

**PRODUCT DEVELOPMENT OF ALOE VERA LOTION
FROM ALOE VERA EXTRACT POWDER**

BY

PHARAWEE CHAROENKOOL

ID: 5310644

A special project submitted to

School of Biotechnology, Assumption University

In part fulfillment of the requirements of Degree of Bachelor of

Science in Biotechnology

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Title: Product development of Aloe Vera lotion from Aloe Vera
extract powder

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Academic year: 2014

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Advisor



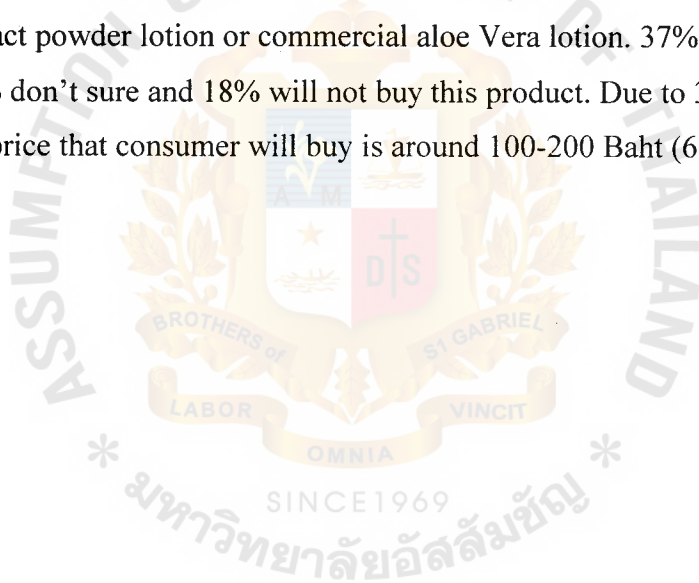
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Assumption University

2014

Abstract

The aim of this research was to develop Aloe Vera body lotion by using Aloe Vera extract powder. The results showed that suitable amount of Aloe Vera extract powder was 1%200X. The pH of the Aloe Vera lotion was 5.66. The original solution of body lotion that using for final was Sodium polyacrylate 2.7%, Dicaprylyl ether 3%, Mineral oil 70 4%, Propylene glycol 8%, DMDM hydantoin 0.6%, Sodium stearyl Glutamate 0.2%, Water 81.5%, and Aloe Vera extract powder 200x 1%.The color of final Aloe Vera lotion was light yellow because of Aloe Vera powder. The results showed that there are no different between commercial Aloe Vera lotion with Aloe Vera lotion from Aloe Vera extract power in overall liking, viscosity, ease of spread, ease of absorb, stickiness, and skin moisturizing. There was significantly different in skin smoothness by 6.40 and 5.87. There are 37% prefer body lotion with Aloe Vera extract powder, 44% prefer commercial Aloe Vera lotion, and 19% not prefer any of aloe Vera extract powder lotion or commercial aloe Vera lotion. 37% of consumer will buy this product, 45% don't sure and 18% will not buy this product. Due to 300 ml Aloe Vera lotion the preferable price that consumer will buy is around 100-200 Baht (60%).



Acknowledgement

First of all, I am grateful that my special project establishing me to complete this seminar.

I would like to sincere thanks to Dr. Aussuma Soontrunnarudrungsri, Lecturer, Department of School of Biotechnology, Assumption University, My lovely project advisor, for help me with necessary facilities and encouragement in every situation.

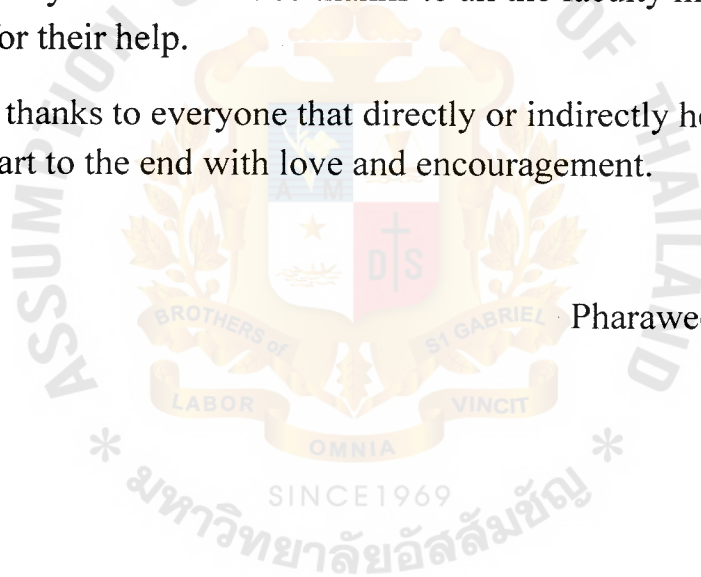
I would like to thanks to Tipco Company for providing me with the necessary products of Aloe Vera extract powder.

I take this opportunity to record my sincere thanks to Omaraya and Jaithip Charoenkool, Thorung Charoenkool, Moonoi's family, Patcha and Supat for support me in every situation. I also thanks to all the faculty members school of Biotechnology for their help.

I also like to thanks to everyone that directly or indirectly help me doing this project from start to the end with love and encouragement.

Pharawee Charoenkool

August 2015



CONTENT

Title	Page
Introduction	1
Literature	2
Material and Method	6
Result and Discussion	15
Conclusion	30
Reference	31
Budget and Timeline	32
Appendix	35



Introduction

Skin was the biggest part of our body. When the body facing with the environmental, skin was the first part that will touching the environmental. If there are something wrong with our body the skin will be the first part of our body that other will notice that there are something wrong. The example of the skin problem were scar that may cause from the injury or the burnt scar from Ultra Violet. The skin problems was the problem that most of everybody worry about especially woman. The lotion was one of the helper for woman to reduce their scar and decrease the rough surface of the scar.

Lotion was the most body product that people mostly use every day and there are many type of body lotion that launched in the market. Aloe Vera lotion also one of favorite lotion in the market. Aloe Vera has big power of improve moisturizer in skin and also mostly use for healing skin from burnt by ultra violet. In Thailand, after get some scar from burning people immediately put fresh aloe Vera directly on the scar to reduce the hot surface because of aloe Vera was cold plant.

Aloe Vera was the plant that people used gel of aloe Vera leave to skin healing and softening skin after burnt. The used of Aloe Vera is not only the plant of aloe Vera there are many using of aloe Vera in the field of cosmetic and medicine. Lotion was one of the product that using a lot of aloe Vera for the ingredient and some products using aloe Vera for the main ingredient or to name the product by the word "Aloe Vera".

The development of Aloe Vera body lotion helped the improvement quality of moisturizer in body lotion. The most important of using body lotion was moisturizing and the plant that gave the highest moisture contain was Aloe Vera.

