PALM OIL – COCONUT OIL – OLIVE OIL SOAPS WITH OKRA (*ABELMOSCHUS ESCULENTUS*) AND CINNAMON (*CINNAMOMUM ZEYLANICUM*) PREPARATION AND TESTING

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ABSTRACT

The purposes of this research project are to produce solid soap from natural-based ingredients, to analyze the physical and chemical properties of the soap as well as the antimicrobial activity of the soap towards *Escherichia coli*. Three types of oils chosen for this project are coconut oil, olive oil and palm oil. Several different ratio of two types of oil will be prepared for the production of soap. Each oil without mixing the other oils is prepared for the control of the experiment. Cinnamon (*Cinnamomum zeylanicum*) extracts will be substituted with distilled water in the preparation of sodium hydroxide. At the end of the saponification process, the ground okra (*Abelmoschus esculentus*) will be added into the soap mixture as the additive in the soap. After the production of soap has complete, the physical, chemical and biological parameters of the soap will be examined. The physical parameter to be observed is the color of the soap. The soaps have three different colors which are influenced by the ingredient added into the soap. The colors of the soap are dark brown for Type A soap, light brown for Type B soaps and milky white for Type C soaps. Meanwhile, the chemical parameters that will be considered in this study are the pH value, foam height, foam retention and alcohol insoluble matter of the soap. The pH value of all soaps were found to be in the acceptable limit which is within pH 8.5 to pH 10.5. Most of the soaps did not reached the acceptable limit of foam height which is 400ml. Only Type C soap made up of olive oil with foam height of 400ml, the acceptance limit of foam height. Meanwhile, the foam retention of soaps were stable after the observation for 4 minutes with 1 minute intervals time for all types of soaps. The alcohol insoluble matter of all types of soaps are found to be in the acceptance limit which is less than 0.5%. Last but least, the biological parameters to be determined is the antimicrobial activity of the soap which is based on the zone inhibition of *Escherichia coli*. The antimicrobial activity of soap was also examined. Some of Type A and Type B soaps expressed the antimicrobial activity. However, all Type C soaps do not show any antimicrobial activity towards wild type *Escherichia coli*.

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CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

Soap was produced nearly 5000 years ago by the Romans and also at other early civilization centers. Based on the report by Kirk and Othmer (1954), they used wood ashes which are the ancient source for alkali and animal fats as the raw material for the soap production during that time (Onyegbado et al., 2002). Nowadays, it has been used widely as one of the essential hygiene products in modern daily life. In the recent time, the basic reactants which is lye for soap are usually potassium or sodium salts where it will react with the oils or fat. The process involves in this reaction is called saponification. Saponification is the term for a chemical reaction for producing salt using an acid or base as the reactant. In terms of soap production, the acid would be the oil or fat while the lye would be the base leading to the production of soap containing salt and glycerin.

Soap can be classified into two forms which are solid as in bar soap and liquid soap. Both of these types of soaps have their pros and cons. In the past few years, most people prefer liquid soap than bar soap. This is might be due to the sanitary consideration because it will only be dispensed in single quantity use compared to the bar soap which is exposed to the surrounding area and can cause self-contamination potential risk. However, the bar soap still has some benefits of its own. As known, the bar soaps are sold much cheaper as compared to the liquid soap although both of the soaps give almost similar effect to our skin. Usually, a soap scum or slimy residue are left on our skin and shower area after using the bar soap, also, the possibility of exchange of germs are high since it is uncovered and touched more frequently. Meanwhile, if liquid soap is used, the chances of formation scum residues are lower compared to the bar soap. Moreover, the exchange of germs can be lowered when using the liquid soap since the remaining soap is protected in the bottle.