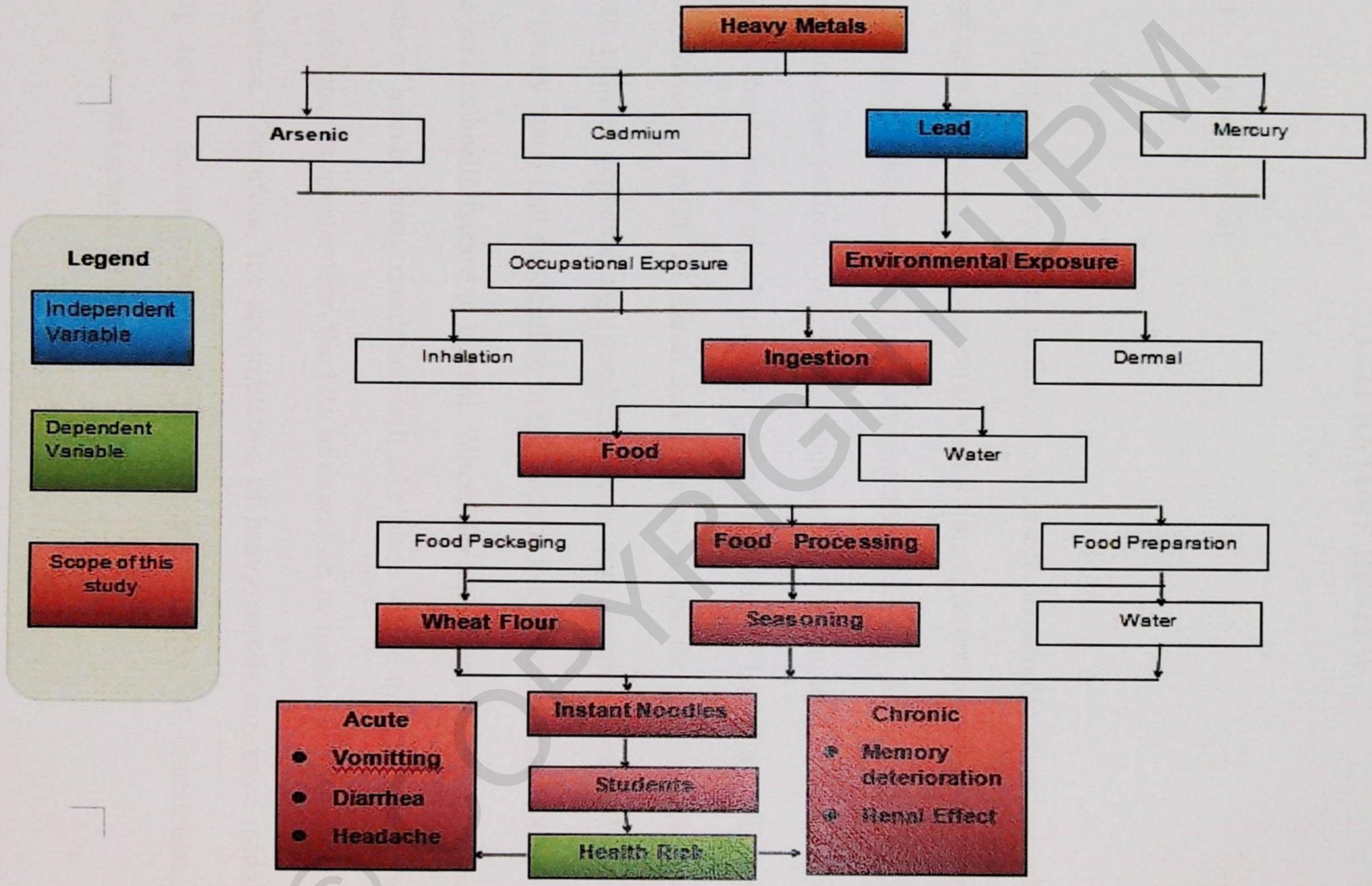

Figure 1.1: Conceptual Framework

CHAPTER 2

LITERATURE REVIEW

2.1 Heavy Metal

The term heavy metal indicate to element of metallic chemical which contain high density compared to water (at least 5 times greater than that of water). Therefore, it is toxic or poisonous at low concentration , Heavy Metals (2017). Since heavy metal increase in toxicity; arsenic, cadmium, chromium, lead and mercury are ranked among the priority metals that give impact to human health and also environment, Tchounwou et al.(2012) stated that there are a few factor of toxicity including the dose, route of exposure, age, gender, genetics and nutritional status. Determination of the heavy metal that accumulate in the body is very essential to life since it will pose the serious health hazard to human. When, the toxic chemical was accumulate in the tissue of human, bioaccumulation will take place within the body if the rate of intake of substance is greater than the rate of excretion or metabolic transformation of that substance. Therefore, the accumulation of heavy metals can have middle-term and long term health risks, strict periodic surveillance of contaminant (Nnorom, Osibanjo and Ogugua ,2007).

2.2 Lead

Lead is a naturally occuring bluish-gray metal in the environment and it result due to human activities. Lead is a cumulative toxicant that can cause multiple body system problems (WHO,2017). Heavy metals which is generally toxic are released into the environment from both natural and anthropogenic sources and may enter soils and groundwater. There are a few sources of lead in the environment such as fertilizers and pesticides, soil wastes, metal plating and finishing operations, and also factory chimney (Jaishankar et.al., 2015). These environmental pollution is the main cause of heavy metal contamination in food chain (Anderson et al.,1992) and technological process which used to bring the food to the consumer (Cabrera et. al., 2003). Lead is highly toxic metal which potentially harmful metals that have aroused considerable concern (Cabrera et. al., 2003). Lead is non-biodegradable and have long biological half-lives and tend to accumulate over time. Several recent studies have reported the presence of heavy metals such as lead, cadmium, mercury and arsenic in instant noodles (Akhigbemidu, 2015); (Krejcova, 2006). Therefore ,food is an important source of heavy metal contamination in the general population.

2.3 Lead Route of Exposure

Lead exposure is a global issue which is a major concern because people can become exposed to lead through occupational and environmental sources.. Lead which is toxicant that can enter to human body through inhalation, ingestion, absorption and injection. The most common route of lead exposure is ingestion, except in industrial environments, inhalation of lead fumes may play a larger role Health Canada. (2013, February 4). *Lead.* From 20% to 70% of ingested lead is absorbed into the body includes swallowing a foreign body containing lead, Agency for Toxic Substances and Disease Registry (2017 April 19). Meanwhile, the absorption of lead through the skin and injection of lead to bloodstream are rare.

2.4 Health Effect Related to Lead Exposure

According to Paracelsus the father of toxicity, poison is in everything, and no thing is without poison. But it is known that, when increase the lead exposure, increase the severity of effect and symptoms. The dosage makes it either a poison or a remedy. Lead that enter into the body will give acute or chronic health impact to human depending the dose of intake because lead has major health implications even expose to a lower concentration of lead. According to United States Environmental Protection Agency; USEPA (2017) acute exposure is exposure by the oral, dermal, or inhalation route for 24 hours or less while chronic exposure is repeated exposure by

the oral, dermal, or inhalation route for more than approximately 10% of the life span in humans (more than approximately 90 days to 2 years in typically used laboratory animal species).

According to WHO 2017, there is no known safe blood lead concentration. The exposure of lead that enter into the body will interfere the normal cell function and physiological process (Anjali, 2000). A few research have been done about the serious effect of lead exposure to health. Most of them stated that the high and prolonged exposure will effect the nervous system, WHO (2017); (Wang and Du, 2013) ; (Anjali, 2000). This is because nervous system seems to be the most sensitive to lead poisoning. The concentration of lead that enter into the body will cause acute effect to health such as anxiety, tiredness, headache, muscle and joint pain, numbness and dizziness, (Jarup, 2003) and Workplace Safety News (2011, September 16) , *Short-and Long-Term Effect of Lead Exposure*. However, lead effects children and adults in different ways which is children are particularly vulnerable to the toxic effects of lead particularly affecting the development of brain and nervous system while it cause long term harm effect to adults including kidney damage. (WHO, 2017) . Therefore, lead exposure is preventable in order to reduce its risk to health.

2.5 Trace Metal Contamination in Food

According to Food Safety and Standards Authority of India (2015), the term "Trace Metals" refers to metals which may be present in foods in amounts well below 50 mg/kg and which have some toxicological or nutritional significance. Lead, Cadmium, Mercury and Arsenic actually can be found naturally occurring in soil and can leach into water, *Heavy Metal Environmental Contaminants In Food* (2014, June 4). Therefore, heavy metals are continuously used in next process or production. Due to the increased of technology in processed food industry, the issue of heavy metal in food is a major concern since it contribute harm effect to human health. According to European Food Safety Authority , EFSA 2017, heavy metal that presence in the environment can also be present as residues in food as a result of human activities. Referring to (Nnorom, Osibanjo and Ogugua, 2007), it stated that heavy metal in food can occur due to technological processes which significantly increase the total trace metal contents of the food as most food production today are produced by machine. Since there are a lot of sources of trace metals contamination in food, it is very essential to determine the level of metal contents in food for food safety and nutritional consideration.

2.6 Method of Metal Analysis in Foods

There is a need to analyse heavy metal in the food because heavy metal toxicity has proven to be a major threat as some metals get accumulated in the body and food chain (Jaishankar et.al., 2015). According to Food Safety and Standards Authority of India (2015), there are four major steps involved in the analysis of foods for the metal contents; (a) obtaining a representative sample from bulk received for testing, (b) destruction of organic matter, (c) separation and concentration of the element of interest and (d) determination.

Different type of food have different type of method to detect the heavy metal that content in the food. For fresh food samples, the homogenization process is like macerating in a blender whereas dry products are normally ground mechanically and then mixed and the powder is sieved before analysis. Contamination during this step can be avoided by using stainless steel equipment. After the sample is properly homogenized and reduced to usable form, it should be stored in an air tight container. The edible portion of the sample food has to be taken for preparation of sample for analysis.

There are three method of digestion method to analyse trace elements which are dry ashing, wet ashing and microwave digestion procedures. Dry ashing digestion procedures use high temperature of furnace to remove organic matrix in sample, then

the residue is dissolves with appropriate solvent. For wet digestion procedures it can be carried out by adding strong oxidizing acids into sample and heating so that the organic materials in sample can be decomposed. This procedures are easy to operate and can digest relatively large number of samples, but it consumes a lot of acid which may introduce to environmental pollution. Third method is microwave digestion procedure which will enhances chemistry for sample preparation and allows for shorter reaction times. This process are also very well suited for standardization and automation during method development (Yang et. al, 2013). Each digestion method have pros and cons depending on type of samples but for certain samples suit with wet ashing digestion since less loss and contamination.

2.7 Lead in Instant Noodles and Seasoning

According to World Instant Noodles Association (2017), instant noodles that were born in Japan, now integrated into the diets of many different countries. Ten countries out of 15 are from Asia, where nearly 80 % of instant noodles are consumed and eaten every day. Regardless of the area, age and gender, instant noodle are loved as " global food". Therefore, it is no wonder instant noodles is a food item that has always been under a lot of speculation.

Food Safety and Standards Authority of India (2015) had stated that there is a presence of lead that excess the maximum permissible level in 10 out of 13 samples

of instant noodle tested. Instant noodles are precooked and usually dried noodle block together with its seasoning. Noodles based on wheat are prepared mainly from three basic ingredients; flour, water and salt. These three basic ingredients are highly possible to obtain secondary contamination since environmental pollution is a main factor of heavy metal contamination in food chain. According to Onyema et al. (2014), harmful elements like arsenic, cadmium and lead can be found in instant noodles. Based on Jothi and Uddin (2014), they found that the amount of lead was higher in one of instant noodles sample after comparing the result of heavy metals with standards. The possible sources of lead are from the ingredients that have been used in noodles which is wheat flour. According to Maleki and Zarasvand (2008), they stated that the conventional agriculture was contaminated by lead. The other possible sources of lead are irrigation with contaminated water, use of fertilizer, metal based pesticides and also method of harvesting and stirage. For example the process of making instant noodles from wheat flour involved the use of high technology which is source of heavy metal contamination of the product (Gulfrazi. et. al., 2003).

In recent years the scientific community has evidenced a particular interest in the determination of trace and heavy metals in all food components including salt and spices. The category of spices and herbs covers a number of different products that used in seasoning, (Gonzalves , 2007). Other than that, the making of instant noodles and its seasoning will contaminated by lead due to the technological process by the machine (Nnorom, Osibanjo and Ogugua, 2007).

2.8 Process of Making of Instant Noodles

There are three basic ingredients in process of making instant noodles; flour, water and salt (Fu, 2007). Besides, there are also added other ingredients in the instant noodles to improve the texture and flavor of noodles. Instant noodles are classified into two types of methods used for the removal the moisture which are instant dried noodles and instant fried noodles. Next, there also have two type of packaging of instant noodles based on commercially packaged, i.e, packet type and cup type instant noodles. Packet type instant noodles are available with seasonings packed within and usually cooked in constantly boiling water for about three-four minutes before serving while cup noodles are instant noodles in a waterproof polystyrene cup with the seasoning sprinkled over the noodles and are ready to serve after pouring hot water into the bowl and resting for two-three minutes. The basic processing of for packet and cup instant noodles is similar. The difference between these two type of instant noodles are, the noodle strands of cup noodles are usually thinner to facilitate the rehydration rate, starch is usually included in the formulation, and they are fried for a longer time as compared with packet type counterparts, (Gulia et al.,2014). Manufacturing of instant noodles also involve sheeting and cutting of dough which resulted in lower water addition.

Recently, instant noodles are fortified either by the fortification of flour used to make noodles or by fortifying the seasoning consumed along with the noodles.

Micronutrients also can be added after considering their stability during processing and recommended daily values. However, fortification is not mandated by government regulations. It is relatively simple to add fortification but ensuring the stability of nutrients in seasoning mixture throughout the shelf life of instant noodles is a major concern (Gulia et al., 2014). Along the process of making instant noodles, there is no adding of heavy metal into the ingredient of noodles or seasoning, but heavy metal such as lead available in instant noodle due to contamination during production of raw materials such as wheat and also due to machine that used to process instant noodles.