Objective

1. To develop body lotion by using aloe Vera extract powder.
2. To study the acceptance of the consumers with body lotion that added aloe Vera extract powder.

Literature

Lotion is the product that almost everybody used it in everyday life. There are many type of lotion which is body lotion that use with body, hand and nail lotion that use with hand and nail, foot lotion that use with feet, and facial lotion that use for face. Because of the using of lotion in each type may not use for other so each lotion will have special ingredient for special using. Some use lotion to protect their body from destroyed by ultraviolet. Some use lotion to make their skin brighter. Some use lotion for moisture their skin.

Body lotion have variety of purposes that benefit users in everyday life or for specific situations. Men and women sometimes need skin hydration and moisturizing. As women get older and their skin becomes drier, body lotion can become the helper to keep skin healthy and attractive. Romantic lotion use for massage as a considerate gesture of affection. From skin care to health management and anti-aging treatments, body lotion serves a multitude of needs that we may overlook or take for granted.

Moisturizing lotion: This type of lotion using for people that have dry skin to add more moisturizer to improve their skin from dry and may cause the skin itchy or crack. Some also use moisturizing lotion in the winter season for protect their skin from drying.

Whitening lotion: The lotion that use for brighten up the skin.

Firming lotion: Lotion that use for burn cellulite in the skin and made your body fit and firm. Most of this type of lotion add hot ingredient such as chili or pepper to made your skin hotter when appear lotion on the body and some also have to massage the lotion for more warmer for increase efficiency of burning power of the lotion.

Tanned lotion: Lotion that use for made darker skin tone. This type of lotion very famous in Japanese. Their use this lotion to make darker skin in fact of using sunburn.

Healing lotion: The lotion that use for recover skin from burnt by ultra violet and also made skin healing faster than normal. Most of healing lotion was made from natural ingredient such as aloe Vera that have ability to reduce the temperature of skin after burnt by sunlight.

Drug lotion: Lotion that use for special use such as lotion for reduce the skin itchy and lotion that use for reduce the cracked skin that happen when skin expend very fast. Some lotion that use for reduce scars also in drug lotion.

Applying body lotion is the inexpensive ways that people can pamper themselves. Bath body lotion can keep moisture into the skin to prevent drying, while body care lotion softens rough surface of elbows and heels, along with other dry areas of the skin. A quality body skin lotion can work wonders on scaly, dehydrated skin that feels rough and looks unattractive, and hand body lotion works especially well on the hands and feet, but can be applied all over the body. As millions of users will agree, body lotion provides many benefits to people who make

time to use it on a regular basis. **Rose Alexander, Published, (2007, July 26), The 7 Body Lotion Benefits, Explore the benefits of body care lotion.**

Lotion can make from many type of ingredients such as herbal lotion or fruit lotion. Lotion can easily made by yourself at home or can sell it for your own benefit. Type of lotion not only specify by the ingredient, lotion also classify by how to use and where to use that lotion. Lotion that classify from using are body lotion that you can appear this type of lotion all over your body, hand lotion that it's a special lotion only for your hand some of hand lotion will also include nail, face lotion that you can use with you face without harmful.

Herbal was using for the cosmetic product which represent cosmetics associated with active bioactive ingredients or pharmaceuticals. In general, each herbal provide different vitamins, antioxidants, various oils, essential oils, dyes, tannins, alkaloids, carbohydrates, proteins, terpenoids and other bioactive molecules. The use of phytochemicals from a variety of botanicals have dual function, they serve as cosmetics for the care of body and its parts and the botanical ingredients present influence biological functions of skin and provide nutrients necessary for the healthy skin or hair. These are also topically applied and considered more preferred with compare to cosmetics. Personal care industry is now more concentrated on herbal based cosmetics as it is a fast growing segment with a vast scope of manifold expansion in coming years. Herbal cosmetics are not considered under the preview of Drugs and Regulations of Food and Drug Administrations. Like cosmetics, these are subjected for their safety according to the existing rules of the different countries. Generally, it is not mandatory for a manufacturer to claim that how bioactive ingredients penetrate the skin or that these ingredients cause drug-like or therapeutic effect. **V P Kapoor, National Botanical Research Institute, Lucknow – 226 001, Uttar Pradesh, India**

Aloe Vera was the plant that people have used the gel from aloe Vera leaves for healing and softening the skin. In fact, aloe has also long been a treatment for many purposes, including constipation and skin disorders. The plant's secret is the clear jelly stored inside its thick succulent leaves a juice which forms a protective coating over a cut, burn, or abrasion and so promotes healing. Best of all, this natural ointment needs no processing to be effective. Just break off a leaf, slit it open, and smear the gel liberally on an affliction. Then keep the area moist to draw out the pain. In modern world research into aloe Vera's benefits is mixed, with some evidence showing it fights tumors and some showing it causes colorectal cancers. There are no food that contain aloe Vera but Aloe Vera that in form of gel and form the square shape may added in some of Aloe Vera juice or fruit juice to made the chewy texture in fruit juice products. A native of southern Africa, the aloe Vera plant has fleshy spiny-toothed leaves and red or yellow flowers. It is an ingredient in many cosmetics because it heals moisturizes, and softens skin. Simply cut one of the aloe Vera leaves to easily extract the soothing gel.

Aloe Vera also known as lily of the desert or the plant of immortality. Aloe Vera has the properties of emollient, purgative and vulnerary. Aloe Vera was recommended to use for sunburn, minor burns, wrinkles, insect bites, skin irritations, minor cuts and scratches. The clear

gel of Aloe Vera has dramatic ability to healing the wounds, ulcers and healing skin burns. One of the most valuable cosmetic properties of Aloe Vera is the gel of Aloe Vera that has the ability of stimulate the circulation of the skin and remove dead skin cells, so Aloe Vera giving fresher and younger appearance of the skin. Aloe Vera also have ability to remove blemishes, protect the skin against infections and reduce wrinkles.

Aloe Vera contains vitamins A, C and E, which are antioxidants and gave the skin smoothness. Aloe Vera also contains vitamin B12, folic acid, and choline. Antioxidant neutralizes free radicals. Aloe Vera contains 8 enzymes which is aliase, alkaline phosphatase, amylase, bradykinase, carboxypeptidase, catalase, cellulase, lipase, and peroxidase. Bradykinase help rduction of skin excessive inflammation when applied to the skin topically, while others help the breakdown of sugars and fats. Aloe Vera provides calcium, chromium, copper, selenium, magnesium, manganese, potassium, sodium and zinc. They are essential for the proper functioning of various enzyme systems in different metabolic pathways and few are antioxidants. **Amar Surjushe, Resham Vasani, and D G Saple, Indian J Dermatology, (2008)**

Aloe Vera not provided only the benefit but the used of Aloe Vera may provide some side effect if there are wrong using of Aloe Vera. Researchers warn against the use of aloe Vera; however, if the aloe product is free of aloin -- an extract of the plant that has been found to cause colorectal cancer in rats -- it is fine as a topical remedy for sunburn and to drink in juice form. Aloin is found between the outer leaf of the aloe plant and the gooey stuff inside.

