DETERMINATION OF CAFFEINE IN ENERGY DRINKS AVAILABLE AT LOCAL MARKET USING HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC) WITH DIODE ARRAY DETECTOR (DAD)

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In recent years, the increase consumption of energy drinks has raised concerns among scientific community and public about the health effects of these products that related with its caffeine content. Hence, it is important to efficiently determine the caffeine concentration in the drinks. High Performance Liquid Chromatography (HPLC) method has been developed to determine the amount of caffeine in different brands of energy drink. In this method, the identification and determination of caffeine in energy drinks were carried out under constant flow rates which is 1.6 mL/min and at 272 nm wavelength detector. A mixture of water:acetonitrile (v/v) was used as mobile phase to separate caffeine in Hypersil GOLD C18 column (25 cm x 4.6 cm x 5 μm). Peaks separation was best achieved using gradient elution of mobile phase within 6.0 min. Both samples and caffeine standard were analysed under the same conditions. Caffeine was detected at 1.9 min for both standard and energy drink samples. The concentration of caffeine in energy drinks was quantified using multiple point external standard method. Calibration curve gave a good correlation coefficient (R^2) of 0.9986 while limits of detection (LOD) and quantitation (LOQ) were found to be 4.79 and 14.51 mg/L respectively. The results obtained shows that ED2 had the highest amount of caffeine. It was, however, noted that though most of the energy drinks had high caffeine content they had no label claim.

CHAPTER 1

INTRODUCTION

1.1 Background of Study and Problem Statement

Energy drinks are available in many countries and it is the fastest growing beverage market in western country especially in the United States. In recent years, a number of different energy drinks have been introduced to the Malaysian market as an energy booster or as a dietary supplement.

Although energy drinks are relatively new kind of beverages, they are quickly becoming popular and have been consumed by different societies, particularly among young consumers and active individuals like athletic person. This is because energy drinks are commonly thought to be capable of providing power throughout the day yet safe for consumption without any health problems or side effects. In addition, energy drink products are aggressively marketed by the manufacturer with convincing advertising statements that says it can give lots of benefits in term of increase attention, endurance, performance, and weight loss (Reissig *et al.*, 2009). The manufacturers often advertise the energy boosting benefits of the drinks and they usually announce the consumption of these drinks to be very efficient with no relating health problems or side effects (Higgins *et al.*, 2010).