QUALITY ASSESSMENT IN TERMS OF pH AND TOTAL FATTY MATTER OF TWO SOAPS PRODUCED IN ILOILO

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ABSTRACT

Soap is a cleanser, used by people to remove filth. Specifically, it is the simplest type of surface-active agent (Skin Care Guide.com 2005). The properties of commercial soap are often analyzed after manufacture to guarantee high quality in the finished product (Classic Encyclopedia 2006). The pH of soap is analyzed because it significantly affects the skin's protective acid mantle. Highly alkaline soaps have been found to cause dryness and inflammation of the skin surface (Gfatter and others 1997). Total Fatty Matter (TFM) is a measure of the amount of fatty matter present in the soap. The higher the TFM, the better the soap is considered (Pundir 2009). Since the conduct of these tests is decided by the manufacturers (Lallanilla 2005), it is possible that homemade soaps being sold in the local markets have not been subjected to such tests. Thus, this study analyzed the quality of two such soaps, namely, "Women – Herbal Papaya Soap" and "Women – Herbal Bath Soap with Skin Care Protection", in terms of pH and Total Fatty Matter.

Three batches of each of the two soaps were analyzed. The pH of the samples was determined using a pH meter. The Total Fatty Matter of the samples was determined through ethanol extraction.

In terms of pH, it was found that "Women – Herbal Papaya Soap" produced an average pH value of 9.45 for Batch 1, 9.48 for Batch 2, and 9.64 for Batch 3. The second soap, "Women – Herbal Bath Soap with Skin Care Protection", produced an average pH value of 10.52 for Batch 1, 9.45 for Batch 2, and 10.63 for Batch 3. In terms of Total Fatty Matter, it was found that "Women – Herbal Papaya Soap" produced an average TFM of 54% for Batch 1, and 63% for both Batch 2 and Batch 3. The second soap, "Women – Herbal Bath Soap with Skin Care Protection", produced an average TFM of 53% for Batch 1, 63% for Batch 2, and 59% for Batch 3.

Therefore, it can be concluded that in terms of pH, "Women – Herbal Papaya Soap" can be classified as normal quality soap and "Women – Herbal Bath Soap with Skin Care Protection" can be classified as low quality soap. However, in terms of Total Fatty Matter, both soaps were found to be low quality soaps.

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CHAPTER I

INTRODUCTION

A. Background of the Study

Soaps are used for washing and cleaning, enabling water to carry away normally insoluble matter, such as grease and oils, through emulsification. A number of methods may be employed to make soap, but all of them are based on the same principle of operation. Soap is the hydrolysis of fats and oils with caustic alkali to yield propane-1, 2, 3 –triol and the corresponding sodium salts of the component fatty acids. These salts are the principal constituents of soap, and the properties of the soap produced depend mainly on the alkali and the fats or oils used (Anzene and Aremu 2007).

After manufacture, commercial soap is put through several tests to guarantee high quality in the finished product. These tests evaluate the various physical as well as chemical properties of soap, ranging from pH to antibacterial properties. The most important points in soap analysis, however, are determination of fatty matter, determination of total alkali, determination of the substances insoluble in water, and determination of the water contained in the soap itself – otherwise known as moisture content (Classic Encyclopedia 2006). But as homemade soaps have started to occupy their own little niche in the local markets – under the purview of "organic" or "herbal" soaps – it is possible that these tests have not been carried out. This study analyzed the quality of such soaps in terms of pH and Total Fatty Matter.

B. Statement of the Problem

This study analyzed the quality of two locally produced soaps, specifically, "Women – Herbal Papaya Soap" and "Women – Herbal Bath Soap with Skin Care Protection", in terms of pH and Total Fatty Matter.

C. Objectives of the Study

General objectives:

1. This study aimed to analyze the quality of two locally produced soaps using the following parameters: pH and TFM.

   Specific objectives:

   i. The pH of "Women – Herbal Papaya Soap" and "Women – Herbal Bath Soap with Skin Care Protection" was measured.

   ii. The TFM of "Women – Herbal Papaya Soap" and "Women – Herbal Bath Soap with Skin Care Protection" was measured.