Side effects of using Aloe Vera. Topical aloe Vera might cause skin irritation. Oral aloe, which has a laxative effect, can cause cramping and diarrhea. A few days of using Aloe Vera may cause electrolyte imbalances in the blood. Aloe Vera also stain the colon, thus making it difficult to visualize the colon during a colonoscopy. So avoid it for a month before having a colonoscopy. Aloe gel, for topical or oral use, should be free of aloin, which can be irritating to the gastrointestinal tract.

Prevention the risk of using Aloe Vera. Do not apply topical aloe Vera to deep cuts or severe burns. People allergic to garlic, onions, and tulips are more likely to be allergic to aloe. High doses of oral aloe are dangerous. Don't take oral aloe if you have intestinal problems, heart disease, hemorrhoids, kidney problems, diabetes, or electrolyte imbalances.

Interaction of using Aloe Vera. If taking any drugs regularly, ask your doctor before start using aloe supplements. They could interact with medicines and supplements like diabetes drugs, heart drugs, laxatives, steroids, and licorice root. **David Kiefer, MD, research fellow, Department of Family Medicine, University of Wisconsin., Vitamins and Supplements Lifestyle Guide, October 31, 2014.**

From the varieties of using body lotion, Aloe Vera was chosen for added in the body lotion. The healing properties of Aloe Vera was the most properties that using in lotion to healing the wound by increased the level of collagen in the skin. The properties of Aloe Vera in

protective effect against radiation damage to the skin also popular to add in body lotion because Aloe Vera can reduced the wound from burnt by Ultra Violet. The properties of Aloe Vera in moisturizer skin was added to the body lotion which is use to increase the moisture in the skin also to reduce the dried skin cells. There are some product that added more than 90% of Aloe Vera extract that can use in all-purpose such as use for healing your skin from sunburn and dehydrate your skin. Most of the product that contain more than 90% of Aloe Vera was the product that in form of the Aloe Vera Gel that easy to absorb and least adding of the other chemical.

Most of the product that using Aloe Vera will using Aloe Vera inform of gel because the original from of Aloe Vera was inform of Gel and gel was easy to apply on the skin. The benefit of the Aloe Vera gel was to healing the burning skin by Ultra Violet. In term of body lotion that added Aloe Vera the form of the Aloe Vera may be Aloe Vera juice or Aloe Vera powder. Aloe Vera lotion has more viscosity than Aloe Vera gel to keep all the benefit of Aloe Vera to skin as long as Aloe Vera lotion can, So the chemical was using for this purpose. Aloe Vera lotion using for the main purpose of skin smoothness and healing the skin after sunburn. Most of the sun burn products have the Aloe Vera in the ingredient.



Material and method

Material

Aloe Vera extract powder from TIPCO herbal extract company

Water

Chemical

Sodium polyacrylate

Dicaprylyl ether

Mineral oil 70

Propylene glycol

DMDM hydantoin

Sodium stearyl Glutamate

Equipment

Beaker 500ml x2

Cylinder 50ml x2

Cylinder 10mlx2

Stirrer x2

pH meter

Storage container

SAS program



Methodology

- 1) Development of base lotion
 - a) The base body lotion from Hong Hout was prepared then evaluated using 9-point hedonic scale and JAR in order to indicate the developing direction.
 - b) Finding the average score
- 2) Improvement of basic body lotion
 - a) Preparation two different solution of body lotion for vary the viscosity of lotion.
 - b) Sensory evaluation of the product using 9-point hedonic scale in 7 attributes, including overall liking, during apply: viscosity, ease of spread, ease of absorb, after apply: stickiness, skin moisturizing, and skin smoothness. The number of panel was 35.
 - c) Using the experimental design of Randomized Complete Block Design (RCBD)
- 3) Improvement of aloe Vera body lotion solution
 - a) Comparing quality of the lotion containing aloe Vera 200x and aloe Vera 200xs in three different percentages
 - b) Using the experimental design of Randomized Complete Block Design (RCBD)
- 4) Consumer test
 - a) Preparation aloe Vera body lotion from basic lotion with 1% 200X and commercial aloe Vera body lotion from Beauty formulas Cooling Aloe Fresh Lotion.
 - b) Consumer acceptance test of product using questionnaire survey and sensory evaluation of the product using 9-point hedonic scale preference test on 7 attributes, including overall liking, During apply: viscosity, ease of spread, ease of absorb, After apply: stickiness, skin moisturizing, skin smoothness. The number of consumers was 100.
 - c) Using the experimental design of Randomized Complete Block Design (RCBD)
- 5) Statistic analysis
 - a) ANOVA at $\alpha = 0.05$
 - b) t-test at $\alpha = 0.05$ to compare two different means
- 6) Location
 - a) Faculty of Biotechnology laboratory E5, Assumption University, Hua mak campus
 - b) Survey location – Assumption University, Hua mak campus, and Sumrong hospital Samutplakan.

Method of making Body lotion

Phase1 Sodium polyacrylate

Dicaprylyl ether

Mineral oil 70

Propylene glycol

Phase2 DMDM hydantoin

Sodium stearyl Glutamate

Water

1. Mix all the chemical in Phase1 until mix well and leave at room temperature
2. Mix all the chemical inPhase2 until mix well and leave at room temperature
3. Combine Phase1 and Phase2 solution together and mix well by stir the solution until the clear white solution develop.

Experiment 1

The original solution and amount of ingredient for solution.

Phase1 Sodium polyacrylate 0.8%

Dicaprylyl ether 3%

Mineral oil 70 4%

Propylene glycol 4%

Phase2 DMDM hydantoin 0.6%

Sodium stearyl Glutamate 0.2%

Water 87.1%

Phase3 Perfume 0.3% (optional if no perfume add more water by 0.3%)

1. Mix all the chemical in Phase1 until mix well and leave at room temperature
2. Mix all the chemical inPhase2 until mix well and leave at room temperature
3. Combine Phase1 and Phase2 solution together and mix well by stir the solution until the clear white solution develop.
4. Finding the average score.

Experiment2

To improve the thickness, add more emulsifier which is Sodium polycrylate.

