# QUANTITATIVE ANALYSIS OF ESSENTIAL METALS IN CEYLON CINNAMON AND CASSIA CINNAMON BY USING FLAME ATOMIC ABSORPTION SPECTROMETRY (FAAS)

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## ABSTRACT

## QUANTITATIVE ANALYSIS OF ESSENTIAL METALS IN CEYLON CINNAMON AND CASSIA CINNAMON BY USING FLAME ATOMIC ABSORPTION SPECTROMETRY (FAAS)

This study was conducted to determine the amount of essential metals in bark and powder of two different species of cinnamon which are Ceylon cinnamon and Cassia cinnamon. The amount of copper, manganese, calcium, iron and zinc were determined using Flame Atomic Absorption Spectrometry. The wavelength of copper, zinc, manganese, calcium and iron used were 324.75 nm, 213.86 nm, 279.48 nm, 422.67 nm and 248.33 nm respectively. A series of standard with different concentrations were prepared for the metal under study to construct the calibration curve. The essential metals were extracted by using wet digestion method. Based on the results, Ca is the highest metal found in both types of cinnamons (bark and powder), followed by Mn. The amount of Ca in bark and powder of Ceylon cinnamon are $5391.8 \pm 5.0\times10^{-3}$ mg/kg and $5790.3 \pm 2.0\times10^{-3}$ mg/kg respectively while the amount of Ca in bark and powder of Cassia cinnamon are $7625.7 \pm 4.0\times10^{-3}$ mg/kg and $6496.5 \pm 7.0\times10^{-3}$ mg/kg respectively. The content of Mn in bark and powder of Ceylon cinnamon are $231.0 \pm 9.0 \times10^{-3}$ mg/kg and $355.5 \pm 5.0 \times10^{-3}$ mg/kg respectively while the content of Mn in Cassia cinnamon are $248.8 \pm 2.0 \times10^{-3}$ mg/kg (bark) and $551.0 \pm 6.0 \times10^{-3}$ mg/kg (powder). Generally, Cassia bark is better than Ceylon bark because it contains high amount of essential metals while Ceylon powder is better than Cassia powder when comparing different species. In addition, the powder of Ceylon cinnamon is better than bark of Ceylon cinnamon while the bark of Cassia cinnamon is better than powder of Cassia cinnamon.

# CHAPTER 1

# INTRODUCTION

## 1.1 Background

Cinnamon is one of the medicinal plants and spices that has been used since the ancient times for instance in India, Sri Lanka, China and Indonesia. According to Vinitha and Ballal (2008), the name cinnamon comes from the Greek word that means sweet wood. Cinnamon is an aromatic plant that has the ability to produce an essence or fragrance and most of the aromatic plants are phenolic compounds. They have been used as food additives to boost the flavour and taste for the food industry due to their strong aroma, sweet and spicy flavour. Cinnamon spice is obtained by drying the central part of the bark (Thomas and Duethi, 2001) and is commercialized in various forms such as ground form (stick), liquid form (oil) and powder form (Santos *et al.*, 2017). Harvesters cut the inner bark of the tree into the curled sticks and the bark is ground up into powder.