2. The acquired data, that is the measured pH and TFM, was compared with the standards set for commercial soaps.

D. Significance of the Study

For any producer of any good, quality is a factor he must always keep in mind. Because of this, nearly all commercial products must be put through a series of tests to gauge their quality before they arrive on supermarket shelves. However, the responsibility for conducting these tests lies with the manufacturers, who then report the results with no independent review (Lallanilla 2005). They use these tests merely as tools to assure the consumer of the product's quality – which ultimately enables them to increase their selling price.

Cosmetic products do not undergo pre-market approval (Katz, cited in Lallanilla 2005). Research and reviews are done on a post-market basis, and only if the product is found to be mislabeled, adulterated, or if the product poses a question of safety to the health of its consumers. Because of this minimal regulation, everyday cosmetics – such as soaps, makeup, and shampoos – have been found to contain ingredients that are known or suspected of causing cancer, reproductive harm, or hormonal changes (Epstein, cited in Lallanilla 2005).

While these issues of concern are geared mostly towards the chemicals used in these products, organic ingredients may not always be better. Organic and herbal products, especially of the homemade variety, are often left untested. Therefore, their quality is left unknown.

The quality of a commercial soap is tested using several parameters, the most important of which are the determination of fatty matter, determination of total alkali, determination of the substances insoluble in water, and determination of the moisture content (Classic Encyclopedia 2006). The pH of the soap is often analyzed as well, as it significantly affects the skin's protective acid mantle, possibly changing the composition of the cutaneous bacterial flora and the activity of enzymes in the upper epidermis (Gfatter and others 1997).

E. Scope and Delimitation of the Study

The research was designed to cover two parameters only: pH and Total Fatty Matter. Only two locally produced soaps were tested and compared to standards. Three batches of each of the two soaps were tested. The soaps were bought at the Iloilo Producers' Association and were manufactured by Rosary Herbal Products. The two soaps that were used in the study were named "Women – Herbal Papaya Soap" and "Women – Herbal Bath Soap with Skin Care Protection".

F. Definition of Terms

Alkali – is a soluble salt of an alkali metal like sodium or potassium. The common alkalis used in soap making are sodium hydroxide (NaOH), also known as caustic soda, and potassium hydroxide (KOH), also known as caustic potash (SDA 2009).

Caustic – an adjective that refers to a corrosive substance that burns or destroys organic tissue by chemical action. Caustic can refer to an acid or a base but is typically used to describe the action of an alkaline base (Natural Soap Directory 2009).

Cleanser – a detergent, powder, or other chemical agent that removes dirt, grease, or stains (Dictionary.com 2009).

Cosmetic – a preparation, such as powder or a skin cream, designed to beautify the body by direct application (Dictionary.com 2009).

Emulsification – the process of making a normally insoluble matter dissolve in water.

Ethanol extraction – is a type of solvent extraction used to extract fragrant compounds directly from dry raw materials. Because ethanol is less hydrophobic than solvents used for organic extraction, it dissolves more of the oxidized aromatic constituents (alcohols, aldehydes, etc.), leaving behind the wax, fats, and other generally hydrophobic substances (Wikipedia 2009).

Lye – refers to either sodium hydroxide or potassium hydroxide. Sometimes refers to a solution of either sodium hydroxide or potassium hydroxide dissolved in water (Natural Soap Directory 2009).

pH – the scale used to measure the acidity or alkalinity of a chemical typically dissolved in water. The measurement scale goes from 0 (very acidic) to 14 (very alkaline or very basic), with pH of 7 representing neutral (Natural Soap Directory 2009).

Rosin – the yellowish to amber, translucent, hard, brittle, and fragmented resin left after distilling the oil of turpentine from the crude oleoresin of the pine. It is an ingredient in varnishes, printing inks, soldering fluxes, sealing wax, and soap (Dictonary.com 2009).