Phase1 Sodium polyacrylate $0.8 \times 2 = 1.6 + 0.3\% = 1.9\%$

Dicaprylyl ether 3%

Mineral oil 70 4%

Propylene glycol 4%

Phase2 DMDM hydantoin 0.6%

Sodium stearoyl Glutamate 0.2%

Water 86.3%

1. Mix all the chemical in Phase1 until mix well and leave at room temperature
2. Mix all the chemical inPhase2 until mix well and leave at room temperature
3. Combine Phase1 and Phase2 solution together and mix well by stir the solution until the clear white solution develop.
4. Finding the average score.

Experiment3

To improve the quality of absorption, add more humectant.

Phase1 Sodium polyacrylate $0.8 \times 2 = 1.6\%$

Dicaprylyl ether 3%

Mineral oil 70 4%

Propylene glycol $4\% \times 2 = 8\%$

Phase2 DMDM hydantoin 0.6%

Sodium stearoyl Glutamate 0.2%

Water 82.6%

1. Mix all the chemical in Phase1 until mix well and leave at room temperature
2. Mix all the chemical inPhase2 until mix well and leave at room temperature

3. Combine Phase1 and Phase2 solution together and mix well by stir the solution until the clear white solution develop.

Experiment 4

Develop two different solution by concern about thickness.

Phase1

	Lotion 4	Lotion 5
Sodium polyacrylate	$0.8 \times 3 = 2.4 + 0.3 = 2.7\%$	$0.8 \times 4 = 3.2 + 0.3 = 3.5\%$
Dicaprylyl ether	3%	3%
Mineral oil 70	4%	4%
Propylene glycol	8%	8%

Phase2

	Lotion 4	Lotion 5
DMDM hydantoin	0.6%	0.6%
Sodium stearyl Glutamate	0.2%	0.2%
Water	81.5%	80.7%

1. Mix all the chemical in Phase1 until mix well and leave at room temperature
2. Mix all the chemical inPhase2 until mix well and leave at room temperature
3. Combine Phase1 and Phase2 solution together and mix well by stir the solution until the clear white solution develop.
4. Finding the average score of Lotion 4 (Triple of Sodium Polyacrylate)

1515 0.1

Experiment 5

To develop the basic lotion by produce two body lotion by vary the thickness of the body lotion and use the best one for basic body lotion solution.

Phase1

	Lotion 6	Lotion 7(Basic Lotion)
Sodium polyacrylate	$0.8\text{gx}2=1.6+0.3=1.9\%$	$0.8\text{gx}3=2.4+0.3=2.7\%$
Dicaprylyl ether	3%	3%
Mineral oil 70	4%	4%
Propylene glycol	8%	8%

Phase2

	Lotion 6	Lotion 7
DMDM hydantoin	0.6%	0.6%
Sodium stearoyl Glutamate	0.2%	0.2%
Water	82.3%	81.5%

1. Mix all the chemical in Phase1 until mix well and leave at room temperature
2. Mix all the chemical inPhase2 until mix well and leave at room temperature
3. Combine Phase1 and Phase2 solution together and mix well by stir the solution until the clear white solution develop.
4. ANOVA at $\alpha = 0.05$ Using the experimental design of Randomized Complete Block Design (RCBD)

Experiment 6

Body lotion with aloe Vera extract powder

Phase1

	Lotion Aloe Vera 1	Lotion Aloe Vera 2
Sodium polyacrylate	$0.8 \times 3 = 2.4 + 0.3 = 2.7\%$	$0.8 \times 3 = 2.4 + 0.3 = 2.7\%$
Dicaprylyl ether	3%	3%
Mineral oil 70	4%	4%
Propylene glycol	8%	8%

Phase2

	Lotion Aloe Vera 1	Lotion Aloe Vera 2
DMDM hydantoin	0.6%	0.6g
Sodium stearyl Glutamate	0.2%	0.2g
Water	81.5%	81.5g

Phase3

	Lotion Aloe Vera 1	Lotion Aloe Vera 2
Aloe Vera powder	5% 200x	5% 200xs

1. Mix all the chemical in Phase1 until mix well and leave at room temperature
2. Mix all the chemical inPhase2 until mix well and leave at room temperature
3. Combine Phase1 and Phase2 solution together and mix well by stir the solution until the clear white solution develop.
4. ANOVA at $\alpha = 0.05$ Using the experimental design of Randomized Complete Block Design (RCBD)

Experiment 7

Phase1

	Aloe Vera Lotion 1	Aloe Vera Lotion 2	Aloe Vera Lotion 3
Sodium polyacrylate	$0.8 \times 3 = 2.4 + 0.3 = 2.7\%$	$0.8 \times 3 = 2.4 + 0.3 = 2.7\%$	$0.8 \times 3 = 2.4 + 0.3 = 2.7\%$
Dicaprylyl ether	3%	3%	3%
Mineral oil 70	4%	4%	4%
Propylene glycol	$4 \times 2 = 8\%$	$4 \times 2 = 8\%$	$4 \times 2 = 8\%$

Phase2

	Aloe Vera Lotion 1	Aloe Vera Lotion 2	Aloe Vera Lotion 3
DMDM hydantoin	0.6%	0.6%	0.6%
Sodium stearyl Glutamate	0.2%	0.2%	0.2%
Water	81.5%	81.5%	81.5%

Phase3

	Aloe Vera Lotion 1	Aloe Vera Lotion 2	Aloe Vera Lotion 3
Aloe Vera powder	1% 200x	2% 200x	3% 200x

1. Mix all the chemical in Phase1 until mix well and leave at room temperature
2. Mix all the chemical inPhase2 until mix well and leave at room temperature
3. Combine Phase1 and Phase2 solution together and mix well by stir the solution until the clear white solution develop.
4. ANOVA at $\alpha = 0.05$ Using the experimental design of Randomized Complete Block Design (RCBD)

Experiment 8

Final products of Aloe Vera body lotion from aloe Vera extract powder

Phase1 Sodium polyacrylate $0.8 \times 3 = 2.4 + 0.3 = 2.7\%$

Dicaprylyl ether 3%

Mineral oil 70 4%

Propylene glycol $4 \times 2 + 0.3 = 8\%$

Phase2 DMDM hydantoin 0.6%

Sodium stearoyl Glutamate 0.2%

Water 81.5%

Phase3 Aloe Vera extract powder 200x 1%

1. Mix all the chemical in Phase1 until mix well and leave at room temperature
2. Mix all the chemical in Phase2 until mix well and leave at room temperature
3. Combine Phase1 and Phase2 solution together and mix well by stir the solution until the clear white solution develop.
4. ANOVA at $\alpha = 0.05$ Using the experimental design of Randomized Complete Block Design (RCBD), One-way and tTest.