2.9 Dietary Pattern of Malaysian Students

According to Office of Disease Prevention and Health Promotion, ODPHP (2010), dietary pattern is quantities, proportions, variety or combination of different kind of food, drinks, nutrients in diet including the frequency with which they are habitually consumed. University students tend to have poor eating practices and this is related to nutritional status (Hakim, Muniandy and Danish, 2012). This might become worse when students living away from home tend to develop poor eating habit compared to students who live at the family home (Angeliki et al.,2007). The selection of unhealthy food, high cost of healthy foods and the ease of availability of fast food may have a negative impact on university student's eating behaviour (Gan et al., 2011). That is why, according to Muslim Volunteer Malaysia Association

(2016), 41% of undergraduate students in Malaysia consume instant noodles since instant noodles as a staple food source is rising in many Asian countries Dietary pattern is very important because nowadays many diseases are reflected to food.

It's no secret many of Asians love eating instant noodles. According to World Instant Noodles Association, 80% of instant noodles are consumed by Asians. The consumption of instant noodles of more than 2 times in a week is associated with a higher prevalence of metabolic syndrome. Metabolic syndrome also association with heavy metal such lead, cadmium and arsenic.

2.10 Permitted Level and Provisional Tolerable Weekly Intake (PTWI) of Lead

Based on Malaysian Food Regulation 1985, the permitted level for the lead concentration in food is 2 mg/kg in order to ensure food safety and quality (Malaysian Food Act 1983). The Provisional Tolerable Weekly Intake (PTWI) is used to determine maximum amount of contaminant the person can be exposed per week over a lifetime without unacceptable risk of health (Bhupander and Mukherjee, 2011). PTWI was used instead of Acceptable Daily Intake (ADI) because PTWI is established and used for substances with extremely long elimination half-life. The PTWI of heavy metal are set by the Food and Agriculture Organization/ World Health Organization (FAO/WHO) Joint Expert Committee on Food Additive (JECFA). The PTW of lead is 0.025 mg/kg body weight for adult (WHO,2011).

2.11 Health Risk Assessment

Risk assessment is the characterization of the probability of potentially adverse effects from human exposures to environmental hazards. (National Academy of Sciences). According to USEPA (2015), there are four steps in health risk assessment which are; (a) Hazard Identification, (b) Dose Response Assessment, (c) Exposure Assessment and (d) Risk Characterization.

2.11.1 Hazard Identification

According to the National Academy of Sciences, hazard identification is the characterization of innate adverse toxic effects of agents. Identification of type of hazards, hazard sources, and mode of transmission are very necessary as part of identification of lead in instant noodles.

2.11.2 Dose-Response Assessment

According to the National Academy of Sciences, dose-response assessment is the characterization of the relation between doses and incidences of adverse effects

in exposed populations. As dose increase the effect also increase. The higher consumption of instant noodles, the higher the risk of lead contamination.

2.11.3 Exposure Assessment

According to the National Academy of Sciences, exposure assessment is measurement or estimation of the intensity, frequency, and duration of human exposures to agents. For example, assess the contaminant source in instant noodles by using questionnaire.

2.11.4 Risk Characterization

According to the National Academy of Sciences, the risk characterization is the estimation of the incidence of health effects under the various conditions of exposure in order to developed a numerical risk estimate for the hazard assess, present assumptions, uncertainties, and scientific judgement pertaining to the hazard assessed and define significance of estimated risk.

CHAPTER 3

METHODOLOGY

3.1 Study Design

A cross sectional comparative study was conducted to determine the lead concentration in instant noodles and health risk assessment among university students in UPM.

3.2 Study Location

The study was conducted at Thirteenth and Fourteenth Residential College of Universiti Putra Malaysia. Figure 3.1 shows the location of study. This study was conducted on October 2017 until May 2017

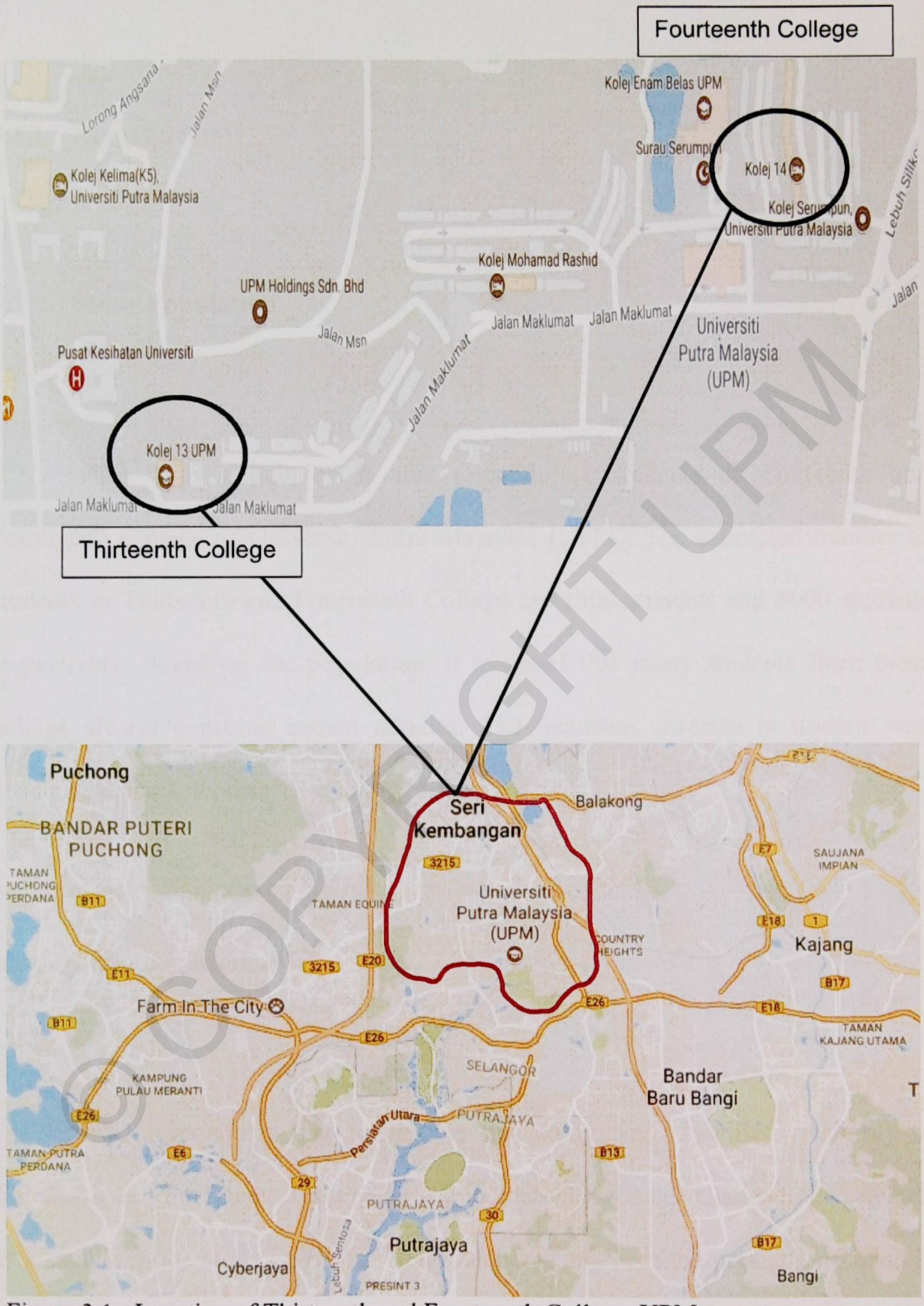

Figure 3.1 : Location of Thirteenth and Fourteenth College, UPM

Source: googlemap.com, 2017

3.3 Study Sample

3.3.1 Respondents

a) Study Population

The study population in this research are students of Thirteenth and Fourteenth College of Universiti Putra Malaysia (UPM). The estimated number of students in Thirteenth and Fourteenth College are 1500 students and 5000 students respectively. Based on the population, it assumed that many students from these college always consume instant noodles. The inclusion criterion is student who consumes instant noodles.

b) Sampling Method

The respondents that involve in this study were stratified randomly at Thirteenth and Fourteenth College. Every individual has a fair chance to be selected as a sample in the study based on the same characteristic of the population which is the students who consume instant noodles. The inclusion criteria in this study require respondents who are consuming instant noodles and they are residents of Thirteen

College (K13) and Fourteenth College (K14). The exclusion criteria for this study when the respondents was moving out or quit from UPM.

c) Sample Size

The sample size calculation is based on Lemeshow et.al., (1990) formula for group comparison using combined (or pooled) standard deviation for the two groups as follows:

Equation 3.1

$$s = \frac{2\,X\,2\,\delta^2(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})}{(\mu 1 - \mu 2)^2}$$

Where,

$2\delta^2$ = Estimated standard deviation (assumed to be equal to each group)

$\mu 1$ = Estimated mean (larger)

$\mu 2$ = Estimated mean (smaller)

$Z_{1-\frac{\alpha}{2}}$ = Standard error associated with confident interval, 95% CI=1.96

$Z_{1-\beta}$ = Standard error associated with power, 80% of power = 0.84

Prevalence of reported heavy metals toxicity among group:

$$s = \frac{4(268)^2(1.96 + 0.84)}{(280 - 180)^2}$$

$$= 80.44 \approx 80 \text{ Respondents}$$

Based on formula, 80 respondents were needed for both groups of students. The numbers of students were increased by 20% for the strength of the analysis of the study and to take into account on non-responsive respondents, missing data and errors. Therefore the minimum number of samples that were included in this study were 96 respondents for each group.

3.3.2 Instant Noodle Sample

a) Sampling Method

There were seven preferred brands of instant noodles by students that were purposively sampled. All the selected instant noodles were bought at the shop in the Thirteenth and Fourteenth College according to same batch production. Each type of instant noodles was analysed in triplicate by separating the noodles and its seasoning powder. Inductively Coupled Mass Spectrophotometer (ICP-MS) was used to analyse the sample in order to determine the lead concentration in noodles and seasoning powder.

3.3.3 Sampling Frame

The total number of students in Thirteenth and Fourteenth College was obtained from the registration record.

3.3.4 Sampling Unit

The sampling unit was a students in Thirteenth and Fourteenth College, Universiti Putra Malaysia. From the estimation of 6500 students for both colleges, 200 of students were chosen to be the respondents in this study.

3.4 Data Collection and Instrumentation

The data obtained are as below:

3.4.1 Socio-Demographic Information, Food Frequency Intake and Influencing Factor of Instant Noodles Consumption

A set of questionnaire (Appendix 2) was designed to obtain the information of socio-demographic, the frequency of instant noodles intake and influencing factors of instant noodles consumption which are health status and lifestyle information. The applicable of this questionnaire only for students of foundation programme and undergraduate students who are currently consumed instant noodles. The self administered questionnaire was modified from National Health & Nutritional Examination Survey and Methodological Evaluation of Method for Dietary Heavy Metal Intake and was divided into four main parts.

Part A of the questionnaire is socio-demographic information of the respondents which include gender, age, educational level, family income level, living expenses for food and race. Part B of the questionnaire consist of the information about instant noodle dietary intake. The respondents should include their preferred brand of instant noodles that they always consume within a week. According to Rahul and Rajeshri (2000), the frequency intake of instant noodles is categorized into less frequent (≤ 3 times per week) and frequent (> 3 times per week). The questionnaire also include a few question on how they prepare the instant noodles and the factor of purchasing instant noodles.

Part C of the questionnaire , the respondents need to answer the question of current health status and recall the past medical history while in Part D, the questions were lifestyle information of respondents which include smoking behaviour and the subtance that they exposed during daily activity. Part B and Part C are important to analyze the health risk of instant noodle consumption.

3.4.2 Lead in Instant Noodle and Seasoning

Wet digestion methodwere used to extract the instant noodles because of less loss and contamination of lead during analysis. Wet digestion was preferred in this method of analysis just like what consumers prepared instant noodles because most of them will eat instant noodles by adding the water. The noodles were analyzed separately with the seasoning in order to determine the concentration of lead. Firstly, the samples of instant noodles were soaked with 500mL of hot water for three to five minutes. Then the water was removed. After that, one gram of the samples were weighted on analytical balance and placed in the crucible. After that, the samples were put in the beakers and the diluted nitric acid was prepared. 25mL diluted nitric acid were added in the beaker and the beaker were put on the hot plate for 2 hours with 50^0C. The samples were stir evenly by using magnetic stirrer .Then, the samples were filtered by using 0.45um Whatmann filter paper and transferred into the 15mL of centrifuge tube. Then the samples were analyzed by ICP-MS to determine the lead concentration. Ten millimeter of standard solution were prepared and diluted to

10 ppb, 20ppb, 50 ppb, 100ppb and 300 ppb. Lastly, the standard solution and a blank were analyzed with ICP-MS to obtain the standard curve value.

For seasoning, 500mL of hot water were added and wait for three to five minutes. Then, the samples were filtered by using 0.45um Whatmann filter paper and transferred into the 15mL of centrifuge tube. After analysed using the ICP-MS, the concentrations of the lead in instant noodles were obtained. Then, the concentration were calculated using the formula below:

$$\text{Lead concentration in instant noodle, mg/kg} = \frac{[(A \times B)] \times C}{W} \qquad \text{equation 3.2}$$

Where,A= volume of extraction (digested sample) (g)

B= dilution factor (volume of diluted sample/volume of extract)

C= heavy metal concentration in instant noodle

W= Weigh of sample (g)

3.4.3 Provisional Tolerable Weekly Intake (PTWI) of the Respondents

PTWI is the maximum amount of a contaminant to which a person can be exposed per week over a lifetime without an unacceptable risk of health effects:

$$\text{Provisional Tolerable Weekly Intake (mg/kg bw)} = \frac{\text{Amount of instant noodle ingested per week(kg/weeek)} \times \text{lead concentration in instant noodles (mg/kg)}}{\text{Body wieght (kg)}} \quad \text{equation 3.3}$$

PTWI were set by Food and Agriculture Organization / World Health Organization (FAO/WHO) Joint Expert Committee on Food Additives (JECFA).

3.4.4 Health Risk Assessment

The health effect of the lead contamination was determined by using a health risk assessment. The non carcinogenic risk is identified. Non cancer risk is identified by comparing the exposure to the reference level via a ratio that known Hazard Quotient (HQ). If the value of hazard quotient is less than 1, it indicates the exposure is not likely to be associated with adverse health effects. While if the hazard quotient

value is more than 1, it indicates that the exposure is likely associated adverse effects (USEPA, 2015).