Saponification – refers to the reaction of a metallic alkali (base) with a fat or oil to form soap.

Tallow – the white, nearly tasteless, solid fat rendered from the natural fat of cattle and sheep which is used chiefly in soaps, candles, and lubricants (Dictionary.com 2009).

Total Fatty Matter (TFM) – is the ratio of the mass of the fatty content to the mass of the soap.

CHAPTER II

REVIEW OF RELATED LITERATURE

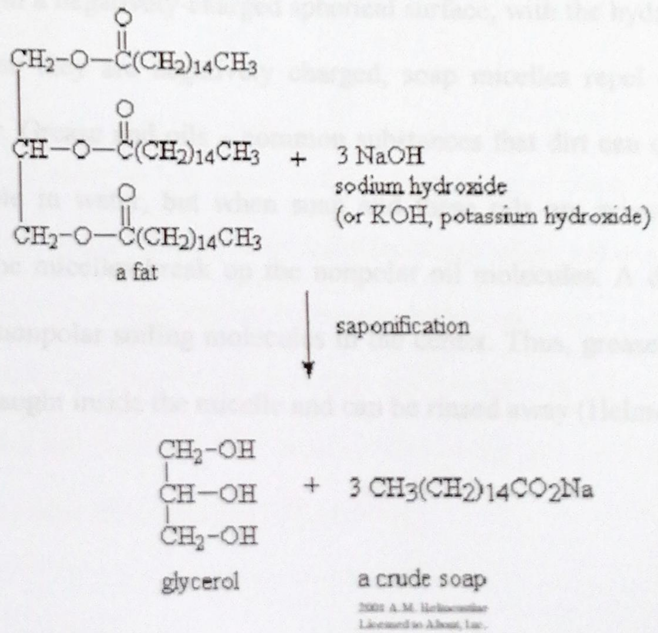
This chapter comprises the following topics: soap, pH, and Total Fatty Matter.

A. Soap

Soap is one of the oldest chemical substances known to man, with its history beginning before the earliest written study. A soap-like material found in clay cylinders during the excavation of ancient Babylon is evidence that soap making was known as early as 2800 B.C. (SDA 2009). Soap was also found in Egyptian literature, mainly in connection with medical writings (Anzene and Aremu 2007). The Ebers Papyrus, a medical document from about 1500 B.C., describes combining animal and vegetable oils with alkaline salts to form a soap-like material used for treating skin diseases, as well as for washing (SDA 2009). In pre-Christian and early Christian times, the Romans used putrid urine as a cleanser. Its effectiveness stemmed from its ammonium carbonate $(NH_4)_2CO_3$ content, which reacted with fats and oils in wool to produce a slight saponification (Anzene and Aremu 2007).

The manufacture of soap was stimulated by Chevreul's discovery of oleic and stearic acids in the early 19th century and by Leblanc's method of preparing caustic soda from common salt in 1791 (The Columbia Encyclopedia, 6^{th} ed. 2008). Prior to this, it was believed that soap consisted merely of a binary compound of fat and alkali. In 1741, Claude Geoffroy pointed out that the fat or oil recovered from a soap solution by neutralization with a mineral acid differs from the original fatty substance by dissolving readily in alcohol, which is not the case with ordinary fats and oils. This observation – along with another one in 1783 by Scheele, in which he obtained a sweet substance now known as glycerin by boiling olive oil with oxide of lead and a little water – was overlooked. Nevertheless, it was these discoveries that formed the basis of Chevreul's researches and enabled him to establish the constitution of oils and the true nature of soap (Classic Encyclopedia 2006).

Saponification is a chemical reaction in which triglycerides are reacted with sodium or potassium hydroxide to form a metal salt and an alcohol, which appear as soap and glycerol. Fats and oils – often blended – are heated in a large vessel, and then enough alkali to react with all of the fat is stirred in. Once the saponification reaction is complete, salt is added and the soap precipitates, forming a light curd that floats to the surface. Glycerol, a valuable byproduct, can then be recovered from the liquid residue through vacuum distillation (The Columbia Encyclopedia, 6th ed. 2008 and Helmenstine 2001).