Result and Discussion

1. Sensory analysis of basic lotion using 9-point hedonic scale for study liking score on basic lotion in 35 consumers.

Table: Average score (mean) and Standard Deviation (SD) of liking score on basic lotion

From the table, viscosity was the attribute that got the lowest score in 9-point hedonic

Attribute	Average(mean)	Standard Deviation (SD)
Overall liking	6.9	1.2
Viscosity	6.3	1.8
Ease of spread	7.2	1.2
Ease of absorb	6.4	1.7
Stickiness	7.0	1.5
Skin moisturizing	6.7	1.5
Skin smoothness	7.1	1.1

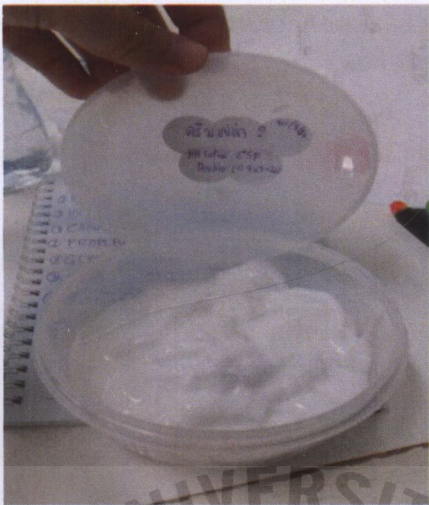
scale which is 6.3 of average score and highest standard deviation which is 1.8. Viscosity was the attribute that choosing for develop in the next experiment. Texture of lotion was very low viscosity. Texture of the lotion is one of the important attribute that consumer would detected easily when testing the sample.

2. Improvement of viscosity by adjust the amount of Sodium Polyacrylate (Double amount of Sodium Polyacrylate from 0.8 to $0.8 \times 2 = 1.6\%$)

Table: Average score (mean) and Standard Deviation (SD) of liking score on basic lotion after adjusting Sodium Polyacrylate.

Attribute	Average(mean) ^{ns}	Standard Deviation (SD)
Overall liking	6.9	1.0
Viscosity	6.2	1.1
Ease of spread	6.6	1.2
Ease of absorb	6.4	1.3
Stickiness	6.3	1.6
Skin moisturizing	6.2	1.5
Skin smoothness	6.2	1.4

From the table, after adjusting viscosity by double amount of Sodium Polyacrylate the average score was lower from 6.3 to 6.2 and the standard deviation was lower from 1.82 to 1.09. Because of the panelist in each experiment not the same the result may showed the differentiation of liking score in each experiment. Viscosity was the attribute that choosing for develop in the next experiment.



Fig*Basic lotion with double of Sodium Polyacrylate*

3. Improvement of viscosity by adjust the amount of Sodium Polyacrylate (Triple amount of Sodium Polyacrylate from 0.8 to $0.8 \times 3 = 2.4\%$)

Table: Average score (mean) and Standard Deviation (SD) of liking score on basic lotion after adjusting Sodium Polyacrylate.

Attribute	Average(mean)	Standard Deviation (SD)
Overall liking	6.4	1.2
Viscosity	5.6	1.5
Ease of spread	6.4	1.3
Ease of absorb	5.9	1.3
Stickiness	6.1	1.3
Skin moisturizing	6.6	1.4
Skin smoothness	6.4	1.5

From the table, after adjusting viscosity by triple amount of Sodium Polyacrylate the average score was lowers from 6.2 to 5.6and the standard deviation was higher from 1.09 to 1.46. Because of the panelist in each experiment not the same panelist the result may showed the differentiation of liking score in each experiment. The viscosity lower made the lotion thicker and the consumer don't like the lotion that too thick. Viscosity was the attribute that choosing for develop in the next experiment.

4. Improvement of viscosity on basic lotion by adjusting the amount of Sodium Polyacrylate into two amounts which are double ($0.8 \times 2 = 1.6\%$) and triple ($0.8 \times 3 = 2.4\%$). Using liking score 9-point hedonic scale and preference test.

Table: Average score (mean) and Standard Deviation (SD) of liking score on basic lotion after adjusting Sodium Polyacrylate.

Attribute	Double of Sodium Polyacrylate		Triple of Sodium Polyacrylate	
	Average(mean) ^{ns}	Standard Deviation (SD)	Average(mean)	Standard Deviation (SD)
Overall liking ^{ns}	6.3a	1.5	6.5a	1.8
Viscosity ^{ns}	5.6a	2.1	5.6a	1.9
Ease of spread ^{ns}	5.7a	1.8	6.1a	1.7
Ease of absorb ^{ns}	6.0a	1.9	6.1a	2.0
Stickiness ^{ns}	5.5a	2.0	6.0a	1.8
Skin moisturizing ^{ns}	6.1a	1.7	6.4a	1.8
Skin smoothness ^s	6.0a	1.7	6.6b	1.7

From the table, after adjusting two different amount of Sodium Polyacrylate by double and triple. The average score and standard deviation of two formulas given similar result on both average score and standard deviation. There the attribution of skin smoothness that significantly different on the average score which the triple of sodium Polyacrylate have 6.6 and double sodium polacrylate get 6.0. Mean that the higher of sodium polyacrylate not provide only the thickness to the lotion but also made the consumer feeling more of skin smoothness. So the focusing on the experiment moving to the preference test.

Table: Preference test

Double of Sodium Polyacrylate	Triple of Sodium Polyacrylate	No Preference
8	26	2

From the preference test, the result showed the most preference formula was triple of Sodium Polyacrylate. Because after added more of sodium polyacrylate the lotion was easier to spread and easier to absorb when during apply the lotion in case of the viscosity was the same score. The result of after apply the lotion, the consumer liked the stickiness of the lotion that add triple sodium polyacrylate. More of the sodium Polyacrylate also given more moisturizer and smoothness to skin. Formulation of triple of Sodium Polyacrylate was chosen to use for the basic lotion.

5. Sensory analysis of Aloe Vera lotion in three different percentage which are 1%, 2%, and 3% of 200X Aloe Vera extract powder using liking score 9-point hedonic scale.

Table: Average score (mean) and Standard Deviation (SD) of liking score on Aloe Vera lotion.

Attribute	1%		2%		3%	
	Average (mean)	Standard Deviation (SD)	Average (mean)	Standard Deviation (SD)	Average (mean)	Standard Deviation (SD)
Overall liking ^s	6.7a	1.2	6.3ab	1.3	5.6b	1.4
Viscosity ^{ns}	7.1a	1.3	6.4a	1.6	5.3a	1.3
Ease of spread ^s	7.5a	0.9	6.1b	1.3	5.3b	1.4
Ease of absorb ^s	5.9a	1.3	6.6a	1.3	5.6b	1.8
Stickiness ^{ns}	6.3a	1.5	6.5a	1.5	5.8a	1.7
Skin moisturizing ^{ns}	6.5a	1.3	6.3a	1.5	5.9a	1.6
Skin smoothness ^{ns}	6.2a	1.5	6.8a	1.4	5.4a	1.3

From the table, the result showed that sample 1% 200x Aloe Vera extract powder got the highest score in overall liking, viscosity, ease of spread, and ease of absorb. Because the texture of 2% 200x Aloe Vera extract powder and 3% 200x Aloe Vera extract powder are low viscosity. The higher of Aloe Vera extract powder gave more of thickener to the lotion and make the lotion low viscosity. In this result, the consumer liked the lotion that have high viscosity and the score of ease of spread higher when the lotion was thicker. The absorption of the lotion when applying the lotion not constant because of the style of applying the lotion of personal use was different.