Below is calculation of average daily dose (ingestion) that will compared to identify risk acceptability for non-carcinogenic risk.

$$\text{Average Daily Dose (Ingestion)} = \frac{C \times IR \times EF \times ED,}{BW \times AT} \text{ mg/kg-} \qquad \text{equation 3.4}$$

(USEPA,1992)

Where,

ADD= Average daily dose of pollutant through ingestion of food (mg/kg.day)

C= Pollutant concentration in a food item (mg/kg)

IR= Food item ingestion rate

EF= Exposure frequency

ED= Exposure duration

BW= Body weight

AT= Average time (days)

$$\text{Hazard Quotient} = \frac{\text{ADD}}{\text{Oral RfD}}, \text{ mg/kg/day/day} \qquad \text{equation 3.5}$$

(USEPA,1992)

Where,

HQ= Hazard quotient

ADD= Average daily dose (mg/kg-day)

RfD= Reference dose (mg/kg-day)

The reference dose of the lead is $4\times10\text{-}^{3}$ mg/kg-day.

3.5 Data Analysis

Statistical analysis as shown in table 3.1 below were performed by using SPSS Statistical version 25.

No	Objectives	Variables	Type of Data	Hypothesis	Statistical Analysis
1	To compare the socio -demographic information between two group of respondents	Age, gender, races,	Continuous/ Numerical	There is significant difference of socio-demographic information between two group of respondents	Chi-square t-test Mann-Whitney U
2	To compare the instant noodles frequency intake between two group of respondents	Frequency intake of instant noodles	Categorical	There is significant difference of instant noodles frequency intake between two group of respondents	Chi-square
3	To compare the influencing factor of instant noodles consumption among two group of respondents	influencing factor of instant noodles consumption	Categorical	There is significant difference of instant noodles consumption among two group of respondents	Chi-square
4	To determine the lead concentration in instant noodles and its seasoning.	lead concentration in instant noodles lead concentration in seasoning	Continuous	There is significant difference of lead concentration in instant noodles and its seasoning.	t-test Mann-Whitney U

5	To determine the association of socioeconomic status and frequency intake of instant noodles	Socioeconomic status frequency intake of instant noodles	Categorical	There is significant difference between socioeconomic status and frequency intake of instant noodles	Chi-square
6	To compare Provisional Tolerable Intake (PTWI) of lead of respondents with Food and Agriculture Organization/ World Health Organization (FAO/WHO) Join Expert Committee on Food Additive (JECFA) standard.	Provisional Tolerable Intake (PTWI) of lead	Categorical	There is significant difference (PTWI) of lead of respondents with Food and Agriculture Organization/ World Health Organization (FAO/WHO) Join Expert Committee on Food Additive (JECFA) standard.	Chi-square
7	To assess the health risk by Hazard Quotient (HQ) among two group of respondents	Hazard Quotient (HQ)	Categorical	There is significant difference of health risk by Hazard Quotient (HQ) among two group of respondents	Chi-square

Table 3.1 : Statistical Analysis

3.6 Quality Control

i. Questionnaires

The pre-test was carried out among 10% from the total number of respondents with same characteristics but not from the same population. It was performed before the questionnaire is given to the respondents. This to ensure the realibility and validity of questionnaires. It will be conducted among Seventeen College students prior to the data collection to ensure appropriateness of the questions. Based on the pre-test, some minor corrections were made regarding the questionnaire.

ii. Standard Operating Procedures

Analysis of ICP-MS by following the Standard Operating Procedure (SOP) to prevent any analytic error while analysing the concentration of lead in instant noodle. All of the preparation and procedure was conducted according to the guidance book for ICP-MS that was provided by the manufacturer. All glassware used were soaked overnight in solution of 20% nitric acid and rinsed with deionized water before used to remove organic material from glassware.

3.7 Ethical Consideration

Approval from (JKEUPM) was obtain prior to data collection (Appendix 1).The information about the respondents was confidential. Written consent (Appendix 2) was obtained from the respondents prior to the data collection.

CHAPTER 4

RESULT

4.1 Socio-demographic of the respondents.

This study was conducted to determine the lead concentration in instant noodles and health risk assessment among students in UPM. The sample size was 200 respondents of UPM students that were categorized into two groups with different education level which are foundation students (Group 1) and undergraduate students (Group 2). These two groups of respondents that fulfilled inclusion criteria were approached. The questionnaires were randomly distributed to respondents.

Table 4.1 showed the socio-demographic information including gender, age, races, family income, and expenses for food per month. The age of respondents that involved in this study were 18 to 27 years old. The respondents of group 1 consists of males (n=22) and females (n=78) that involve Malay (n=90), Chinese (n=4) and Indian (n=6) while the respondents of group 2 consist of males (n=24) and females (n=76) that involve Malay (n=91), Chinese (n=2) and Indian (n=7). Both group were dominated by Malay girls. There is significant difference between two groups in family income (p= <0.001). More than half of the respondents from middle economic status which are group 1 (n=58) and group 2 (n=80). Therefore, their expenses for food per month about RM50 to RM300 ; group 1 (n=60) and group 2 (n=54).

Table 4.1: Socio-demographic information of the respondents (N=200)

Variables	Group 1 (n=100)	Group 2 (n=100)	Statistical analysis	*p*-value
Gender				
Male	22	24	X^2=0.113	0.737
Female	78	76		
Age (years old)	19	22	Z=-12.515	*<0.0001
Races				
Malay	90	91		
Chinese	4	2	X^2=0.749	0.688
Indian	6	7		
Family Income#				
Middle (<RM5000)*	58	80	X^2=11.314	*0.001
High (>RM5000)*	42	20		
Expenses for food per month				
RM50 to RM 300	60	54		
RM301 to RM600	26	30	X^2=29.85	0.321
>RM600	14	16		

#Based on Central Bank of Malaysia Report 2013

#Significant at *p*=<0.05

4.2 Frequency of instant noodles consumption

Frequency intake of seven type of instant noodles by two groups of respondents were shown in Table 4.2 and Figure 4.1. The frequency intake of instant noodles was classified into less frequent for those who consuming instant noodles once or twice per week and frequent for those who consuming instant noodles more than three times per week as stated in the previous study of fast food consumption status which was conducted by Jahanbaksh & Mousanezhad (2015).

Based on the result, there is no significant difference of frequency intake of instant noodles per week among two groups because majority of the respondents consumed instant noodles less than three times in a week; group 1 (n=93) and group 2 (n=96) and only a few respondents who were frequently eating instant noodles in a week; group 1 (n=7) and group 2 (n=4). It clearly shown in figure 4.1 most of the respondents consumed instant noodles once a week; group 1 (n=52) and group 2 (n=49)

Table 4.2: Frequency of instant noodles consumption in a week. (N=200)

	Group 1 Frequency, (n=100)	Group 2 Frequency, (n=100)	Statistical analysis	*p* value
Freq in a week (Med/IQR)	1/1	2/1	Z= -2.934	*p*=0.03*
Less freq (< 3)	93	96	x^2=0.866	*p*=0.352
Freq (≥ 3)	7	4		

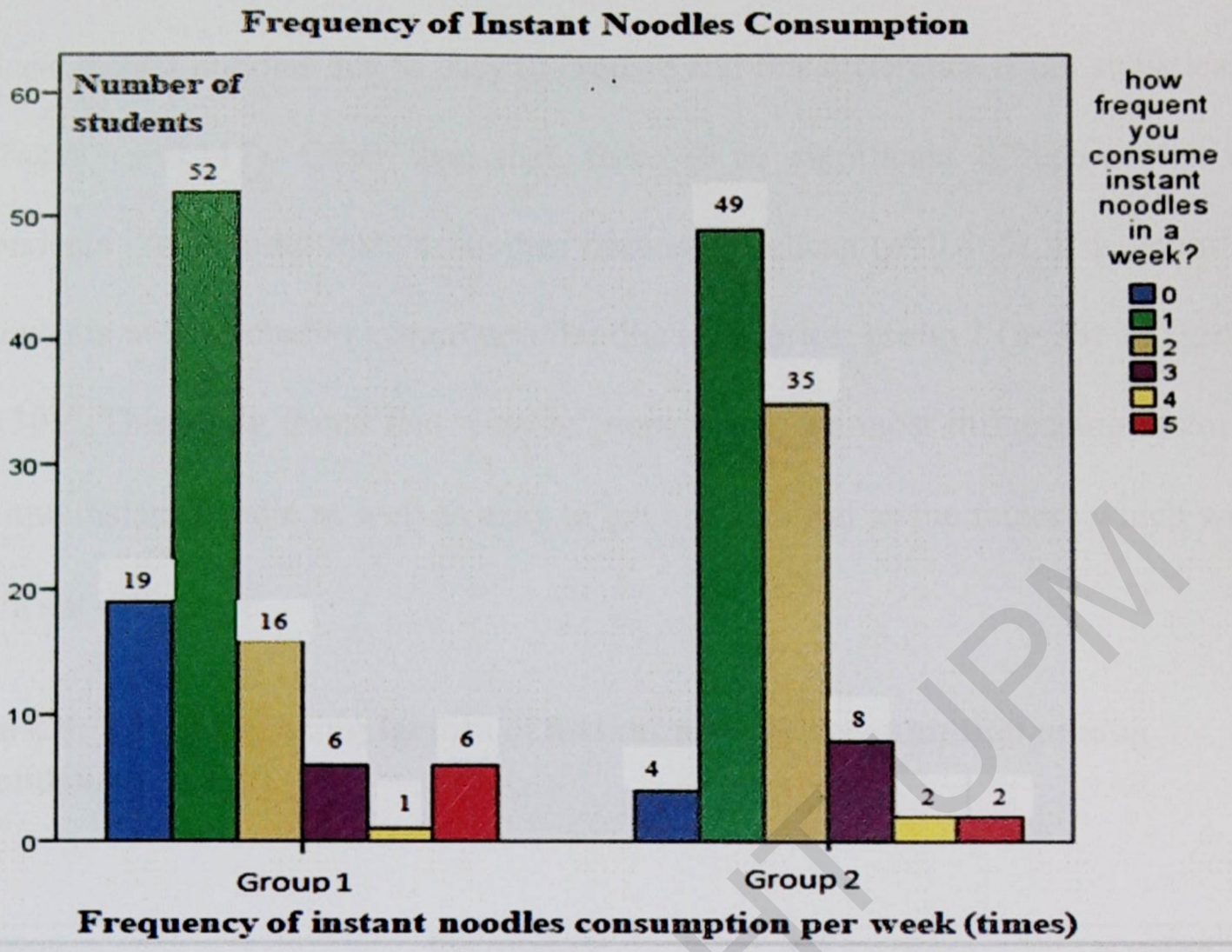

Figure 4.1: Frequency of instant noodles consumption

4.3 The influencing factors of instant noodles consumption

There are few factors such as easy to get, easy to prepare, cheap and no food which contribute to instant noodles consumption. Table 4.3 shown the influencing factors of instant noodles consumption by the respondents. There is significant difference of easy to get (p=0.01) and no food (p=0.028) as the influencing factors for respondents to consume instant noodles. More respondents in group 2 (n=48) compared to group 1 (n=21) will purchase instant noodles due to easy to get and oppositely for no food factor which dominated by respondents in group 1 (n=45) than group 2 (n=30). However, majority of the respondents which is more than 50

respondents in both groups; group 1 (n=62) and group 2 (n=51) agreed that they will purchase instant noodles due to easy to prepare and this difference is not statistically significant (p=0.117). Other than that, there is no significant difference for the respondents consuming instant noodles because of cheap (p=0.885). It is about 40 respondents will purchased instant noodles due to its price; group 1 (n=38) and group 2 (n=30). This study found that, easy to prepare was the most influencing factor to consume instant noodle as well as easy to get and no food as the factors which were significant difference.

Table 4.3: The influencing factors of instant noodles consumption among respondents (N=200).

Factors	**Frequency**		**Chi-square**	***p*-value**
	Group 1 (n=100)	**Group 2 (n=100)**	**(X^2)**	
Easy to get:				
Yes	21	48	16.1301	0.01*
No	79	52		
Easy to prepare:				
Yes	62	51	2.462	0.117
No	38	49		
Cheap:				
Yes	38	40	0.84	0.885
No	62	60		
No food:				
Yes	45	30	4.80	0.028*
No	55	70		

*Significant at p<0.05

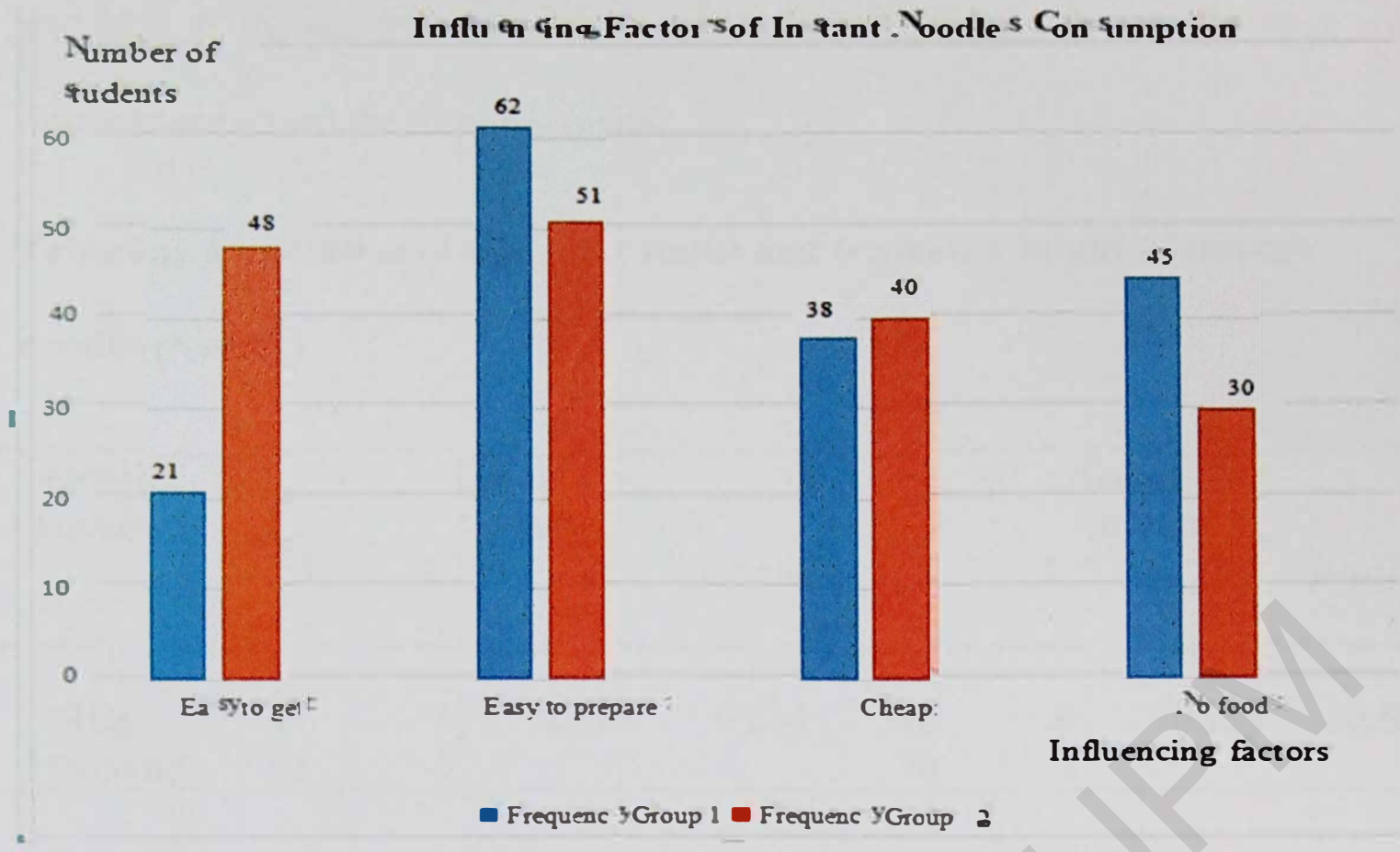

Figure 4.2: Influencing factors of instant noodles consumption.