Soaps are cleansers, used everyday by millions of people for the purposes of removing filth. Specifically, soap is the simplest type of surface-active agent, or surfactant, and works by making fat and oil water-soluble and easily removed by wiping or washing. Made from fatty acid salts, soaps clean by reducing the surface tension of the skin with anionic agents such as carboxylate, sulfonate and sulfate ions (Skin Care Guide.com 2005).

The cleansing power of soap is attributed primarily to the inherent property of its solution to emulsify fats (Hillyer 1903, cited in Classic Encyclopedia 2006). Emulsification is the process by which soap stabilizes the interface between oil and water particles in suspension.

The organic part of a natural soap is a negatively-charged, polar molecule. Its hydrophilic, or water-loving, carboxylate group (-CO_2) interacts with water molecules via ion-dipole interactions and hydrogen bonding. The hydrophobic, or water-fearing, part of a soap molecule is its long, nonpolar hydrocarbon chain, which does not interact with water molecules. The hydrocarbon chains cluster together, forming structures called micelles. In these micelles, the carboxylate groups form a negatively-charged spherical surface, with the hydrocarbon chains inside the sphere. Because they are negatively charged, soap micelles repel each other and remain dispersed in water. Grease and oils – common substances that dirt can easily cling to – are nonpolar and insoluble in water, but when soap and these oils are mixed, the nonpolar hydrocarbon portion of the micelles break up the nonpolar oil molecules. A different type of micelle then forms, with nonpolar soiling molecules in the center. Thus, grease and oil and the dirt attached to them are caught inside the micelle and can be rinsed away (Helmenstine 2001).

Composition of Typical Soaps

Kind of Soap	*Milled Toilet*	*Chip*	*Shaving*	*White Floating*	*Ordinary Laundry*
Nature of Fat	Tallow, 87% Coconut oil, 13%	Mixed fats	Tallow and Coconut	Tallow plus 25%-30% Coconut	Mixed fats Some Rosin
Moisture and volatile matter	15%	15%	15%	34%	36%
Free NaOH	0.1%	0.5%	0.05%	0.15%	0.5%
Free oleic acid	--	--	--	--	--
NaCl	0.3%	1%	0.3%	1%	1.5%
Insoluble in alcohol	0.3%	1.5%	0.3%	1%	8%
Insoluble in water	0.1%	0.2%	0.1%	0.2%	1%
Unsaponified fat	0.1%	--	0.1%	--	--
Rosin	None	None	None	None	25%
Sodium silicate	0.15%	--	--	--	--
Mixed fatty acids:					
Acid number	203-212	--	190-215	212	--
Titer test	37° C.	39° C.	40° C.	--	--

Soaps always contain more or less water and small amounts of impurities incidental to manufacture. In commercial soaps, certain other substances are often present. These include rosin, as a substitute for part of the fat; sodium carbonate, borax, and other salts for increasing hardness and detergency; sand and pumice for scouring; and cheapening fillers such as mineral oil, wax, sodium silicate, and talc (Griffin 1927). Rosin is also commonly used in laundry soap to increase lathering (The Columbia Encyclopedia, 6th ed. 2008).

Hard soaps are soda soaps, made from sodium hydroxide or a mixture of sodium hydroxide and potassium hydroxide, whereas soft soaps are essentially potash soaps, made from potassium hydroxide. Almost all soda soaps are precipitated from their watery solutions by the addition of salt. Potash soaps with the same reagent undergo double decomposition – a proportion being changed into soda soap with the formation of potassium chloride (Griffin 1927 and Classic Encyclopedia 2006).