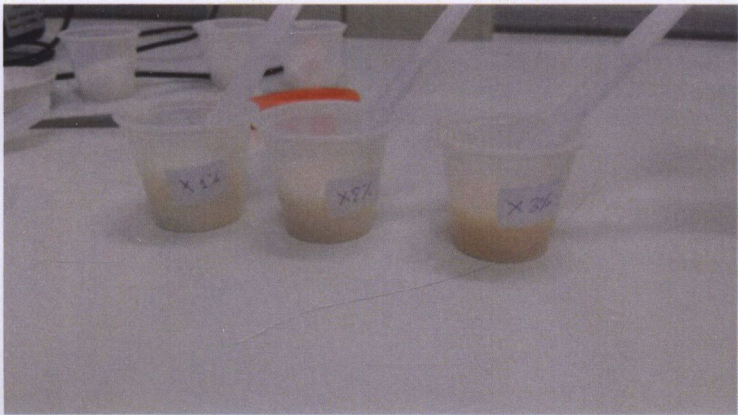


Fig *Aloe Vera lotion in three different amount of 200X Aloe Vera extract powder*

6. Sensory analysis of Aloe Vera lotion in three different percentages which are 1%, 2%, and 3% of 200XS Aloe Vera extract powder using liking score 9-point hedonic sclae.

Table: Average score (mean) and Standard Deviation (SD) of liking score on Aloe Vera lotion.

Attribute	1%		2%		3%	
	Average (mean)	Standard Deviation (SD)	Average (mean)	Standard Deviation (SD)	Average (mean)	Standard Deviation (SD)
Overall liking ^{ns}	5.9a	1.8	5.6a	1.5	5.2a	1.8
Viscosity ^s	5.4a	1.9	5.7a	1.7	4.5b	1.7
Ease of spread ^{ns}	6.5a	1.6	6.2a	1.4	5.2a	1.6
Ease of absorb ^{ns}	5.3a	2.5	5.3a	1.9	4.8a	2.0
Stickiness ^s	5.7a	1.9	5.3a	1.9	4.3b	1.7
Skin moisturizing ^s	6.0a	1.6	5.5ab	1.5	5.3b	1.5
Skin smoothness ^s	6.2a	1.7	5.7ab	1.4	4.9b	1.9

According to table, the result showed that there are significantly different in viscosity, stickiness, skin moisturizing, and skin smoothness. The result of sensory analysis in using 200XS Aloe Vera extract powder was lower that the lotion that added 200X Aloe Vera extract Powder. 200XS Aloe Vera extract powder gave high viscosity and hard to absorb. The intensity of 200XS Aloe Vera extract powder was higher than 200X Aloe Vera extract powder.

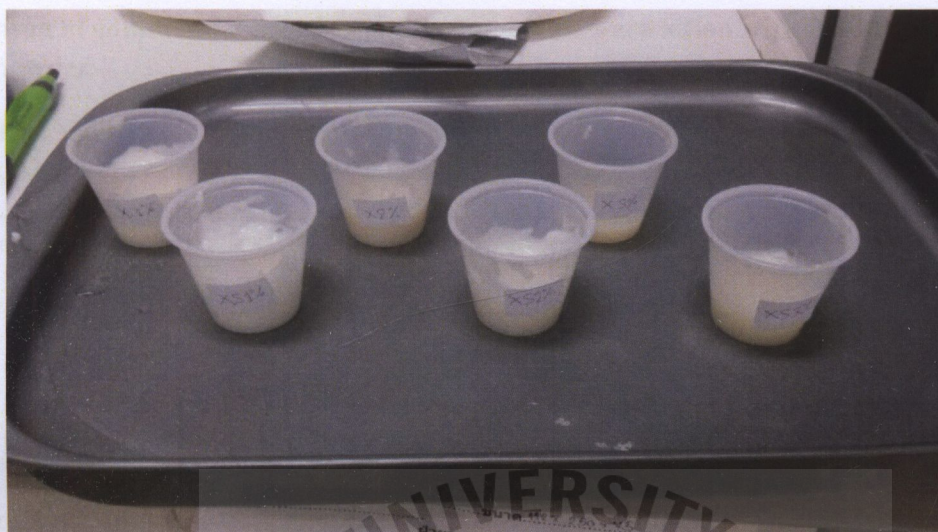
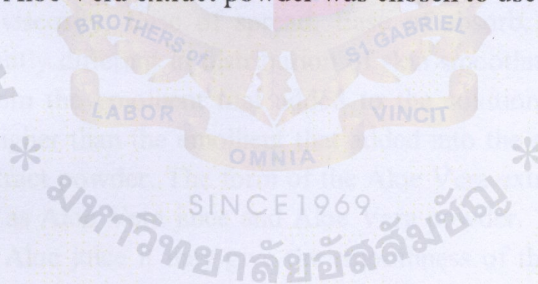


Fig *Aloe Vera lotion in three different amount of 200X and 200XS Aloe Vera extract powder*

According to the table, the highest average score of overall liking was body lotion with 1% 200X Aloe Vera extract powder by 6.7. Because of the consumer in this section liked the lotion that have high viscosity, easy to spread. The 1% 200x Aloe Vera extract powder also gave the highest score of skin moisturizing that means the added of 1% 200X Aloe Vera extract powder was the right amount that not given the lotion too thick and also gave the skin moisture at the same time. The 1% 200x Aloe Vera extract powder was chosen to use for the development of Aloe Vera lotion in further.