4.4 Association of Economic Status and Frequency Intake of Instant Noodles

Table 4.4 showed the association of economic status and frequency intake of instant noodles between two groups. Family income were categorized into high and middle based on Central Bank of Malaysian Report(2013). Family income with more than RM5000 is categorized as high income and vice versa if family income with less than RM5000 it will categorize as middle family income. The frequency intake of instant noodles also was categorized into less frequent if consume instant noodles once or twice per week (< 3) and frequent if consume instant noodles more than three times per week (≥3); Jahanbaksh & Mousanezhad (2015). From the result below there is no significant association between economic status and frequency intake of instant noodles between group 1 (X^2=2.373, p= 0.234) and group 2 (X^2= 1.055,

p=0.580). It showed that the middle economic status family from both group were the most consumed the instant noodles.

Table 4.4: Association of economic status and frequency intake of instant noodles (N=200)

Family Income	Group 1 (n=100)				Group 2 (n=100)			
	< 3	≥ 3	X^2	p-value	< 3	≥ 3	X^2	*p-value*
*High	41	1	2.373	0.234	20	0	0.153	0.695
**Middle	52	6			76	4		

Based on Central Bank of Malaysia Report (2013)

*High= Family income with RM5000 and above

**Middle= Family income with RM5000 and below

4.5 Lead Concentration in Instant Noodles and Seasoning

Table 4.5 (a) and table 4.5 (b) showed the calculation of the lead concentration in instant noodles and seasoning respectively. Table 4.5 (c) is the mean final concentration of lead in instant noodles and seasoning. From the result, the range of lead concentration in instant noodles were between 9.53×10^{-2} mg/kg to 1.17×10^{-2} mg/kg while for seasoning the lead concentration were <0.02 mg/kg until 1.08×10^{-3} mg/kg. One sample of seasoning (sample E) was under limit of quantification (< 0.002 mg/kg). Based on the standard of Malaysia Food Regulation (1985), the permitted level of lead concentration in instant noodles is 2 mg/kg.

Therefore, in this study, lead concentration in instant noodles and seasoning were not exceeded the permitted level of 2 mg/kg.

The findings found that lead concentration in instant noodles were F>G>D>C>E>A>B while lead concentration in seasoning were A>B>C>F>D>G>E.

Below are the list of samples of instant noodles that were used in this study.

A Maggi (chicken flavor)

B Maggi (tomyam flavor)

C Maggi (curry flavor)

D Mamee (curry flavor)

E Cintan (curry flavor)

F Mi Sedap (original flavor)

G Samyang

Table 4.5 (a) : The concentration of lead in instant noodles

Samples	Concentration of lead in extraction (mg/kg)	Dilution factor	Volume of Extract (ml)	Weight of sample (g)	Final Concentration (mg/kg)
A1	0.0183	0.5	10	1.0	0.0915
A2	0.0109	0.5	10	1.0	0.0545
A3	0.0218	0.5	10	1.0	0.1090
B1	0.0293	0.5	10	1.0	0.1465
B2	0.0113	0.5	10	1.0	0.0565
B3	0.0165	0.5	10	1.0	0.0825
C1	0.0067	0.5	10	1.0	0.0335
C2	0.0106	0.5	10	1.0	0.0530
C3	0.0071	0.5	10	1.0	0.0355
D1	0.0087	0.5	10	1.0	0.0435
D2	0.0070	0.5	10	1.0	0.0350
D3	0.0063	0.5	10	1.0	0.0315
E1	0.0083	0.5	10	1.0	0.0415
E2	0.0221	0.5	10	1.0	0.1105
E3	0.0113	0.5	10	1.0	0.0565
F1	0.0014	0.5	10	1.0	0.0070
F2	0.0018	0.5	10	1.0	0.0090
F3	0.0039	0.5	10	1.0	0.0195
G1	0.0067	0.5	10	1.0	0.0334
G2	0.0062	0.5	10	1.0	0.0310
G3	0.0039	0.5	10	1.0	0.0195

Table 4.5 (b) : The concentration of lead in seasoning

Samples	Concentration of lead in extraction (mg/kg)	Dilution factor	Volume of Extract (ml)	Weight of sample (g)	Final Concentration (mg/kg)
A4	4.48×10^{-4}	3.33	15	1.0	0.0224
A5	1.32×10^{-3}	3.33	15	1.0	0.0659
A6	1.45×10^{-3}	3.33	15	1.0	0.0724
B4	5.51×10^{-4}	3.33	15	1.0	0.0275
B5	6.30×10^{-5}	3.33	15	1.0	3.15×10^{-3}
B6	-0.90×10^{-5}	3.33	15	1.0	-4.50×10^{-4}
C4	3.20×10^{-5}	3.33	15	1.0	1.60×10^{-3}
C5	2.08×10^{-4}	3.33	15	1.0	0.0104
C6	1.02×10^{-3}	3.33	15	1.0	0.0509
D4	5.10×10^{-5}	3.33	15	1.0	2.55×10^{-3}
D5	1.02×10^{-4}	3.33	15	1.0	5.09×10^{-3}
D6	9.6×10^{-5}	3.33	15	1.0	4.80×10^{-3}
E4	-3.1×10^{-5}	3.33	15	1.0	-1.55×10^{-3}
E5	-4.2×10^{-5}	3.33	15	1.0	-2.10×10^{-3}
E6	-3.0×10^{-5}	3.33	15	1.0	-1.50×10^{-3}
F4	1.30×10^{-5}	3.33	15	1.0	6.49×10^{-4}
F5	9.00×10^{-6}	3.33	15	1.0	4.50×10^{-4}
F6	2.40×10^{-5}	3.33	15	1.0	1.20×10^{-3}
G4	5.60×10^{-5}	3.33	15	1.0	2.80×10^{-3}
G5	8.60×10^{-5}	3.33	15	1.0	4.30×10^{-3}
G6	8.00×10^{-5}	3.33	15	1.0	4.0×10^{-3}

Table 4.5 (c) : The mean final concentration of lead in instant noodles and seasoning

Samples	Mean concentration in instant noodles (mg/kg)	Mean concentration in seasoning (mg/kg)
A	0.085	0.0536
B	0.0952	0.0101
C	0.0406	0.0209
D	0.0367	4.15×10^{-3}
E	0.0695	*<0.002
F	0.0118	7.66×10^{-4}
G	0.0279	3.7×10^{-3}

* Limit of quantification: <0.002 mg/kg

4.6 Provisional Tolerable Weekly Intake (PTWI) of Lead

Table 4.6 (a) and 4.6 (b) showed the summary of calculation of PTWI of lead concentration in one packet for each brand of instant noodles together with its seasoning among the respondents. The value of PTWI has been set by Food and Agriculture Organization/ World Health Organization (FAO/WHO) Joint Expert Committee on Food Additive (JECFA) standard which is 0.025 mg/kg. In this study, all the PTWI of the respondents in both group were below the limit.

Table 4.6: The PTWI of lead concentration in instant noodles and its seasoning.

Brands	Lead concentration in instant noodles and its seasoning(mg/kg)	Ingestion rate (kg/week)	PTWI (mg/kg) Group 1 and Group 2
A	0.1386	0.077	1.87×10^{-4}
B	0.1053	0.080	1.48×10^{-4}
C	0.0615	0.079	8.52×10^{-5}
D	0.0409	0.073	5.24×10^{-5}
E	0.0695	0.076	9.27×10^{-5}
F	0.0126	0.091	2.01×10^{-5}
G	0.0316	0.140	7.76×10^{-5}

The mean of body weight of respondents =57 kg

4.7 Health Risk by Hazard Quotient (HQ)

In this study, health risk is determined by Hazard Quotient (HQ). If the HQ is more than 1, it mean adverse health effects are possible while if the HQ is less than 1, then there is no adverse health effect of exposure. Therefore, the acceptable risk is less than 1 (USEPA, 2015).

Table 4.7 showed the average daily dose (ADD) for lead in instant noodles and seasoning that were obtained in order to determine the health risk for Hazard Quotient (HQ) for lead.

Table 4.7 : The average daily dose (ADD) for lead in instant noodles and its seasoning

Brands	IR (kg/day)	Lead Concentration in Instant Noodles and its Seasoning. (mg/kg)	ADD (mg/kg-day) Group 1 and Group 2
A	0.077	0.1386	2.67×10^{-5}
B	0.080	0.1053	2.10×10^{-5}
C	0.079	0.0615	1.21×10^{-5}
D	0.073	0.0409	6.69×10^{-6}
E	0.076	0.0695	7.46×10^{-6}
F	0.091	0.0126	2.87×10^{-6}
G	0.140	0.0316	1.11×10^{-5}

Table 4.7 (a) : The reference value for average daily dose (ADD) calculation

*References value	Group 1	Group 2
EF (day/year)	52	52
ED (years)	12	15
BW (kg)	57	57
AT[a] (days) ED X 365	4380	5475

Table 4.8 showed the Hazard Quotient (HQ) of seven samples of instant noodles and seasoning which indicate the health risk of non-carcinogenic health effect among the respondents in both groups . The range of HQ in instant noodles together with its seasoning were from 2.87×10^{-6} to 2.67×10^{-5} . All the HQ value were less than 1; therefore the ingestion of the instant noodles and its seasoning that contaminated with lead are not associated with the non-carcinogenic risk.

Table 4.8: Health Risk for Hazard Quotient (HQ) for Lead in Instant Noodles and Seasoning

Brands	Instant Noodles and its Seasoning	
	ADD (mg/kg-day)	HQ
A	2.67×10^{-5}	6.68×10^{-3}
B	2.10×10^{-5}	5.25×10^{-3}
C	1.21×10^{-5}	3.03×10^{-3}
D	6.69×10^{-6}	1.67×10^{-3}
E	7.46×10^{-6}	1.87×10^{-3}
F	2.87×10^{-6}	7.18×10^{-4}
G	1.11×10^{-5}	2.78×10^{-3}

Reference Dose= 4×10^{-3}

ADD= Average Daily Dose

Hazard Quotient (HQ)= if HQ < 1 : no associated with risk

if HQ>1 : associated with risk

CHAPTER 5

DISCUSSION

5.1 Socio-demographic of the respondents.

For this study, a total of 200 respondents were recruited from Thirteenth and Fourteenth residential college in UPM. In general, those respondents were age between 18 to 27 years old already cover all ages in UPM which study Foundation of Agricultural Sciences (group1) and undergraduate programme (group2). There is significant difference in age between these two groups because foundation students (group 1) majority are 19 years old while undergraduate students (group 2) are 22 years old. In this study, there were three races involved which were Malay, Chinese and Indian. The number of the respondents with different races represent the whole population. The majority of students in UPM were Malay. Most of the respondents for both groups were Malay girls because this study was conducted at local university which majority of students were Malay and entrance qualification is based on the meritocracy system of their academic achievement which were dominated by female (Latifah, 2015).

Family income was significantly different between foundation and undergraduate students. The number of respondents from high family income is highest among foundation students compared to undergraduate students. However, it

was contrast with other perception with assume that undergraduate students have more income compared to the foundation students as stated in the study that was conducted by Fazli & Jariah (2006), university students received study loan ranging from MYR5,000 to MYR 7,000 per semester to support their university education and financial need. Even though, the are more foundation students which from high family income, most of them spent their money for food just RM50 to RM300 compared to undergraduate students which allocate more expenses for food more than RM300 per month. According to Fazli & Jariah (2006) in their study about the sources of income among university students in Malaysia, they found that university students have additional amount of money to meet their need as students. Majority of undergraduate students received study loan such as Perbadanan Tabung Pendidikan Tinggi Nasional (PTPTN) and Jabatan Perkhidmatan Awam (JPA) scholarship. Besides received money from their parents, in some cases they owned extra money by doing part time job.

5.2 Frequency of instant noodles consumption

In order to assess health risk assessment among students who are eating instant noodles, the frequency of instant noodles intake per a week were taken in the questionnaire form. This study found that majority of the respondents in both groups were not frequently consuming instant noodles per week. Based on the study about the consumers' preference and consumption towards fast food by Habib, Dardak and Zakaria (2011), they found that the consumption of fast food among students in Malaysia is higher than the United Kingdom. The instant noodles, even though they

are cheap the intention to purchase is low. According to Syafiqah (2017), university students have to depend more on fast/instant foods with their busy life styles but in overall students spend more on fried chicken and least for instant noodles although it was a common perception that people who have not enough money consume instant noodle.

Frequently consume instant noodles which contaminated with lead will cause side effect to the body. According to the (WHO, 2010), lead can accumulate in the blood in one months while one to two month in soft tissue and 20 to 30 years in bone. Even though there is no significant difference of frequency of instant noodles consumption among students, it still in concern because the survey found that there is still a few respondents that frequently consumed more than three packets of instant noodles per a week. Surprisingly foundation students consumed instant noodles more frequent as compared to undergraduate students.

5.3 Influencing factors of instant noodles consumption.

There are few factors such as easy to get, easy to prepare, cheap and no food that were listed in the questionnaire form in order to identify the reasons of purchasing instant noodles. The result showed most of the respondents said that easy to prepare is the main reason to consume instant noodles. Previous study about the influence of instant food among student was conducted by Syafiqah (2017) , she found that convenience in preparation is the main reason of fast/instant foods consumption. Lack of time, finances, skills, knowledge and ability to prepare home-

cooked meals usually influence the intention of consumers to choose convenience food. According to Shin et al. (2014) instant noodles are considered as a convenience food by most consumers. A few other similar studies by Atkins & Bowler, (2011) and Wales (2009) found that convenience has a great impact on the food choices of present day consumers, as they prefer food that can be prepared instantly and is ready to be consumed.

