DETERMINATION OF PARTICULATE CONTENT IN CIGARETTE SMOKE FROM SELECTED CIGARETTE BRANDS

BY

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DECLARATION

This study is original and has not been submitted for any other degree award to any other University before.

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Signature...............................

This report has been submitted for examination with the approval of the following supervisor.

Mr. OYEGE IVAN

Signature......................................

Date...................................

DEDICATION

This research is dedicated to my beloved mother Nassali Saidati, my sisters (Nakayi Aisha and Rahma Umaru), Naiga Kaitetsi Habbibah and all Ugandans.

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WHO - World Health Organisation

UN   - United Nations

GYTS - Global Youth Tobacco Survey

NCDs - Non Communicable Diseases

TB - Tuberculosis

HIV/AIDS - Human Immune Virus/ Acquired Immunodeficiency Syndrome

UDHS C- Uganda Demographic and Health Survey

UCI - Uganda Cancer Institute

BAT - British American Tobacco

SDGs – Sustainable development goals

TPM – Total particulate matter

FCTC - Framework Convention on Tobacco Control

TSNAs - Tobacco-specific nitrosamines

PAHs – Poly aromatic hydrocarbons

MS – Mainstream Smoke

SS - Sidestream Smoke

ETS - Environmental tobacco smoke

IARC - International Agency for Research on Cancer

NDA – N-nitrosodiamine

ATSDR - Agency for Toxic Substances and Disease Registry

ABSTRACT

This study was aimed at establishing the total amount of particulates the smoker and the non-smoker are exposed to and also establish the chemical composition of total particulates of cigarette smoke from the selected cigarette brands sold in Uganda. This was achieved by using an apparatus that mimics the smoking process of a human being and the passive smoker; this set was connected to a set up containing a cigarette to burnt . The chemical composition was determined using the conventional tests for the organic functional groups. It has been found out that sportsmann and locally cured tobacco to contain the highest total particulate content (73 mg and 116 mg) while supermatch and safari have the lowest total amount of particulates (45.5 mg and 40.3 mg) and rex contains 55 mg . The cigarette were found to be composed of the following functional groups (aromatics, phenolics, nitrosoamines and alkaloids) but aldehyde and ketonic groups were not detected. The cigarette composition results in cigarette smoke composition either the main stream or the side stream causing the disease to respiratory system for example lung cancer, emphysema and cancers in the mouth cavity and oesophagus since they are carcinogenic lead to development of cancerous cells

CHAPTER ONE: INTRODUCTION

1.1   Back ground

Cigarette smoking is a widespread habit in our society and the social, political, aesthetic and medical issues resulting from cigarette smoking have affected smokers and non-smokers in the same way. According to American Lung Association, cigarette smoking is the primary cause of lung cancer (results from mutation of lung cells) and Emphysema (results from over inflation of lung structures (alveoli) which occurs when alveoli walls begin to break down). (Beck *et.al*, 1981)

Tobacco smoke has been documented to cause numerous diseases such as asthma, bronchitis, heart diseases, high blood pressure, stroke, stomach ulcers and, many cancers such as cancer of lungs, throat and mouth (Bataringaya, 2001). It is also linked with miscarriages, premature birth and impotence in men (Benjamin, 2010). Tobacco use also increases complications of tuberculosis (TB), diabetes and HIV/AIDS (WHO, 2011). In Uganda, 26% of deaths are due to cancers of the respiratory system and 14.0% of deaths due to other respiratory diseases were attributable to tobacco smoking (WHO, 2011).

Cigarette smoke is a heterogeneous complex mixture of gases and liquid particulate matter. The particulate phase contains macro-sized particles (about 0.5 micron median size) which are carcinogenic such as poly aromatic hydro carbons (PAHs), nitrosoamines, alkaloids and heavy metals like lead, nickel and cadmium (Benner *et.al*, 1989). Therefore as it enters the mouth, the smoke is a concentrated aerosol with millions of particles per cubic centimetre such that when they aggregate on a surface of cavities they may cause diseases in respiratory organs and associated organs. (Griest, 1997)

Many organic and inorganic chemicals in the aerosol (volatile, and particulate phases) of cigarette smoke appear to contribute to smoke's toxicity to the respiratory system, including hydrocarbons, aldehydes, ketones, organic acids, phenols, cyanides, acrolein, and nitrogen oxides (Harris, 2006). Some components contribute to the development of chronic mucus hypersecretion in the central

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