Comparison of commercial Aloe Vera lotion and Aloe Vera lotion with 1% 200x Aloe Vera extract powder

Table: Mean and standard deviation of commercial Aloe Vera lotion and Aloe Vera lotion with 1% 200x Aloe Vera extract powder

Level of Trt	N	overall		Viscosity		Spread		Absorb		Stickiness		Moist		Smooth	
		Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Aloe Vera Powder ^{ns}	100	5.8a	1.6	5.5a	1.6	5.8a	1.7	5.7a	2.0	5.5a	1.9	6.1a	1.2	5.9a	1.7
Commercial ^{ns}	100	5.5a	1.9	5.8a	1.6	6.1a	1.6	6.1a	1.9	5.8a	1.6	6.2a	1.6	6.4b	1.5

From the t Test the result shown that there are no significantly different between Commercial Aloe Vera lotion and aloe Vera body lotion from aloe Vera extract powder in the distribution of overall liking, viscosity, Ease of spread, Ease of absorb, Stickiness, and Skin moisturizer. There are significantly different in distribution of skin smoothness with 5.9 and 6.4. The skin smoothness come from the emollient that added to the solution. The amount of the emollient of commercial may higher than the emollient that added into the solution of Aloe Vera body lotion from aloe Vera extract powder. The form of the Aloe Vera extract that added to the lotion were in many type such as Aloe Vera juice and Aloe Vera powder. The commercial Aloe Vera in this research uses the Aloe juice it may give the smoothness of the skin more than the Aloe Vera powder.

Table: Preference test

Aloe Vera lotion from Aloe Vera extract powder ^{ns}	Commercial ^{ns}	No Preference
37	44	19

From the preference test, 44% from 100 consumer preferred commercial Aloe Vera lotion because of commercial lotion added perfume.37% of consumer prefer Aloe Vera lotion from Aloe Vera extract powder. Most of the consumer that preferred Aloe Vera lotion from Aloe Vera extract powder because of the lotion has no smell and their don't preferred the lotion that gave strong smell of perfume. Perfume also the thing that effect the liking score of the lotion because perfume dose not gave the smell to the lotion perfume also gave mood of the lotion user. The mood of lotion user can made the liking score of the lotion in fact that consumer like to have the smell in the lotion more than the lotion that have no smell although the smell of the lotion was too strong.



Consumer acceptance survey from 100 consumers

The consumer acceptance survey was conducted by using questionnaire and 9-hedonic scale preference test. One hundred consumers who work at Sumrong Hospital and around Assumption University Huamak Campus wear involved in this survey. The questionnaire consists of three parts. First part was part of consumer’s behavior. Second part was product acceptance and third part was demographic information. The result was shown as the pie chart.

Part 1: Consumer’s behavior consumption of Body lotion

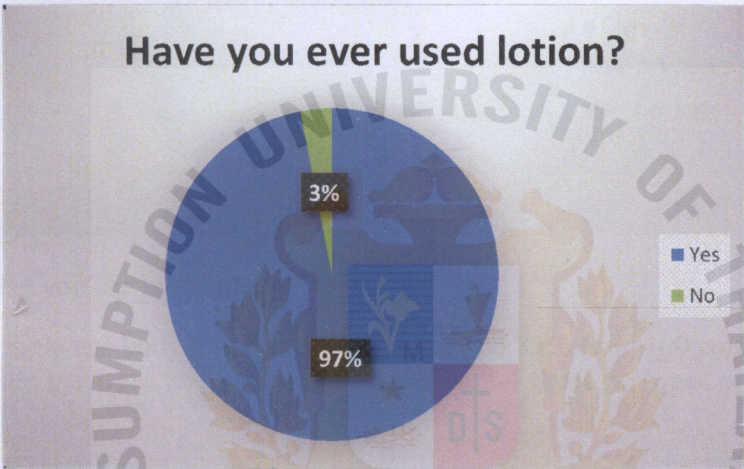


Fig *Have you ever used lotion?*

The pie chart showed that from 100 consumers, 97% of 100 consumers have ever used lotion before while 3% never used lotion.



Fig *what brand of body lotion that you use?*

Pie chart showed the famous brand of body lotion that people mostly use was Vaseline which is 39%, followed by Nivea which is 17%, 13% was the other brand that mostly were Oriental princess and Yves Roche, 11% was Johnson & Johnson, 10% was Citra, 5% was Jergens, 4% was Mistine and 1% was soap and glory.

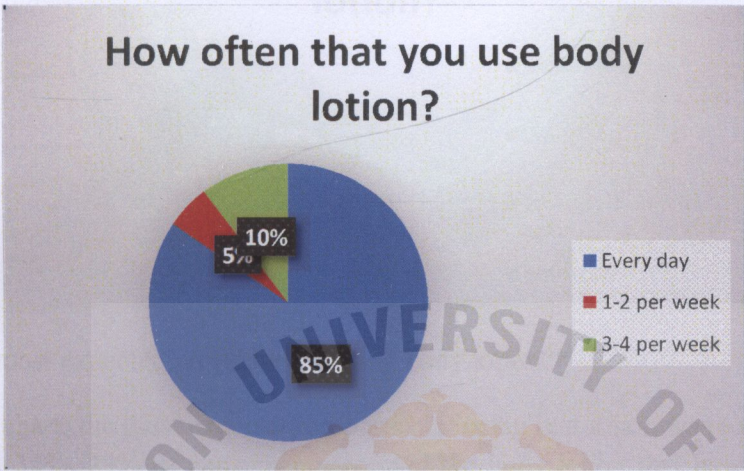


Fig *How often that you use body lotion?*

Most of people use body lotion everyday as showed 85% from 100 consumers. Some use body lotion 1-2times per week and some use body lotion 3-4 times per week which were 5% and 10%.

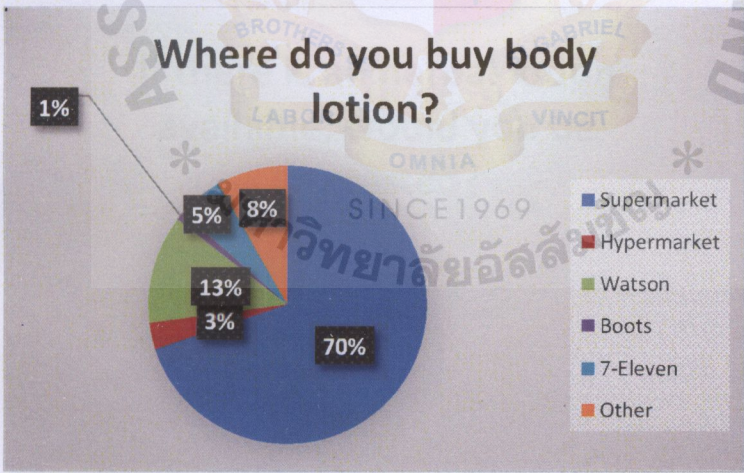


Fig *Where do you buy body lotion?*

The pie chart shown that the most place that consumer bought body lotion was supermarket which is 70%, followed by Watson which is 13%, 8% was other place which consist of the shop of the brand that their used such as oriental princess or the body shop, 5% was 7-eleven, 3% was hypermarket and 1% was boots. Because of the area around Sumrong hospital have Imperial department store, so most of consumers were bought at the supermarket for easy buying.