According to study of consumption behavior and factors influencing the purchase instant noodles that conducted in Bangkok, the reason why the students consume instant noodles is it easy to find and to cook (Kaeocha & Tanphihat, 2004). In this study, more undergraduate students purchased instant noodles due to easy to get as they have their own transport compared to foundation students who still young in a university. In the other hand, more foundation students than undergraduate students complained that there is no food to eat other than instant noodles since there is limited choice of food sold at the cafe near the residential college. Other than that, they do not have own transport to buy other food outside their college and they also complained about time constrain by having pack schedule of classes since they need to finish their foundation programme in three semester within one year.

The other influencing factor that make students to consume instant noodles due to its price which is cheap and affordable for everyone to buy. The rising costs of living and education are a challenge for most university students to make ends meet. This problem may affect their intention towards the consumption of food that is

cheap and affordable but in this study the price of instant noodles is not the main factors for students consuming instant noodles.

5.4 Association of Economic Status and Frequency Intake of Instant Noodles

Economic status was not associated with the frequency intake of instant noodles. According to Matsuo and Tanaka (2008) which stated that the frequency intake of instant noodles is not influenced by family income. It found that the price of food product did not influence the purchasing of unhealthy food such as instant noodles among low, middle and high socioeconomic status.

5.5 Lead Concentration in Instant Noodles and Seasoning

Lead concentration in instant noodles and seasoning were determined. However the lead concentration were not exceed the limit of 2mg/kg in both instant noodles and also the seasonings. Surprisingly, lead concentrations in instant noodles were higher as compared to seasoning. It is different with the general perception which assumed that the ingredient in seasoning might be contained high level of lead. This study was clearly found that there is high level of lead concentration in instant noodles than seasoning.

Previous study that was conducted by Jothi and Uddin (2003) about detection of heavy metal in some commercial brands of noodles, they revealed that the concentration of lead in instant noodles exceeded the limit. They found that four commercial brands of instant noodles were exceeded the permitted limit of lead

concentration in instant noodles. However the finding of this study was in contrast with previous study.

As our knowledge, this is the first study in Malaysia which separately determine the concentration of lead in instant noodles and its seasoning, therefore further research is needed. Even though there is small amount of lead concentration in instant noodles and seasoning, the consumers should not regularly consumed it, because the accumulation of lead in body will cause harm to health either long term or short term effect.

5.6 Provisional Tolerable Weekly Intake (PTWI) of Lead

Based on the result there is no respondents exceeded the limit of PTWI. This is because the low level of PTWI among the two groups of the respondents was due to the low intake of instant noodles per week. Previous study that was conducted by Jahanbakhsh & Mousanezland (2015), 20.3% of the respondents consumed instant noodles once to twice per week and the rest consumed instant noodles three to five time per week. Event though the respondents not exceeded the standard of PTWI of 0.025 kg/mg, they should aware that lead which was accumulated in the body is non-biodegradable and have long biological half-lives and tend to accumulate over time

5.7 Health Risk for Hazard Quotient (HQ)

Based on the result, all the samples of instant noodles together its seasoning there is not significant risk to the health because the value of HQ is less than 1. Therefore, lead exposure via ingestion of instant noodles is not associated with the non-carcinogenic risk. Even though the instant noodles were found not associated with risk, everyone should aware that we eat many food products the contamination status were unknown. Sometime we cannot avoid the ingestion of food that was contaminated by lead, however we can get some other food which able to flush the heavy metals out from the body. The study about herbs and heavy metals detoxification was conducted by Kerry and Michelle (2006), one of the herb that everyone used is garlic. Garlic was tested against lead poisoning in rats. Then lead concentration were reduced in their body.

5.8 Strength

The finding of this study can be the reference or the baseline for lead concentration in instant noodles and seasoning in Malaysia. Based on the previous study there is no study which analysed lead concentration in instant noodles and seasoning separately.

5.9 Limitation

There are few limitations during conducting this study. Firstly, the sources of ingredient in making of instant noodles and seasoning cannot be identified. Therefore, the lead contamination in instant noodles and seasoning also cannot be determined.

Next, this study only consider instant noodles as single dietary exposure. Risk assessment toward lead should be also conducted in other food resources that usually consumed by respondents such as vegetables, fruits, rice and meat so that the Provisional Tolerable Weekly Intake and Hazard Quotient can be determine accurately among the respondents.

Lastly, recall bias during answering the questionnaires might be occurred due to inability to remember the past history of instant noodles intake.

CHAPTER 6

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

As the conclusion, most of the respondents in both groups consumed instant noodles once to three times per week. They consumed instant noodles due to easy to prepare. There are significant different between two group when purchasing instant noodles; they will consider the factors of no food and easy to get. This study found that, socioeconomic status is not associated with the frequency intake of instant noodles. Lead in instant noodles and seasoning were analysed and it found that low level of lead was detected in all the samples. All of these did not exceed the permitted level of 2 mg/kg set by Malaysian Food Regulation 1985 because there is low percentage of respondents who were frequently consuming instant noodles more than three times per week. Therefore, the PTWI of the respondents were below the standard of 0.025 mg/kg/week which indicate that the level of dietary exposure of respondents to lead could be under health risk. The calculate HQ was also <1 which represent no significant of non-cancer risk was likely to occur.

6.2 Recommendation

As recommendation, further study is needed on improving the determination of lead concentration in instant noodles and seasoning as there is no previous study that found which was conducted on heavy metal in instant noodles and seasoning separately. The source of lead in making of instant noodles should be explored because this study found that there is high level of lead in instant noodles compared to its seasoning.

The method to prepare extract of samples of instant noodles and seasoning should be revise because the lead concentration is influenced by dilution factor and wet digestion methods.

This study should be extended for other population among children because most of the respondents stated that they consumed instant noodles since seven years old.

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APPENDICES

ETHICS COMMITTEE FOR RESEARCH INVOLVING HUMAN SUBJECTS
(JKEUPM)
UNIVERSITI PUTRA MALAYSIA

Research title	:	**Lead Concentration in Instant Noodles and Health Risk Assessment Among Students in UPM**
Study Site	:	**UPM**
JKEUPM Ref No.	:	**JKEUPM-2017-198**
Researcher	:	**Nurul Fadzilah bt Hamid**
Supervisor	:	**Dr. Saliza Mohd Elias**

Documents received and reviewed with reference to the above study:

1. Ethics Application Form, Version 1 dated 31/10/2017
2. Respondent Information Sheet & Consent (English), Version 3 dated 27/12/2017
3. Respondent Information Sheet & Consent (Malay), Version 2 dated 21/11/2017
4. Proposal (English), Version 2 dated 27/12/2017
5. Questionnaire (English), Version 1 dated 31/10/2017
6. Curriculum Vitae of:
    a. Dr. Saliza Mohd Elias

The University Research Ethics Committee, Universiti Putra Malaysia (JKEUPM) operates in accordance to the ICH-GCP Guidelines.

Decision by JKEUPM:

[X] Approved

[ ] **Permission MUST BE OBTAINED from the respective hospitals/ institutions before conducting the research**

[ ] Disapproved

Please note that the approval is **VALID UNTIL 19 JANUARY 2019**

Researchers should comply with the following:

I. Complete a Study Final Report upon study completion (Form 3.2).

II. Ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.

JAWATANKUASA ETIKA UNIVERSITI UNTUK
PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,
SELANGOR, MALAYSIA

FORM 2.4: RESPONDENT'S INFORMATION SHEET AND INFORMED CONSENT FORM

Please read the following information carefully and do not hesitate to discuss any questions you may have with the researcher.

1.STUDY TITLE :

Lead Concentration in Instant Noodles and Health Risk Assessment among Students in UPM

2. INTRODUCTION:

Instant noodles are widely consumed throughout the world. Due to conveniently easy and quick to prepare, it may have contaminated by substances such as heavy metal . The accumulation of heavy metal in the body can have short term and long term health effect. The previous study had shown that there was lead contamination found in the instant noodle. Excessive intake of food associated with lead can cause cardiovascular, renal and gastrointestinal disease.

3. WHAT WILL YOU HAVE TO DO?

The respondents will be given a questionnaire form to obtain the information related to the research. There is no compulsion to participate the research that will be conducted at their residential college. They have the right to withdraw if they are not interested in participating the research. There will be no compensation provided.

4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?

Those who do not consume instant noodles.

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

It will help the respondents to be aware of health through knowledge about the level of lead concentration of the certain brand instant noodles and the risk factors which associated with lead poisoning. Therefore, the respondents can take several measures to prevent from consuming food that contains high tendency towards lead contamination.

(b) TO THE INVESTIGATOR?

It will help the investigator to identify the risk factors associated with the lead poisoning among students and to suggest some measures which would help the students to prevent from consumption of food that contaminated by lead.

6. WHAT ARE THE POSSIBLE RISKS?

This study does not have any possible risk to the respondents because it does not involve human biological sample such as blood sample

7. WILL THE INFORMATION THAT YOU PROVIDE AND YOUR IDENTITY REMAIN CONFIDENTIAL?

All the information about the respondents will be kept confidential

8. WHO SHOULD YOU CONTACT IF YOU HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?

If you have any additional questions, you may contact to Dr. Saliza Bt Mohd Elias, Supervisor of the research at 0162213574 or Nurul Fadzilah Bt Hamid, the researcher at 0134889624

*Please initial here if you have read and understood the contents of this page*_____

9. CONSENT

I ..... Identity Card No. ..... address.....

.....hereby voluntarily agree to take part in the research stated above *(clinical /drug trial/video recording/ focus group/interview-based/ questionnaire-based).

I have been informed about the nature of the research in terms of methodology, possible adverse effects and complications (as written in the Respondent's Information Sheet). I understand that I have the right to withdraw from this research at any time without giving any reason whatsoever. I also understand that this study is confidential and all information provided with regard to my identity will remain private and confidential.

I* wish / do not wish to know the results related to my participation in the research

I agree/do not agree that the images/photos/video recordings/voice recordings related to me be used in any form of publication or presentation (if applicable)

* delete where necessary

Signature .....
(Respondent)

Date :.....

Signature .....
(Witness)

Name :.....

I/C No. :.....

I confirm that I have explained to the respondent the nature and purpose of the above-mentioned research.

Date .....

Signature .....
(Researcher)

JAWATANKUASA ETIKA UNIVERSITI UNTUK
PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,
SELANGOR, MALAYSIA

BORANG 2.4: PENERANGAN DAN PERSETUJUAN RESPONDEN

Sila baca maklumat berikut dengan teliti. Sekiranya anda mempunyai sebarang pertanyaan, sila kemukakan kepada penyelidik.

1.TAJUK KAJIAN

Kepekatan Plumbum dalam Mee Segera dan Penilaian Risiko Kesihatan dalam Kalangan Pelajar di UPM.

2.PENGENALAN

Mee segera diambil secara meluas di seluruh dunia. Oleh kerana mudah dan cepat disediakan, ia mungkin tercemar oleh bahan-bahan seperti logam berat. Pengumpulan logam berat boleh menyebabkan kesan kesihatan pada jangka masa pendek dan jangka masa panjang. Kajian terdahulu telah menunjukkan bahawa terdapat pencemaran utama yang terdapat dalam mee segera. Pengambilan makanan berlebihan yang berkaitan dengan plumbum boleh menyebabkan penyakit kardiovaskular, buah pinggang dan gastrousus.

3.APAKAH YANG PERLU ANDA LAKUKAN?

Responden akan diberi borang soal selidik untuk mendapatkan maklumat yang berkaitan dengan penyelidikan. Tidak ada paksaan untuk menyertai penyelidikan yang akan dijalankan di kolej kediaman mereka. Mereka mempunyai hak untuk menarik balik jika mereka tidak berminat untuk menyertai penyelidikan. Tiada saguhati akan diberikan kepada responden.

4.SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Kajian ini tidak boleh melibatkan responden orang yang tidak makan mi segera.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANDA SEBAGAI PESERTA?

Kajian ini akan membantu responden untuk sedar terhadap kesihatan akibat keracunan plumbum melalui pengetahuan mengenai tahap kepekatan plumbum yang terdapat dalam setiap jenama mee segera yang tertentu dan menegetahui faktor risiko yang berkaitan dengan keracunan plumbum. Oleh itu, responden dapat mengambil beberapa langkah untuk mencegah daripada mengambil makanan yang mempunyai kecenderungan tinggi terhadap pencemaran plumbum.

b) KEPADA PENYELIDIK?

Ia akan membantu penyiasat untuk mengenal pasti faktor yang berkaitan dengan keracunan plumbum di kalangan pelajar dan mencadangkan beberapa langkah yang akan membantu pelajar supaya menghindari daripada memakan makanan yang telah tercemar dengan plumbum.

6. ADAKAH IA BERISIKO?

Kajian ini tidak mempunyai risiko kepada responden kerana ia tidak melibatkan sampel biologi manusia seperti sampel darah.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?

Semua maklumat mengenai responden akan dirahsiakan.

8. SIAPA YANG SAYA PERLU HUBUNGI SEKIRANYA SAYA MEMPUNYAI SOALAN TAMBAHAN SEMASA MENGIKUTI PENYELIDIKAN INI?

Sekiranya anda mempunyai sebarang pertanyaan tambahan, anda boleh menghubungi Dr. Saliza Bt Mohd Elias, Penyelia penyelidikan di taian 0162213574 atau Nurul Fadzilah Bt Hamid, penyelidik di talian 0134889624.

Sila tandatangan di sini sekiranya anda telah membaca dan memahami kandungan halaman ini _____

9. PERSETUJUAN

Saya..... No Kad Pengenalan. .....
beralamat.....
.....dengan ini bersetuju untuk mengambil bahagian secara sukarela dalam penyelidikan yang tersebut di atas *(kajian klinikal/percubaan ubat-ubatan/rakaman video/kumpulan sasaran/temuduga/ soal selidik).

Saya telah diberi penjelasan secara menyeluruh mengenai penyelidikan ini dari segi metodologi, risiko dan komplikasi (seperti tertulis pada Helaian Penerangan Responden). Saya memahami bahawa saya berhak menarik diri dari penyelidikan ini pada bila-bila masa tanpa memberi sebarang alasan.Saya juga memahami bahawa sebarang maklumat yang berkaitan identiti saya akan dirahsiakan.

Saya* berminat / tidak berminat untuk mengetahui keputusan kajian yang melibatkan saya.

I setuju/tidak bersetuju untuk imei/gambar/rakaman video/ rakaman suara digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekiranya berkaitan).