The general characteristics of soap are a certain greasiness to the touch, ready solubility in water with the formation of a viscid solution that – on agitation – yields a tenacious froth or lather, an indisposition to crystallize, and a readiness to amalgamate with small proportions of hot water into homogeneous slimes (Classic Encyclopedia 2006).

After manufacture, the various properties of commercial soap are tested. These properties include determination of fatty matter, determination of total alkali, determination of the substances insoluble in water, and determination of the water contained in the soap itself.

B. pH

The term pH stands for the "potential of hydrogen". The acidity or basicity of a solution is measured using the pH scale, which corresponds to the concentration of hydronium ions in a solution. The pH of a cleanser, such as soap, has a multifold impact on the skin in terms of moisture content, irritability, and bacterial flora (Tyebkhan 2001).

The acid mantle is a very fine, slightly acidic film on the surface of the skin that acts as a barrier to bacteria, viruses, and other potential contaminants that might penetrate the skin. As such, maintenance of the acid mantle is very important for the preservation of healthy skin functionality and the composition of cutaneous bacterial flora. In a study conducted by Ohman and Vahlquist in 1993, it was observed that many enzymes in the upper epidermis, such as hydrolytic enzymes and enzymes involved in lipid metabolism, have a pH optimum of 5.6. The same study suggested that, in the course of human evolution, certain enzymes have become adapted to the low pH in the upper human epidermis and utilize the pH gradient to control their activity.

Normal skin pH falls within the range of 5.4 to 5.9. Nowadays, it is generally accepted that the acidic pH of the skin's surface serves a protective function (Gfatter and others 1997).

The soaps commonly used by the public have a pH ranging from neutral to alkaline, a number which falls between 7 and 9. Although neutral soaps do exist, soaps are by nature alkaline, and have a tendency to raise the skin's naturally acidic pH. While intact skin exhibits an ability to recover from these pH changes, even when exposed to highly alkaline materials, prolonged exposure to these materials applied under occlusion may overwhelm the skin's buffering capacity (Tyebkhan 2001). An increase in the skin's pH leads to an increase in the permeability of the skin surface, as well as inflammation (Laube 1956, cited in Gfatter and others 1997). The latter was observed after the application of a cleansing agent with a pH of 9.6 – a highly alkaline pH typical of laundry soaps, which range from 9 to 10 and higher (Anzene and Aremu 2007).

In summary, harsh cleansers can disrupt the skin's all-important acid mantle by increasing the skin's surface pH, thereby increasing the skin's sensitivity to potential irritants. This in turn causes inflammation, and possible cellular damage when used long-term. These cleansers can also remove the natural moisturizing factors in the skin's protective barrier, leading to dry skin (Skin Care Guide.com 2005). The pH of a cured soap to be used on the skin should fall between 7 and 9, but soap with a more acidic pH is more agreeable to the skin and is physiologically more effective (Gfatter and others 1997).

C. Total Fatty Matter

Chemically, soaps are metallic salts of fatty acids. The fats and oils used in soap making come from animal or plant sources, and are largely responsible for many of the properties of the finished soap.

Traditionally, animal fats are used to make soap, with beef tallow being one of the most common. Beef tallow, or sodium tallowate, yields a hard, white bar of soap with creamy, stable lather that is very moisturizing (Fisher 2005). Aside from fats, various oils are also used to make soap. Vegetable oils are commonly used in place of animal fats in areas where finding a source for the latter can be problematic. Olive oil, palm oil, and coconut oil are several of the most common, used primarily for their mildness, lathering, or moisturizing properties. On commercial soaps, these will be listed as sodium olivate, sodium palmate, and sodium cocoate, respectively. Other oils are used to add fragrance to scented soaps (Natural Soap Directory 2009).

