UNIVERSITI TEKNOLOGI MARA (UiTM)

DEVELOPMENT AND VALIDATION OF HPLC METHOD FOR ANALYSIS OF COCAINE FOR EXTEMPORANEOUS PREPARATION STABILITY TEST

SITI NORIAH BINTI MUHD YUNA

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TABLE OF CONTENT

ABSTRACT

Cocaine is an addictive and powerful drug which has been used mainly as anesthetic agent. The objective of this study is to develop and validate method for quantitative analysis of cocaine for extemporaneous preparation stability test using high performance liquid chromatography (HPLC). High performance liquid chromatography with diode array detector was used to develop the method and multiple wavelength detector was used in order to validate the developed method. Chromatography was performed on ZORBAX 300SB-C18 (4.6 mm × 150 mm, 5μm particle size, Zorbax) using acetonitrile-phosphate buffer pH 4 as mobile phase with the flow rate of 1mL/min. A linear calibration curve over concentration range of 10 μg/mL until 320 μg/mL was obtained. The average correlation coefficient (R^2) for cocaine was 0.9994. The accuracy was founded to be satisfactory.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Cocaine is a stimulant of central nervous system which originates from South American with molecular formula $C_{17}H_{21}NO_4$ (Trends *et al.*, 2011). Cocaine is administered via multiple routes such as insufflation, intravenous injection, smoking, ingestion and mucosal application. It is rapidly absorbed by all routes except ingestion and topical. Bioavailability of cocaine varies according to route of administration. Intravenous and smoked cocaine have bioavailability greater than 90 % while insufflation is 80 %, intranasal 60 % and oral 30 %. It has protein binding of 90 % with half-life about 0.7 to 1.5 hours and elimination period of a few hours (Goldstein *et al.*, 2009). Cocaine is metabolized through multiple enzymatic degradations which are hydrolisation by carboxyesterase and hepatic N-demethylation as the major pathway. Excretion of cocaine is major in urine and minor in fecal (Burnett, 2012).

The mode of action of cocaine is by modification of action of dopamine in brain. It binds to dopamine re-uptake transporters on the pre-synaptic membranes of dopaminergic neurons. This will cause the inhibition of the removal of dopamine from the synaptic cleft and its degradation by monoamine oxidase in the nerve terminal (Drugs & Health, 1997). The second major action is anesthetic effect by blocking the fast sodium channel in the neuronal cell hence damaging conduction of nerve impulse and electrical impulse in heart. It also acts as anticholinergic drug in high concentration to inhibit the muscarinic receptor (Scholz, 2002).