*potong yang tidak berkenaan

Tandatangan .....
(*Responden*)

Tarikh :.....

Tandatangan .....
(*Saksi*)

Nama :.....

No. K/P: .....

Saya mengesahkan bahawa saya telah menerangkan kepada responden ini sifat dan tujuan penyelidikan yang tersebut di atas.

Tarikh .....

Tandatangan .....
(*Penyelidik*)

ID RESPONDENT:

DATE:

Determination of Arsenic and Lead Concentration in Instant Noodles and Health Risk Assessment among Students in Universiti Putra Malaysia.

This is the study of health risk due to lead contamination in instant noodle that consumed by students. This study is carried out at your place. It is pleasure to say that you are lucky to be selected as respondent. Thus you are required to answer all of the questions according to the instruction given. All of information of the respondent is confidential and it is use for research purpose only.

INSTRUCTION:

1. This questionnaires contain of four (4) parts:

   Part A) Socio-demographic Information

   Part B) Instant Noodles Intake

   Part C) Health Status

   Part D) Lifestyle Information

2. Please answer all of the questions.

3. This questionnaire must be return back to researcher after completing.

DEPARTMENT OF ENVIRONMENTAL AND OCCUPATIONAL HEALTH

FACULTY OF MEDICINE AND HEALTH SCIENCES

I ..... Identity Card no. .....
address.....
..... hereby voluntarily agree to take to take part in the research stated above *(clinical/drug trial/video recording/focus group/interview based/ questionnaire based).

I have been informed about the nature of the research in terms of methodology, possible adverse effects and complications (as written in the Respondent's Information Sheet). I understand that I have the right to withdraw from this research at any time without giving any reason whatsoever. I also understand that this study is confidential and all information provided with regard to my identity will remain private and confidential.

I *wish/do not wish to know the result related to my participation in the research.

I agree/do not agree that the images/photos/video recordings/voice recordings related to me be used in any form of publication or presentation (if applicable)

*delete where necessary

Signature .....
(Respondent)

Date: .....

Signature .....
(Witness)

Name: .....

IC No. : .....

I confirm that I have explained to the respondent the nature and purpose of the above-mentioned research.

Date .....

Signature .....
(Researcher)

Part A) Socio-demographic Information

Please answer the following questions

1. Age : _____

2. Gender:
   a) Male
   b) Female

3. Races:
   a) Malay
   b) Chinese
   c) Indian
   d) Others (Please state :.....)

4. Family Income: RM.....

5. Expenses for food per month:
   RM.....

6. What is your program of study?
   .....

Part B) Instant Noodle Intake

1. Have you ever eaten instant noodles?
   (a) Yes
   (b) No

2. When did you start consume instant noodles? (Please state :.....)
   ..... Years

3. What come first in your mind when you hear the word instant noodles?
   (a) Noodles
   (b) Fat food
   (c) Snacks
   (d) Others (please state:.....)

4. What make you consume instant noodles? (Please tick √ all that apply)
   (a) Easy to get
   (b) Easy to prepare
   (c) Cheap
   (d) No food
   (e) Others (please state:.....)

5. How frequent do you consume instant noodles in a week?
..... Times

6. How frequent do you consume instant noodles in a day?
..... Times

7 How many packet or cup of instant noodles do you consume per meal/intake?
..... (packet)
..... (cup)

8. List all brands of instant noodles product that you always consume? (Please state :.....)
.....

9. What size of pack do you generally purchase?
(a) Packet
(b) Cup
(c) Multi packet(5 in 1)

10. How do you prefer to eat these instant noodles?
(a) Boiled
(b) Fried
(c) Straight from packet

11. What are the sources of water do you take to prepare instant noodles?
(a) Water cooler
(b) Mineral water
(c) Tap water
(d) Others (please state:.....)

12. Which factors are important for you while purchasing instant noodles? (Please tick √ all that apply)
(a) Taste
(b) Price
(c) Quality
(d) Packaging
(e) Brand
(f) Others (please state:.....)

13. Do you add any other ingredient during preparation of instant noodles?
(Examples: eggs, vegetables, sauces, fish, meat, chicken)
(a) Yes
(b) No

14. Do you perceive instant noodles as a healthy product?
(a) Yes
(b) No

15. Do you recommend instant noodles to other?
(a) Yes
(b) No

16. Please specify the location of purchasing instant noodles?
    (a) shop nearby the college
    (b) at shopping mall
    (c) Others (please state:.....)

Part C) Health Status

Please state your current weight and height:

Height: ..... cm
Weight: ..... kg

1. Do you experience any of those symptoms after 20 minutes of consuming instant noodle? (Please tick √ all that apply)

Burning of mouth and throat		Memory Loss	
Abdominal Pain		Diarrhea	
Nausea		Headache	
Vomiting		Dehydration	
Constipation		Dark Urine (term black water urine)	
Numbness		Cardiac Problem	
Chest Pain		Vertigo (dizziness)	

2. If none of these, please state your current health status
    (a) Good
    (b) Poor
    (c) Others (please state:.....)

3. **Currently**, do you have any of these diseases? (Please tick √ all that apply)
    (a) Memory deterioration
    (b) Kidney damage
    (c) Reduce ability to understand
    (d) High blood pressure

4. Do you have any **PAST** medical history? (Please tick √ all that apply)
    (a) High blood pressure
    (b) Anaemia
    (c) Lung irritation
    (d) Heart disease
    (e) Kidney problem
    (f) Others (Please state:.....)

PART D) Lifestyle Information

1. Do you smoke?
   (a) Yes
   (b) No

2. What is the source of your daily drinking water?
   (a) Mineral Water
   (b) Boiled from tap water
   (c) Water dispenser

3. Do you eat canned food product? (If Yes or Sometimes; please state what type of canned food product)
   (a) Yes (Please state:.....)
   (b) Sometimes (Please state:.....)
   (c) No

4. What is the type of utensil that you use while preparing the instant noodles?
   (a) Plastic
   (b) Metal
   (c) Glass
   (d) Others (Please state:.....)

5.Do you exposed to any of these during your daily activity?
   (a) Fertilizer
   (b) Pesticide
   (c) Paint
   (d) None of these

Please state when did you exposed to these:
.....

THANK YOU FOR YOUR COOPERATION

Quantitative Analysis - Summary Report

ample ID: Blank
ample Date/Time: Thursday, April 05, 2018 13:10:31
ample Description:
olution Type: Blank
lank File: C:\Elandata\Dataset\Dr Saliza\Blank.001
umber of Replicates: 3
eak Processing Mode: Average
ignal Profile Processing Mode: Average
ual Detector Mode: Dual
ead Time (ns): 55

ample File: C:\Elandata\Sample\Dr Saliza.sam
ethod File: C:\Elandata\Method\dr saliza.mth
ataset File: C:\Elandata\DataSet\Dr Saliza\Blank.001
uning File: C:\Elandata\Tuning\Default.tun
ptimization File: C:\Elandata\Optimize\Default.dac
alibration File:
alibration Type: External Calibration

Summary

Intensities

lyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	208	6329	2.863		
	75	331	1.629		
	111	52	2.869		

Concentration Results

lyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	208					ppb
	75					ppb
	111					ppb

Quantitative Analysis - Summary Report

Sample ID: Std 1 (20 ppb)

Sample Date/Time: Thursday, April 05, 2018 13:12:27
Sample Description:
Solution Type: Standard
Blank File: C:\Elandata\Dataset\Dr Saliza\Blank.001
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza.sam
Method File: C:\Elandata\Method\dr saliza.mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\Std 1 (20 ppb).002
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	628653	2.446	6329.261	2.863
As	75	60609	1.971	331.451	1.629
Cd	111	73352	1.253	52.389	2.869

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	622323.793	20.000	0.49	2.5	ppb
As	75	60277.822	20.000	0.40	2.0	ppb
Cd	111	73299.584	20.000	0.25	1.3	ppb

Quantitative Analysis - Summary Report

Sample ID: Std 2 (30 ppb)
Sample Date/Time: Thursday, April 05, 2018 13:14:25
Sample Description:
Solution Type: Standard
Blank File: C:\Elandata\Dataset\Dr Saliza\Blank.001
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza.sam
Method File: C:\Elandata\Method\dr saliza.mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\Std 2 (30 ppb).003
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

e Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
208	973396	0.823	6329.261	2.863
75	95963	3.854	331.451	1.629
111	115560	0.547	52.389	2.869

Concentration Results

lyte Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
208	967066.277	**30.324**	0.25	0.8	ppb
75	95631.634	**30.512**	1.18	3.9	ppb
111	115507.537	**30.451**	0.17	0.5	ppb

Quantitative Analysis - Summary Report

Sample ID: Std 3 (50 ppb)

Sample Date/Time: Thursday, April 05, 2018 13:16:23
Sample Description:
Solution Type: Standard
Blank File: C:\Elandata\Dataset\Dr Saliza\Blank.001
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza.sam
Method File: C:\Elandata\Method\dr saliza.mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\Std 3 (50 ppb).004
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	1566705	1.617	6329.261	2.863
As	75	157706	0.520	331.451	1.629
Cd	111	189963	1.198	52.389	2.869

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	1560375.251	**49.628**	0.81	1.6	ppb
As	75	157374.699	**50.072**	0.26	0.5	ppb
Cd	111	189910.133	**50.022**	0.60	1.2	ppb

Quantitative Analysis - Summary Report

ample ID: Std 4 (100 ppb)
ample Date/Time: Thursday, April 05, 2018 13:18:21
ample Description:
olution Type: Standard
File: C:\Elandata\Dataset\Dr Saliza\Blank.001
umber of Replicates: 3
Processing Mode: Average
Profile Processing Mode: Average
Detector Mode: Dual
Time (ns): 55

ample File: C:\Elandata\Sample\Dr Saliza.sam
ethod File: C:\Elandata\Method\dr saliza.mth
ataset File: C:\Elandata\DataSet\Dr Saliza\Std 4 (100 ppb).005
File: C:\Elandata\Tuning\Default.tun
ptimization File: C:\Elandata\Optimize\Default.dac
alibration File:
alibration Type: External Calibration

Summary

Intensities

Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
208	3186177	0.942	6329.261	2.863
75	320990	1.566	331.451	1.629
111	384075	0.720	52.389	2.869

Concentration Results

lyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	208	3179847.323	100.310	0.95	0.9	ppb
	75	320658.201	100.549	1.58	1.6	ppb
	111	384023.029	100.315	0.72	0.7	ppb

Calibration Report

lyte Mass	Curve Type	Slope	Intercept	Corr Coeff
207.977	Linear Thru Zero	31700.141953	0.000	0.999960
74.922	Linear Thru Zero	3189.062354	0.000	0.999930
110.904	Linear Thru Zero	3828.190386	0.000	0.999963

Quantitative Analysis - Summary Report

mple ID: IA1
mple Date/Time: Thursday, April 05, 2018 13:27:11
mple Description: Instant noodles & seasoning sample
ution Type: Sample
nk File:
nber of Replicates: 3
Processing Mode. Average
Profile Processing Mode: Average
Detector Mode: Dual
Time (ns): 55

mple File: C:\Elandata\Sample\Dr Saliza.sam
File: C:\Elandata\Method\dr saliza.mth
aset File: C:\Elandata\DataSet\Dr Saliza\IA1.007
File: C:\Elandata\Tuning\Default.tun
imization File: C:\Elandata\Optimize\Default.dac
bration File: C:\Elandata\System\Dr Saliza.cal
bration Type: External Calibration

Summary

Intensities

Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
208	586151	0.711	6329.261	2.863
75	2767	3.728	331.451	1.629
111	2844	1.279	52.389	2.869

Concentration Results

Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
208	579821.624	18.291	0.13	0.7	ppb
75	2435.249	0.764	0.03	4.2	ppb
111	2791.834	0.729	0.01	1.3	ppb

Replicates

Analyte	Concentration
Pb	18.206663
As	0.731701
Cd	0.722765

Analyte	Concentration
Pb	18.223432
As	0.762806
Cd	0.724899

Analyte	Concentration
Pb	18.442368
As	0.796369
Cd	0.740185

Quantitative Analysis - Summary Report

Sample ID: IA2

Sample Date/Time: Thursday, April 05, 2018 13:29:08
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza.sam
Method File: C:\Elandata\Method\dr saliza.mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\IA2.008
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza.cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	353317	1.428	6329.261	2.863
As	75	3242	2.381	331.451	1.629
Cd	111	2843	8.266	52.389	2.869

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	346987.987	10.946	0.16	1.5	ppb
As	75	2910.128	0.913	0.02	2.7	ppb
Cd	111	2790.949	0.729	0.06	8.4	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	10.852629
As	0.894968
Cd	0.691278

Repeat 2

Analyte	Concentration
Pb	11.129693
As	0.902496
Cd	0.799895

Repeat 3

Analyte	Concentration
Pb	10.855511
As	0.940138
Cd	0.695982

Quantitative Analysis - Summary Report

Sample ID: IA3
Sample Date/Time: Thursday, April 05, 2018 13:31:05
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza.sam
Method File: C:\Elandata\Method\dr saliza.mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\IA3.009
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza.cal
Calibration Type: External Calibration

Summary

Intensities

Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
208	697198	7.067	6329.261	2.863
75	6418	5.756	331.451	1.629
111	4765	6.882	52.389	2.869

Concentration Results

Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
208	690868.634	**21.794**	1.55	7.1	ppb
75	6087.005	**1.909**	0.12	6.1	ppb
111	4712.706	**1.231**	0.09	7.0	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	22.110291
As	1.950284
Cd	1.230397

Repeat 2

Analyte	Concentration
Pb	23.165493
As	1.998034
Cd	1.317038

Repeat 3

Analyte	Concentration
Pb	20.105813
As	1.777822
Cd	1.145724

Quantitative Analysis - Summary Report

Sample ID: SA1

Sample Date/Time: Thursday, April 05, 2018 13:33:02
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza.sam
Method File: C:\Elandata\Method\dr saliza.mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\SA1.010
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza.cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	20541	6.200	6329.261	2.863
As	75	23710	2.329	331.451	1.629
Cd	111	194	6.939	52.389	2.869

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	14212.213	0.448	0.04	9.0	ppb
As	75	23378.719	7.331	0.17	2.4	ppb
Cd	111	141.335	0.037	0.00	9.5	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	0.408995
As	7.141821
Cd	0.033117

Repeat 2

Analyte	Concentration
Pb	0.446706
As	7.369224
Cd	0.040040

Repeat 3

Analyte	Concentration
Pb	0.489297
As	7.481675
Cd	0.037602

Quantitative Analysis - Summary Report

Sample ID: SA2

Sample Date/Time: Thursday, April 05, 2018 13:35:00
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza.sam
Method File: C:\Elandata\Method\dr saliza.mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\SA2.011
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza.cal
Calibration Type: External Calibration