Each fat or oil molecule is made up of a distinctive mixture of several different triglycerides. In a triglyceride molecule, three fatty acid molecules are attached to one molecule of glycerin. There are many types of triglycerides, and each type consists of its own particular combination of fatty acids. Fatty acids are the components of the fats and oils that are used in soap making. They are weak acids composed of two essential parts: a carboxylic acid group

CHAPTER III

METHODOLOGY

A. Collection of Soap Samples

The soaps that were used in the study were bought at the Iloilo Producers' Association in Sarabia Manor, located at General Luna, Iloilo City. Three batches of each of the two soaps were bought; three 135 gram bars for "Women – Herbal Papaya Soap" and three 90 gram bars for "Women – Herbal Bath Soap with Skin Care Protection". The soaps were organized into pairs consisting of one bar of each of the two soaps bought at the same time. The pairs were labeled "Batch 1", "Batch 2", and "Batch 3".

B. Preparation of Soap Samples

- Soaps
- Knife
- 6 air tight jars

The researcher cut the bar of soap in two diagonally and took thin shavings from the fresh surfaces, being careful to cut entirely across to obtain a fair proportion of outer and inner layers. The sample was then stored in an air tight jar until the tests were ready to be carried out.

C. Determination of pH

- 18 250 mL beakers
- Distilled water
- pH meter
- Stirring rod
- Analytical balance
- Graduated cylinder

For pH determination, only one trial was conducted per sample. There were three replicates per trial.

The researcher weighed out 15 grams of each sample, 5 grams per replicate. Each of the 5 gram samples was placed in a beaker and dissolved in 100 mL of distilled water, stirring occasionally. The researcher then calibrated the pH meter using a buffer solution of pH 7 and dipped the probe directly into the sample. The reading was taken immediately.

D. Determination of Total Fatty Matter

- 2M H_2SO_4
- Distilled water
- Methyl orange indicator
- Dropper
- Ethanol
- 18 250 mL beakers
- Hot water bath
- Hot plate
- Analytical balance
- Graduated cylinder

For Total Fatty Matter determination, three trials were conducted per sample. There was only one replicate per trial.

The researcher weighed out 5 grams of the sample into a pre-weighed beaker. The sample was then dissolved in 10 mL of distilled water and 20 mL of 2M sulfuric acid (H_2SO_4) was added to liberate the fatty matter. The beaker and its contents were heated in a water bath until the fatty matter formed a layer on top and the solution below became perfectly clear. Afterwards, the solution was decanted, and the researcher washed the fatty matter extract with distilled water until it became neutral to the methyl orange indicator – turning it an orange color. It was then dissolved in 70 mL of 70% ethanol. Finally, the extract was placed on a hot plate, where the ethanol and water were evaporated at 110° C, and the result was weighed as Total Fatty Matter.

$$\text{Total Fatty Matter (\%)} = \frac{\text{final weight of the sample}}{\text{original weight of the sample}} \times 100$$

E. Analysis

Type of Analysis	*Result*	*Remarks*
pH	9.5 and above	May indicate a high percentage of unsaponified alkali. Not a quality bath soap as it will cause dryness or inflammation of the skin, but may be classified as laundry soap.
	Between 7.5 and 9.5	A pH comparable to soaps commonly used by the public. Can be classified as soap of high or normal quality.
	7.5 and below	High quality soap; possesses a pH that is more in tune with the skin's acid mantle, making it physiologically more effective.

Total Fatty Matter	76% and above	High quality soap; a pure soap that cleans skin gently and effectively.
	Between 68% and 76%	Normal, commercial quality soap.
	68% and below	Low quality soap; indicates that the majority of the soap is either alkali, water, or something else.

CHAPTER IV

RESULTS AND DISCUSSION

This study was conducted in order to analyze the quality of two locally produced soaps in terms of pH and Total Fatty Matter, and to compare these values with the standards set for commercial soaps. Specifically, the soaps that were tested were named "Women – Herbal Papaya Soap" and "Women – Herbal Bath Soap with Skin Care Protection", both manufactured by Rosary Herbal Products. Three batches of each of the two soaps were tested.

The pH of the samples was determined using a pH meter. The TFM, or fat content, of the samples was determined through ethanol extraction.

