

UNIVERSITI TEKNOLOGI MARA

**DEVELOPMENT OF HAND
SANITIZER ENHANCED WITH
GREEN COFFEE BEANS EXTRACT**

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JULY 2019

ABSTRACT

This research focused on Chlorogenic acids from green Arabica coffee beans extract. Green coffee beans extract application is still low due to lack of research on its potential and benefits. Since green coffee beans claim to be rich in Chlorogenic acids, it will influence the potential benefits of the extract. Chlorogenic acids also has been proven to exhibit antibacterial activity on pathogenic bacteria. In response to utilize the ability of Chlorogenic acids from green coffee beans, this study conducted to develop sanitizer enhanced with green coffee beans extract which can be an alternative formulation compared to alcohol based. Green coffee beans extract was extracted by using Soxhlet extraction method and Chlorogenic acids was analyses by using UV-Vis spectroscopy. Central Composite design of response surface methodology (RSM) with 13 experimental runs was used to investigate the optimum conditions for the extraction, and the selected variables were solvent volume from 100mL to 300mL and extraction temperature from 100 °C to 200 °C. The maximum predicted Chlorogenic acids concentration (0.012 mg/mL) was obtained at the solvent volume and extraction temperature of 300mL and 200°C respectively. Thus, the result from this extraction has been utilized for the formulation of hand sanitizer with green coffee beans extract. Evaluation of developed hand sanitizer was conducted by using disc diffusion method on the *Escherichia Coli*. An effective zone inhibition (13mm) of hand sanitizer was obtained when using green coffee beans extract at 300mL solvent volume and 200°C extraction temperature.

ACKNOWLEDGEMENT

Firstly, I wish to thanks Allah s.w.t for giving me the opportunity to embark on my degree and for completing this long and challenging journey successfully. My gratitude and thanks go to my supervisor Dr. Ummi Kalthum Ibrahim for the continuous support on my related research, for her patience, motivation, and immense knowledge. Her guidance helped me in all the time of research and writing this thesis.

My appreciation also goes to the staff and technician of the UiTM who provided the facilities and assistance during sampling. Special thanks to my colleagues and friends for the stimulating discussions, for the sleepless nights we were working together before deadlines, and for all the fun we have had in the last four years.

Finally, this thesis is dedicated to the loving memory of my very dear father and mother for the vision and determination to educate me. This piece of victory is dedicated to both of you. Alhamdulillah.

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CHAPTER ONE

INTRODUCTION

1.1 Research Background

Infections outbreak in today community much more related to lack of good hygiene practice where people are more susceptible to numerous microorganisms. Infections can mostly transmit with unclean or soiled hands especially children where transmission comes when playing in microorganisms contaminated area or contaminated toys. Without cleaning their hands, children sometimes will put their fingers into their mouth or having meal without proper hand washing practice (Lal, 2015). Not only children are susceptible to infections, healthcare workers also can be threatening from various pathogens transmitted from hospital setting, equipment and infected patients (Lal, 2015).

Preventive action should be taken to avoid from being infected by microorganism where it is suggested to practice proper hand cleaning or using sanitizer (Goldberg, 2017). Most practical sanitizer that commonly being use is hand sanitizer as it convenient, portable and easy to use when we are doing daily activity or working. Common formulation of hand sanitizer will consist of 60 to 95 per cent alcohol as active ingredient to kills microorganism. Research has proven that alcohol can kills bacteria by inhibiting their sporulation and spore germination (Yamamoto, Tamura & Yokota, 1988). Besides alcohol, antimicrobial agent also can be retrieved from plant where there is wide phytochemical content that believed to be useful for drugs formulation (Dubey, Mishra & Thakur, 2018).

Naturally, plant exhibits their own protection or natural defense against animals, insect and also microorganism due to their chemical compounds which can be varies according specific plants itself (Dubey, Mishra & Thakur, 2018). Research also stated that phytochemicals present in plant with complex structures and biologically active compounds (Dubey, Mishra & Thakur, 2018). This phytochemical initiate scientist for further research on newer compounds derived from plants for treatment of infections. Therefore, research on plant derivative has been accelerated in recent years in order to develop natural formulation on antimicrobial agent. During the age before pharmaceutical drug were developed, the ancestor found healing power of plant to cure