Summary

Intensities

alyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	208	48287	4.030	6329.261	2.863
	75	27556	0.965	331.451	1.629
	111	268	9.673	52.389	2.869

Concentration Results

alyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	208	41957.579	**1.324**	0.06	4.6	ppb
	75	27224.642	**8.537**	0.08	1.0	ppb
	111	215.115	**0.056**	0.01	12.0	ppb

Replicates

peat 1

Analyte	Concentration
Pb	1.257877
As	8.445441
Cd	0.048399

epeat 2

Analyte	Concentration
Pb	1.333396
As	8.556519
Cd	0.059719

epeat 3

Analyte	Concentration
Pb	1.379458
As	8.608679
Cd	0.060459

Quantitative Analysis - Summary Report

Sample ID: SA3

Sample Date/Time: Thursday, April 05, 2018 13:38:57
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza.sam
Method File: C:\Elandata\Method\dr saliza.mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\SA3.012
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza.cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	52158	4.108	6329.261	2.863
As	75	25488	1.281	331.451	1.629
Cd	111	251	9.808	52.389	2.869

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	45829.200	1.446	0.07	4.7	ppb
As	75	25156.124	7.888	0.10	1.3	ppb
Cd	111	198.559	0.052	0.01	12.4	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	1.372699
As	7.967527
Cd	0.045264

Repeat 2

Analyte	Concentration
Pb	1.458314
As	7.924604
Cd	0.052230

Repeat 3

Analyte	Concentration
Pb	1.506116
As	7.772622
Cd	0.058108

Quantitative Analysis - Summary Report

Sample ID: Blank
Sample Date/Time: Thursday, April 12, 2018 13:01:23
Sample Description:
Solution Type: Blank
Blank File: C:\Elandata\DataSet\Dr Saliza\Blank.013
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\Blank.013
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

lyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	208	2227	0.806		
	75	836	2.898		
	111	25	3.687		

Concentration Results

lyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	208					ppb
	75					ppb
	111					ppb

D: B

Quantitative Analysis - Summary Report

Sample ID: Std 1 (20.1915 ppb)

Sample Date/Time: Thursday, April 12, 2018 13:03:20
Sample Description:
Solution Type: Standard
Blank File: C:\Elandata\DataSet\Dr Saliza\Blank.013
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\Std 1 (20.1915 ppb).014
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	365350	0.524	2226.717	0.806
As	75	24629	2.431	835.538	2.898
Cd	111	33098	0.467	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	363123.584	20.191	0.11	0.5	ppb
As	75	23793.519	20.192	0.51	2.5	ppb
Cd	111	33072.543	20.192	0.09	0.5	ppb

Quantitative Analysis - Summary Report

ample ID: Std 2 (30.3077 ppb)
ample Date/Time: Thursday, April 12, 2018 13:05:17
ample Description:
olution Type: Standard
lank File: C:\Elandata\DataSet\Dr Saliza\Blank.013
umber of Replicates: 3
eak Processing Mode: Average
ignal Profile Processing Mode: Average
ual Detector Mode: Dual
ead Time (ns): 55

ample File: C:\Elandata\Sample\Dr Saliza (2).sam
ethod File: C:\Elandata\Method\dr saliza (2).mth
ataset File: C:\Elandata\DataSet\Dr Saliza\Std 2 (30.3077 ppb).015
uning File: C:\Elandata\Tuning\Default.tun
ptimization File: C:\Elandata\Optimize\Default.dac
alibration File:
alibration Type: External Calibration

Summary

Intensities

lyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	208	556394	0.939	2226.717	0.806
	75	38097	1.124	835.538	2.898
	111	52210	0.430	25.167	3.687

Concentration Results

alyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	208	554167.315	**30.462**	0.29	0.9	ppb
	75	37261.028	**30.699**	0.35	1.1	ppb
	111	52185.283	**30.769**	0.13	0.4	ppb

Quantitative Analysis - Summary Report

Sample ID: Std 3 (50.4942 ppb)

Sample Date/Time: Thursday, April 12, 2018 13:07:15
Sample Description:
Solution Type: Standard
Blank File: C:\Elandata\DataSet\Dr Saliza\Blank.013
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\Std 3 (50.4942 ppb).016
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	940817	0.096	2226.717	0.806
As	75	64998	0.701	835.538	2.898
Cd	111	88097	0.212	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	938590.749	**50.865**	0.05	0.1	ppb
As	75	64162.630	**51.281**	0.36	0.7	ppb
Cd	111	88072.015	**50.976**	0.11	0.2	ppb

Quantitative Analysis - Summary Report

Sample ID: Std 4 (101.1209 ppb)
Sample Date/Time: Thursday, April 12, 2018 13:09:14
Sample Description:
Solution Type: Standard
File: C:\Elandata\DataSet\Dr Saliza\Bl ank.013
Number of Replicates: 3
Processing Mode: Average
Signal Profile Processing Mode: Average
Detector Mode: Dual
Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2) mth
Dataset Fil e:C:\El andata\DataSet\Dr Saliza\Std 4 (101.1209 ppb).017
Tuning Fil e:C:\El andata\Tuning\Defaul ttun
Optimization File: C:\Elandata\Opti mize\Defaul t.dac
Calibration File:
Cal bration Type: External Calibration

Summary

Intensities

Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
208	1779472	0.568	2226.717	0.806
75	130257	0.591	835.538	2.898
111	173947	1.562	25.167	3.687

Concentration Results

Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sampl eUnit
208	1777245.168	99.752	0.57	0.6	ppb
75	129421.402	101.747	0.61	0.6	ppb
111	173921.336	100.995	1.58	1.6	ppb

Quantitative Analysis - Summary Report

Sample ID: Std 5 (197.5516 ppb)

Sample Date/Time: Thursday, April 12, 2018 13:11:13
Sample Description:
Solution Type: Standard
Blank File: C:\Elandata\DataSet\Dr Saliza\Blank.013
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\Std 5 (197.5516 ppb).018
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	3307132	0.383	2226.717	0.806
As	75	251126	1.017	835.538	2.898
Cd	111	332351	0.721	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	3304905.202	194.202	0.74	0.4	ppb
As	75	250290.495	197.344	2.01	1.0	ppb
Cd	111	332326.082	196.318	1.41	0.7	ppb

Calibration Report

Mass	Curve Type	Slope	Intercept	Corr Coeff
207.977	Linear Thru Zero	17646.264879	0.000	0.999934
74.922	Linear Thru Zero	1268.294709	0.000	0.999964
110.904	Linear Thru Zero	1682.675507	0.000	0.999990

Quantitative Analysis - Summary Report

Sample ID: 1
Sample Date/Time: Thursday, April 12, 2018 13:15:31
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\1.019
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

lyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	208	519082	0.574	2226.717	0.806
	75	1385	3.305	835.538	2.898
	111	1087	0.928	25.167	3.687

Concentration Results

lyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	208	516855.429	29.290	0.17	0.6	ppb
	75	549.234	0.433	0.04	8.3	ppb
	111	1062.065	0.631	0.01	1.0	ppb

Replicates

peat 1

Analyte	Concentration
Pb	29.414504
As	0.433706
Cd	0.626421

epeat 2

Analyte	Concentration
Pb	29.097616
As	0.468798
Cd	0.637913

epeat 3

Analyte	Concentration
Pb	29.357256
As	0.396643
Cd	0.629195

Quantitative Analysis - Summary Report

Sample ID: 2

Sample Date/Time: Thursday, April 12, 2018 13:17:28
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\2.020
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	201498	0.316	2226.717	0.806
As	75	1469	2.621	835.538	2.898
Cd	111	997	0.275	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	199270.952	11.293	0.04	0.3	ppb
As	75	633.469	0.499	0.03	6.1	ppb
Cd	111	971.944	0.578	0.00	0.3	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	11.334032
As	0.464987
Cd	0.576991

Repeat 2

Analyte	Concentration
Pb	11.268218
As	0.522159
Cd	0.579467

Repeat 3

Analyte	Concentration
Pb	11.275336
As	0.511250
Cd	0.576396

Quantitative Analysis - Summary Report

Sample ID: 4

Sample Date/Time: Thursday, April 12, 2018 13:21:22
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\4.022
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	11950	11.121	2226.717	0.806
As	75	1386	2.589	835.538	2.898
Cd	111	66	1.650	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	9722.892	0.551	0.08	13.7	ppb
As	75	550.956	0.434	0.03	6.5	ppb
Cd	111	40.556	0.024	0.00	2.7	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	0.493742
As	0.437255
Cd	0.023475

Repeat 2

Analyte	Concentration
Pb	0.522925
As	0.461175
Cd	0.024069

Repeat 3

Analyte	Concentration
Pb	0.636300
As	0.404792
Cd	0.024762

Quantitative Analysis - Summary Report

Sample ID: 5

Sample Date/Time: Thursday, April 12, 2018 13:38:02
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
eak Processing Mode: Average
ignal Profile Processing Mode: Average
ual Detector Mode: Dual
ead Time (ns): 55

ample File: C:\Elandata\Sample\Dr Saliza (2).sam
ethod File: C:\Elandata\Method\dr saliza (2).mth
ataset File: C:\Elandata\DataSet\Dr Saliza\5.023
uning File: C:\Elandata\Tuning\Default.tun
ptimization File: C:\Elandata\Optimize\Default.dac
alibration File: C:\Elandata\System\Dr Saliza (2).cal
alibration Type: External Calibration

Summary

Intensities

lyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	208	3345	0.952	2226.717	0.806
	75	1041	1.281	835.538	2.898
	111	34	12.305	25.167	3.687

Concentration Results

Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
208	1118.565	**0.063**	0.00	2.8	ppb
75	205.577	**0.162**	0.01	6.5	ppb
111	8.667	**0.005**	0.00	48.0	ppb

Replicates

epeat 1

Analyte	Concentration
Pb	0.064692
As	0.167697
Cd	0.007924

epeat 2

Analyte	Concentration
Pb	0.061328
As	0.149954
Cd	0.003170

epeat 3

Analyte	Concentration
Pb	0.064144
As	0.168617
Cd	0.004358

Quantitative Analysis - Summary Report

Sample ID: 6

Sample Date/Time: Thursday, April 12, 2018 13:40:00
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\6.024
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	2072	5.188	2226.717	0.806
As	75	1116	2.053	835.538	2.898
Cd	111	28	4.571	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	-154.536	-0.009	0.01	69.6	ppb
As	75	280.697	0.221	0.02	8.2	ppb
Cd	111	2.444	0.001	0.00	51.6	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	-0.015027
As	0.234330
Cd	0.000594

Repeat 2

Analyte	Concentration
Pb	-0.008386
As	0.228941
Cd	0.001981

Repeat 3

Analyte	Concentration
Pb	-0.002859
As	0.200684
Cd	0.001783

Quantitative Analysis - Summary Report

Sample ID: 7

Sample Date/Time: Thursday, April 12, 2018 13:41:58
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

ample File: C:\Elandata\Sample\Dr Saliza (2).sam
ethod File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\7.025
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

lyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	208	123345	1.985	2226.717	0.806
	75	1358	1.363	835.538	2.898
	111	530	6.005	25.167	3.687

Concentration Results

alyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	208	121118.029	6.864	0.14	2.0	ppb
	75	522.563	0.412	0.01	3.5	ppb
	111	504.460	0.300	0.02	6.3	ppb

6.86×10^{-3}

Replicates

Repeat 1

Analyte	Concentration
Pb	6.746080
As	0.404397
Cd	0.297254

Repeat 2

Analyte	Concentration
Pb	6.828188
As	0.428843
Cd	0.319838

Repeat 3

Analyte	Concentration
Pb	7.016723
As	0.402820
Cd	0.282297

Quantitative Analysis - Summary Report

Sample ID: 88
Sample Date/Time: Thursday, April 12, 2018 13:43:56
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\8.026
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	189212	0.597	2226.717	0.806
As	75	1317	1.567	835.538	2.898
Cd	111	595	0.960	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	186985.618	10.596	0.06	0.6	ppb
As	75	481.890	0.380	0.02	4.3	ppb
Cd	111	570.075	0.339	0.00	1.0	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	10.540256
As	0.361420
Cd	0.340343

Repeat 2

Analyte	Concentration
Pb	10.666128
As	0.386523
Cd	0.341135

Repeat 3

Analyte	Concentration
Pb	10.582601
As	0.391911
Cd	0.334895

Quantitative Analysis - Summary Report

Sample ID: 9

Sample Date/Time: Thursday, April 12, 2018 13:45:55
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\9.027
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

alyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	208	126903	0.159	2226.717	0.806
	75	1239	2.099	835.538	2.898
	111	551	2.408	25.167	3.687

Concentration Results

alyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	208	124676.620	**7.065**	0.01	0.2	ppb
	75	403.213	**0.318**	0.02	6.4	ppb
	111	526.239	**0.313**	0.01	2.5	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	7.075767
As	0.303066
Cd	0.304089

Repeat 2

Analyte	Concentration
Pb	7.053165
As	0.341311
Cd	0.319541

Repeat 3

Analyte	Concentration
Pb	7.067048
As	0.309374
Cd	0.314588

Quantitative Analysis - Summary Report

Sample ID: 10

Sample Date/Time: Thursday, April 12, 2018 13:47:54
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\10.028
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	2791	5.647	2226.717	0.806
As	75	1000	2.754	835.538	2.898
Cd	111	25	12.875	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	564.768	0.032	0.01	27.9	ppb
As	75	164.517	0.130	0.02	16.7	ppb
Cd	111	-0.167	-0.000	0.00	1931.3	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	0.024566
As	0.154423
Cd	0.001585

Repeat 2

Analyte	Concentration
Pb	0.029536
As	0.121041
Cd	0.000297

Repeat 3

Analyte	Concentration
Pb	0.041913
As	0.113681
Cd	-0.002179

Analyte
Pb
As
Cd

Quantitative Analysis - Summary Report

Sample ID: 12

Sample Date/Time: Thursday, April 12, 2018 13:51:53
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\12.030
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	20274	4.911	2226.717	0.806
As	75	10744	0.993	835.538	2.898
Cd	111	231	7.456	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	18047.020	1.023	0.06	5.5	ppb
As	75	9908.252	7.812	0.08	1.1	ppb
Cd	111	205.503	0.122	0.01	8.4	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	0.971219
As	7.834805
Cd	0.111134