A. Results

In terms of pH, it was found that "Women – Herbal Papaya Soap" produced an average pH value of 9.45 for Batch 1, 9.48 for Batch 2, and 9.64 for Batch 3. The second soap, "Women – Herbal Bath Soap with Skin Care Protection", produced an average pH value of 10.52 for Batch 1, 9.45 for Batch 2, and 10.63 for Batch 3.

In terms of Total Fatty Matter, it was found that "Women – Herbal Papaya Soap" produced an average TFM of 54% for Batch 1, and 63% for both Batch 2 and Batch 3. The second soap, "Women – Herbal Bath Soap with Skin Care Protection", produced an average TFM of 53% for Batch 1, 63% for Batch 2, and 59% for Batch 3.

B. Discussion

By comparing the measured values with the standards taken from previous studies, it was found that in terms of pH, "Women – Herbal Papaya Soap" produced average pH values that kept in line with those of soaps commonly used by the public, that is ranging from 7 to 9 (Tyebkhan 2001). The only difference was seen in Batch 3, where the average pH value was observed to be higher. This value, 9.64, is enough to cause inflammation of the skin surface (Laube 1956, cited in Gfatter and others 1997).

As for "Women – Herbal Bath Soap with Skin Care Protection", it was found to be a highly alkaline soap. Out of three batches, two were found to have average pH values of 10, indicating a high percentage of unsaponified alkali, thus classifying the soap as one of relatively low quality. These values are stated to be comparable to those of laundry soaps, and are not recommended for use on the skin as it will cause irritation (Anzene and Aremu 2007 and Skin Care Guide.com 2005). The pH value produced by the Batch 2 soap, 9.45, was the only one that adhered to standards. This variation could also suggest that the soaps were not made carefully, which shows poor quality control.

In terms of TFM, it was found that all of the samples are soaps of poor quality, as none of them contained the minimum 68% of fat that the standards require. This suggests that the majority of the soap was either alkali, water, or some other type of filler material (Griffin 1927). As the fats and oils used to make soap are largely responsible for many of the properties of the finished soap, it is only natural that a smaller amount of fatty matter would compromise the quality of the soap (Pundir 2009).

CHAPTER V

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

This study analyzed the quality of two locally produced soaps, specifically, "Women – Herbal Papaya Soap" and "Women – Herbal Bath Soap with Skin Care Protection", in terms of pH and Total Fatty Matter. The objectives of the study were to analyze the quality of two locally produced soaps using the following parameters: pH and TFM. Specifically, these were to measure the pH of "Women – Herbal Papaya Soap" and "Women – Herbal Bath Soap with Skin Care Protection", to measure the TFM of "Women – Herbal Papaya Soap" and "Women – Herbal Bath Soap with Skin Care Protection", and to compare these values with the standards set for commercial soaps.

A. Summary of Findings

This study was able to measure the pH and TFM of two soaps produced in Iloilo.

1.) It was found that the pH of "Women – Herbal Papaya Soap" kept in line with standards set for commercial soaps.

2.) It was found that the pH of "Women – Herbal Bath Soap with Skin Care Protection" was more comparable with laundry soaps.

3.) It was found that both soaps did not contain the minimum 68% of fat that the standards require.

B. Conclusion

It can be concluded that in terms of pH, "Women – Herbal Papaya Soap" can be classified as normal quality soap and "Women – Herbal Bath Soap with Skin Care Protection" can be classified as low quality soap. However, in terms of Total Fatty Matter, both soaps were found to be low quality soaps.

C. Recommendations

It is recommended that future studies should sample much more than two soaps to be able to draw a more valid, general conclusion for the quality of soaps produced in Iloilo.

