

**DETERMINATION OF HEAVY METALS IN BODY WASHES
USING INDUCTIVELY COUPLED PLASMA
OPTICAL EMISSION SPECTROMETRY (ICP-OES)**

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ABSTRACT

DETERMINATION OF HEAVY METALS IN BODY WASHES BY USING INDUCTIVELY COUPLED PLASMA OPTICAL EMISSION SPECTROMETRY (ICP-OES)

This study was carried out to determine the amount of heavy metals (lead, chromium, zinc and copper) in body washes of different brands (from different countries) by using ICP-OES. The samples used were body wash D (Indonesia and Malaysia), body wash P (Thailand and Malaysia) and body wash A (Vietnam and Malaysia). The heavy metals were extracted from the samples by using wet digestion method. This analysis was conducted by using standard calibration method. The emission signals of lead, chromium, zinc and copper were measured at wavelength of 220.353, 267.716, 206.200 and 327.393 nm respectively. Based on the results' interpretation, the concentration of lead, chromium, zinc and copper in; body wash D (Indonesia) are 0.19 ± 0.0006 , 0.31 ± 0.0006 , 1.83 ± 0.0025 and 0.17 ± 0.0006 ; body wash D (Malaysia) are 0.33 ± 0.0012 , 0.21 ± 0.0000 , 2.52 ± 0.0006 and 0.07 ± 0.0000 ; body wash P (Thailand) are 0.10 ± 0.0006 , 0.17 ± 0.0006 , 3.21 ± 0.0066 and 0.10 ± 0.0006 ; body wash P (Malaysia) are 0.10 ± 0.0006 , 0.14 ± 0.0000 , 4.52 ± 0.0038 and 0.07 ± 0.0000 ; body wash A (Vietnam) are 0.67 ± 0.0006 , 1.28 ± 0.0000 , 4.78 ± 0.0017 and 0.48 ± 0.0006 and body wash A (Malaysia) are 0.40 ± 0.0006 , 0.62 ± 0.0006 , 2.19 ± 0.0076 and 0.40 ± 0.0006 mg/kg respectively.

CHAPTER 1

INTRODUCTION

1.1 Background

Body wash is a type of cosmetic products. Cosmetic products are any mixtures that are being applied in contact with various external body parts or within the oral parts (Alsaffar and Hussein, 2014). The purposes of applying these cosmetic products are for cleaning, perfuming, upgrading appearance, improving body odors and keeping the body in good condition. These cosmetic products include care creams, lipsticks, eye makeups, tooth paste, body washes, hair shampoos, face and mouth washes. Overall cosmetic products contain some emulsifiers, oils and other ingredients. The cosmetic products are supposed to be safe for human application and for the environment. However, cosmetic products sold in the market nowadays contain some contaminants such as heavy metals, which can harm human health.

Generally, heavy metals are metals with density five times greater than the density of water (Al-Trabulsy *et al.*, 2010). There are two types of heavy metals that are good (such as iron, zinc and copper) and toxic (such as lead, chromium and cadmium) for body systems. As for the toxic heavy