Repeat 2

Analyte	Concentration
Pb	1.013881
As	7.719159
Cd	0.123912

Repeat 3

Analyte	Concentration
Pb	1.083032
As	7.882826
Cd	0.131340

Quantitative Analysis - Summary Report

Sample ID: 14

Sample Date/Time: Thursday, April 12, 2018 13:55:48
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\14.032
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	125126	0.964	2226.717	0.806
As	75	1799	1.601	835.538	2.898
Cd	111	459	3.652	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	122899.371	6.965	0.07	1.0	ppb
As	75	963.473	0.760	0.02	3.0	ppb
Cd	111	433.678	0.258	0.01	3.9	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	6.975297
As	0.742573
Cd	0.268231

Repeat 2

Analyte	Concentration
Pb	6.891542
As	0.750985
Cd	0.256543

Repeat 3

Analyte	Concentration
Pb	7.026994
As	0.785422
Cd	0.248420

Analyte
Pb
As
Cd

F
As
Cd

Quantitative Analysis - Summary Report

Sample ID: 16

Sample Date/Time: Thursday, April 12, 2018 13:59:41
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processihg Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\16.034
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	3122	3.210	2226.717	0.806
As	75	1139	0.477	835.538	2.898
Cd	111	28	23.557	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	895.153	0.051	0.01	11.2	ppb
As	75	303.588	0.239	0.00	1.8	ppb
Cd	111	3.278	0.002	0.00	204.4	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	0.044993
As	0.242872
Cd	-0.000594

Repeat 2

Analyte	Concentration
Pb	0.050841
As	0.240638
Cd	0.006537

Repeat 3

Analyte	Concentration
Pb	0.056349
As	0.234592
Cd	-0.000099

Quantitative Analysis - Summary Report

Sample ID: 17

Sample Date/Time: Thursday, April 12, 2018 14:01:39
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\17.035
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

nalyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
b	208	4029	6.827	2226.717	0.806
As	75	948	0.545	835.538	2.898
Cd	111	26	18.705	25.167	3.687

Concentration Results

nalyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
b	208	1801.845	**0.102**	0.02	15.3	ppb
s	75	112.567	**0.089**	0.00	4.6	ppb
d	111	0.333	**0.000**	0.00	1430.9	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	0.087718
As	0.088842
Cd	0.003170

Repeat 2

Analyte	Concentration
Pb	0.099945
As	0.084636
Cd	-0.002476

Repeat 3

Analyte	Concentration
Pb	0.118664
As	0.092785
Cd	-0.000099

Quantitative Analysis - Summary Report

Sample ID: 18

Sample Date/Time: Thursday, April 12, 2018 14:03:36
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\18.036
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	3918	4.923	2226.717	0.806
As	75	1136	3.312	835.538	2.898
Cd	111	31	11.329	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	1691.574	0.096	0.01	11.4	ppb
As	75	300.366	0.237	0.03	12.5	ppb
Cd	111	5.833	0.003	0.00	60.2	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	0.085715
As	0.264163
Cd	0.005646

Repeat 2

Analyte	Concentration
Pb	0.094427
As	0.241032
Cd	0.003269

Repeat 3

Analyte	Concentration
Pb	0.107438
As	0.205284
Cd	0.001486

Quantitative Analysis - Summary Report

Sample ID: 19

Sample Date/Time: Thursday, April 12, 2018 14:05:34
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\19.037
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

nalyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
b	208	149129	1.803	2226.717	0.806
s	75	1203	2.915	835.538	2.898
d	111	642	4.917	25.167	3.687

Concentration Results

nalyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
b	208	146902.042	**8.325**	0.15	1.8	ppb
s	75	367.708	**0.290**	0.03	9.5	ppb
d	111	616.412	**0.366**	0.02	5.1	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	8.297448
As	0.264689
Cd	0.377984

Repeat 2

Analyte	Concentration
Pb	8.489053
As	0.319494
Cd	0.376300

Repeat 3

Analyte	Concentration
Pb	8.187970
As	0.285586
Cd	0.344701

Quantitative Analysis - Summary Report

Sample ID: 20

Sample Date/Time: Thursday, April 12, 2018 14:11:47
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\20.038
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	392758	0.329	2226.717	0.806
As	75	1134	1.226	835.538	2.898
Cd	111	1212		25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	390530.973	**22.131**	0.07	0.3	ppb
As	75	298.143	**0.235**	0.01	4.7	ppb
Cd	111	1186.414	**0.705**	0.01	1.6	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	22.060652
As	0.223158
Cd	0.717558

Repeat 2

Analyte	Concentration
Pb	22.206970
As	0.244712
Cd	0.694972

Repeat 3

Analyte	Concentration
Pb	22.125631
As	0.237352
Cd	0.702698

halyte
b
s
id

halyte
b
s
id

Quantitative Analysis - Summary Report

Sample ID: 22

Sample Date/Time: Thursday, April 12, 2018 14:16:01
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\22.040
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	1680	1.337	2226.717	0.806
As	75	763	3.440	835.538	2.898
Cd	111	15	21.742	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	-547.117	-0.031	0.00	4.1	ppb
As	75	-72.173	-0.057	0.02	36.4	ppb
Cd	111	-9.944	-0.006	0.00	33.3	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	-0.029575
As	-0.039427
Cd	-0.007627

Repeat 2

Analyte	Concentration
Pb	-0.031427
As	-0.079773
Cd	-0.003764

Repeat 3

Analyte	Concentration
Pb	-0.032012
As	-0.051517
Cd	-0.006339

Quantitative Analysis - Summary Report

Sample ID: 23

Sample Date/Time: Thursday, April 12, 2018 14:18:00
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\23.041
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	1484	0.271	2226.717	0.806
As	75	692	1.130	835.538	2.898
Cd	111	13	6.837	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	-743.207	**-0.042**	0.00	0.5	ppb
As	75	-143.179	**-0.113**	0.01	5.5	ppb
Cd	111	-12.500	**-0.007**	0.00	6.9	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	-0.042092
As	-0.116965
Cd	-0.008023

Repeat 2

Analyte	Concentration
Pb	-0.041903
As	-0.105794
Cd	-0.007132

Repeat 3

Analyte	Concentration
Pb	-0.042356
As	-0.115913
Cd	-0.007132

E6

Quantitative Analysis - Summary Report

Sample ID: 24

Sample Date/Time: Thursday, April 12, 2018 14:19:59
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\24.042
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	1699	2.096	2226.717	0.806
As	75	762	1.948	835.538	2.898
Cd	111	15	12.644	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	-527.725	-0.030	0.00	6.7	ppb
As	75	-73.951	-0.058	0.01	20.1	ppb
Cd	111	-9.889	-0.006	0.00	19.5	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	-0.032154
As	-0.068865
Cd	-0.006636

Repeat 2

Analyte	Concentration
Pb	-0.029311
As	-0.060323
Cd	-0.004556

Repeat 3

Analyte	Concentration
Pb	-0.028253
As	-0.045735
Cd	-0.006438

Analyte
Pb

Quantitative Analysis - Summary Report

Sample ID: 26

Sample Date/Time: Thursday, April 12, 2018 14:23:54
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\26.044
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	33369	1.205	2226.717	0.806
As	75	770	2.806	835.538	2.898
Cd	111	762	2.586	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	31142.370	1.765	0.02	1.3	ppb
As	75	-66.006	-0.052	0.02	32.7	ppb
Cd	111	736.476	0.438	0.01	2.7	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	1.744095
As	-0.051649
Cd	0.439102

Repeat 2

Analyte	Concentration
Pb	1.761138
As	-0.069259
Cd	0.425333

Repeat 3

Analyte	Concentration
Pb	1.789208
As	-0.035221
Cd	0.448611

Analyte
Pb
As
Cd

Analyte
Pb
As
Cd

Quantitative Analysis - Summary Report

Sample ID: 28

Sample Date/Time: Thursday, April 12, 2018 14:27:47
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\28.046
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	2453	2.588	2226.717	0.806
As	75	546	5.743	835.538	2.898
Cd	111	16	23.330	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	226.670	0.013	0.00	28.0	ppb
As	75	-289.855	-0.229	0.02	10.8	ppb
Cd	111	-9.444	-0.006	0.00	38.8	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	0.013598
As	-0.252983
Cd	-0.007825

Repeat 2

Analyte	Concentration
Pb	0.016007
As	-0.229065
Cd	-0.003467

Repeat 3

Analyte	Concentration
Pb	0.008931
As	-0.203570
Cd	-0.005547

Quantitative Analysis - Summary Report

Sample ID: 29

Sample Date/Time: Thursday, April 12, 2018 14:29:44
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\29.047
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	2381	2.298	2226.717	0.806
As	75	587	4.346	835.538	2.898
Cd	111	19	13.982	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	154.150	0.009	0.00	35.5	ppb
As	75	-248.742	-0.196	0.02	10.3	ppb
Cd	111	-6.611	-0.004	0.00	39.2	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	0.005473
As	-0.206461
Cd	-0.003764

Repeat 2

Analyte	Concentration
Pb	0.011642
As	-0.208958
Cd	-0.005547

Repeat 3

Analyte	Concentration
Pb	0.009091
As	-0.172949
Cd	-0.002476

Quantitative Analysis - Summary Report

Sample ID: 30

Sample Date/Time: Thursday, April 12, 2018 14:31:42
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\30.048
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	2647	1.449	2226.717	0.806
As	75	685	1.330	835.538	2.898
Cd	111	21	3.599	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	420.390	0.024	0.00	9.1	ppb
As	75	-151.013	-0.119	0.01	6.0	ppb
Cd	111	-3.778	-0.002	0.00	20.4	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	0.021959
As	-0.115256
Cd	-0.002773

Repeat 2

Analyte	Concentration
Pb	0.026210
As	-0.114599
Cd	-0.001981

Repeat 3

Analyte	Concentration
Pb	0.023300
As	-0.127347
Cd	-0.001981

Quantitative Analysis - Summary Report

Sample ID: 31

Sample Date/Time: Thursday, April 12, 2018 14:33:40
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\31.049
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	119499	18.766	2226.717	0.806
As	75	1078	5.806	835.538	2.898
Cd	111	1345	18.318	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	117272.271	6.646	1.27	19.1	ppb
As	75	241.970	0.191	0.05	25.9	ppb
Cd	111	1320.325	0.785	0.15	18.7	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	7.972673
As	0.238929
Cd	0.933418

Repeat 2

Analyte	Concentration
Pb	6.524763
As	0.193062
Cd	0.779968

Repeat 3

Analyte	Concentration
Pb	5.439747
As	0.140360
Cd	0.640587

Quantitative Analysis - Summary Report

Sample ID: 32

Sample Date/Time: Thursday, April 12, 2018 14:35:38
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\32.050
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	112291	0.519	2226.717	0.806
As	75	1083	1.523	835.538	2.898
Cd	111	1145	0.873	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	110063.924	6.237	0.03	0.5	ppb
As	75	247.193	0.195	0.01	6.7	ppb
Cd	111	1119.850	0.666	0.01	0.9	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	6.227315
As	0.180051
Cd	0.659607

Repeat 2

Analyte	Concentration
Pb	6.210279
As	0.204233
Cd	0.665451

Repeat 3

Analyte	Concentration
Pb	6.274116
As	0.200422
Cd	0.671494

Quantitative Analysis - Summary Report

Sample ID: 33

Sample Date/Time: Thursday, April 12, 2018 14:37:36
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Repticates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\33.051
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

nalyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
b	208	70511	0.772	2226.717	0.806
s	75	1066	2.879	835.538	2.898
d	111	1125	2.704	25.167	3.687

Concentration Results

nalyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
b	208	68284.517	**3.870**	0.03	0.8	ppb
s	75	230.413	**0.182**	0.02	13.3	ppb
d	111	1099.736	**0.654**	0.02	2.8	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	3.898363
As	0.155080
Cd	0.662480

Repeat 2

Analyte	Concentration
Pb	3.837060
As	0.202393
Cd	0.665451

Repeat 3

Analyte	Concentration
Pb	3.873467
As	0.187542
Cd	0.632761

Quantitative Analysis - Summary Report

Sample ID: 34

Sample Date/Time: Thursday, April 12, 2018 14:39:35
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\34.052
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	3206	1.186	2226.717	0.806
As	75	707	2.423	835.538	2.898
Cd	111	24	2.433	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	979.737	**0.056**	0.00	3.9	ppb
As	75	-128.622	**-0.101**	0.01	13.3	ppb
Cd	111	-1.111	**-0.001**	0.00	52.7	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	0.056094
As	-0.116439
Cd	-0.000990

Repeat 2

Analyte	Concentration
Pb	0.053137
As	-0.090286
Cd	-0.000693

Repeat 3

Analyte	Concentration
Pb	0.057332
As	-0.097515
Cd	-0.000297

Quantitative Analysis - Summary Report

Sample ID: 35

Sample Date/Time: Thursday, April 12, 2018 14:41:34
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\35.053
Tuning File: C:\Elandata\Tuning\Default tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	3736	0.990	2226.717	0.806
As	75	732	1.505	835.538	2.898
Cd	111	21	16.034	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	1509.441	0.086	0.00	2.5	ppb
As	75	-103.676	-0.082	0.01	10.6	ppb
Cd	111	-4.111	-0.002	0.00	82.1	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	0.084827
As	-0.090155
Cd	-0.003071

Repeat 2

Analyte	Concentration
Pb	0.087898
As	-0.072808
Cd	-0.000198

Repeat 3

Analyte	Concentration
Pb	0.083892
As	-0.082270
Cd	-0.004061

Quantitative Analysis - Summary Report

Sample ID: 36

Sample Date/Time: Thursday, April 12, 2018 14:43:33
Sample Description: Instant noodles & seasoning sample
Solution Type: Sample
Blank File:
Number of Repticates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Dr Saliza (2).sam
Method File: C:\Elandata\Method\dr saliza (2).mth
Dataset File: C:\Elandata\DataSet\Dr Saliza\36.054
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File: C:\Elandata\System\Dr Saliza (2).cal
Calibration Type: External Calibration

Summary

Intensities

Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
Pb	208	3637	1.950	2226.717	0.806
As	75	781	5.538	835.538	2.898
Cd	111	23	18.773	25.167	3.687

Concentration Results

Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
Pb	208	1410.010	**0.080**	0.00	5.0	ppb
As	75	-54.949	**-0.043**	0.03	78.7	ppb
Cd	111	-1.722	**-0.001**	0.00	255.6	ppb

Replicates

Repeat 1

Analyte	Concentration
Pb	0.075794
As	-0.059140
Cd	0.001288

Repeat 2

Analyte	Concentration
Pb	0.083825
As	-0.066631
Cd	-0.000495

Repeat 3

Analyte	Concentration
Pb	0.080093
As	-0.004206
Cd	-0.003863