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APPENDIX A

RAW DATA

pH of two locally produced soaps

	Batch 1			Batch 2			Batch 3		
Women – Herbal Papaya Soap	9.46	9.46	9.44	9.45	9.48	9.50	9.68	9.61	9.63
Women – Herbal Bath Soap with Skin Care Protection	10.52	10.55	10.50	9.46	9.43	9.46	10.62	10.66	10.60

Total Fatty Matter of two locally produced soaps

	Batch 1			Batch 2			Batch 3		
Women – Herbal Papaya Soap	51%	52%	58%	66%	59%	65%	65%	64%	60%
Women – Herbal Bath Soap with Skin Care Protection	48%	54%	59%	61%	62%	66%	58%	57%	61%

APPENDIX B

PHOTOS

Plate 1. Preparation of soap samples

Plate 2. Determination of pH using a pH meter

Plate 3. Liberation of fatty matter using 2M H_2SO_4

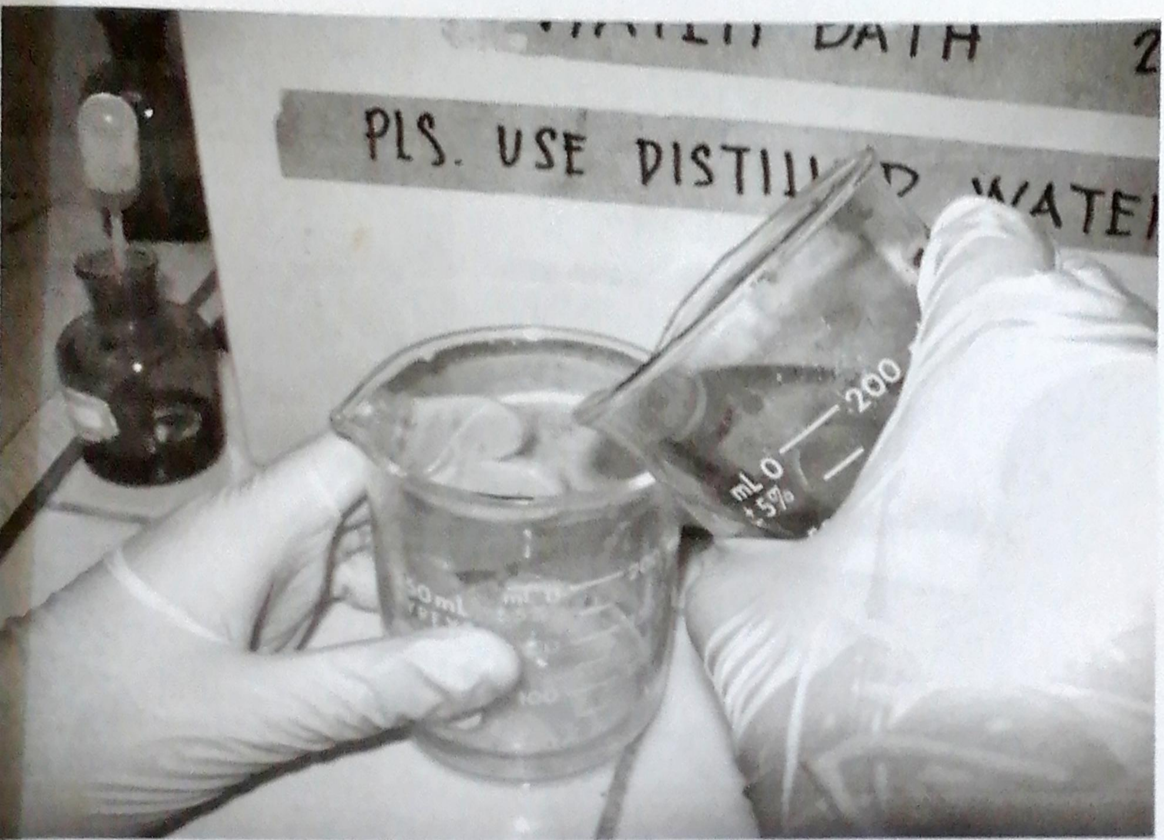

Plate 4. Washing and decanting of fatty matter

Plate 5. Dissolving of fatty matter in 70% ethanol

Plate 6. Evaporation of ethanol and water