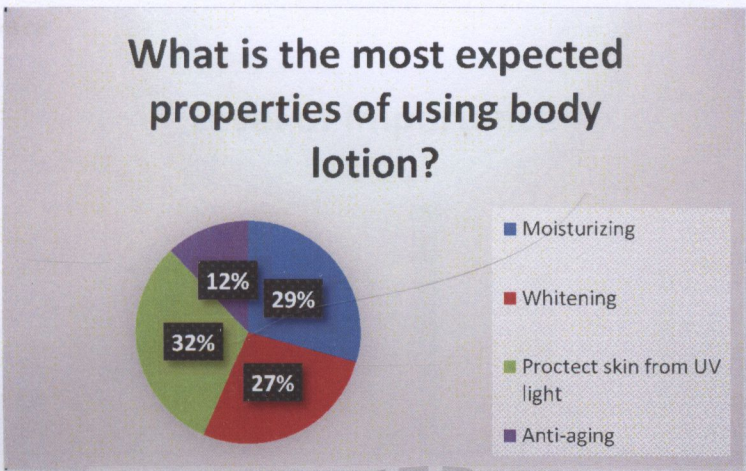


Fig *what is the most expected properties of using body lotion?*

From the chart, the most expected properties of using bod lotion was to protect skin from Ultra Violet with 32%, 29% of consumers expected the body lotion that have the properties of added moisturizer to the skin, 27% of consumer expected the lotion that make skin whiter, and 12% of consumers expected the lotion that make skin younger. Because of the weather in Thailand hotter every day and the Ultra violet was stronger every day, most of the consumer was looking for the lotion that have ability to protect their skin from the sun light. Some of the consumer expected the whitening lotion to make their skin brighter after burning from sunlight.

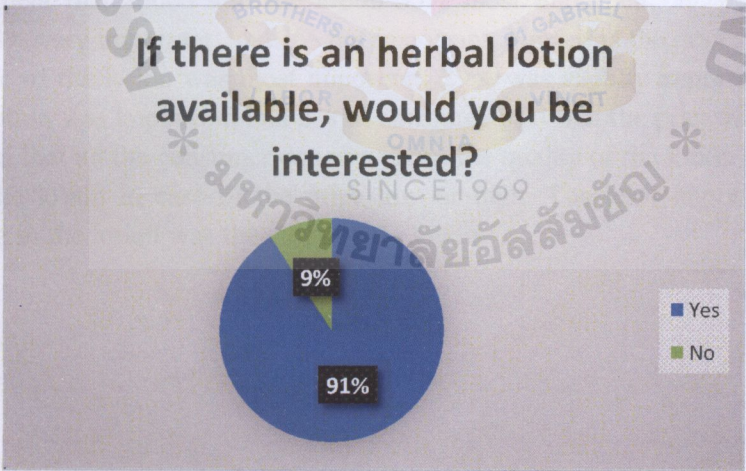


Fig *If there is an herbal lotion available, would you be interested?*

From pie chart, 91% of consumer would be interested if any herbal lotion has launched.

Level of importance

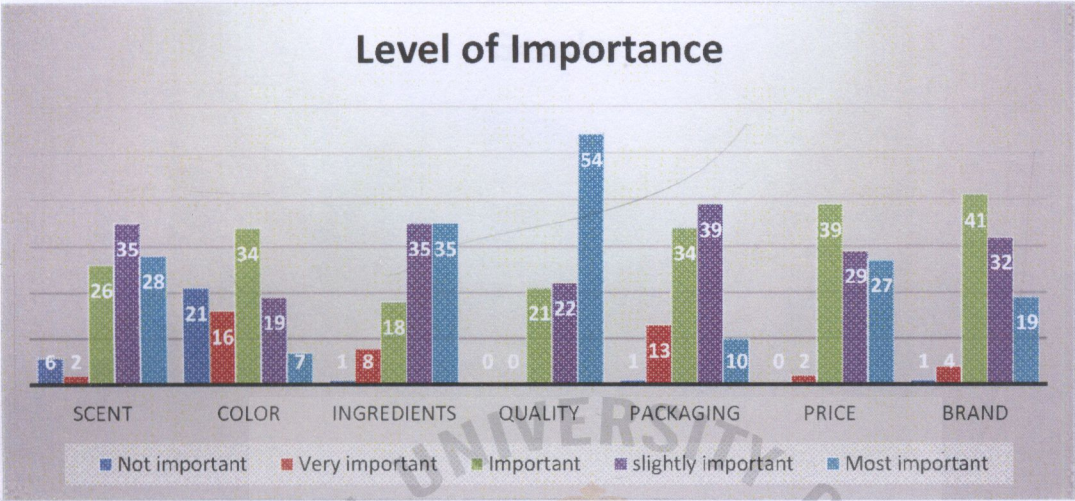


Fig *Level of importance*

According to bar chart, the result showed that from 100 consumers the most important factor for choosing body lotion was quality with 54% most important, 22% slightly important, and 21% with important. Next important attribute that consumer use for choosing their body lotion was ingredient that added into the lotion 35% most important, 35% slightly important, 18% important, 8% very important, and 1% not important. Next was the price, 27% of consumer said that the price of the lotion was most important, 29% was slightly important, 39% said that the price of the lotion was important, and 2% of consumer said that the price was very important. The result showed that all the consumer concern about the quality of the lotion and the ingredient that contain in the lotion in case of the price low or high. The least important attribute that consumer looking in the lotion was the color of the lotion.

Part 2: Demographic information

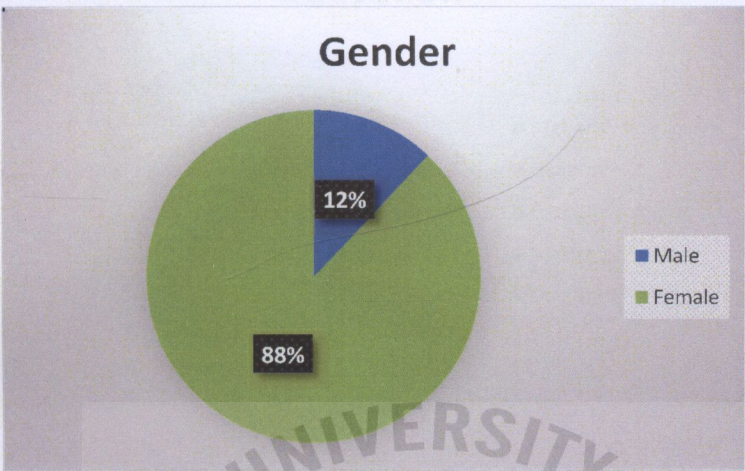


Fig *Gender*

Pie chart shown that from 100 consumers there were 88% female and 12% male. That means most of the opinion in this research came from female opinion.

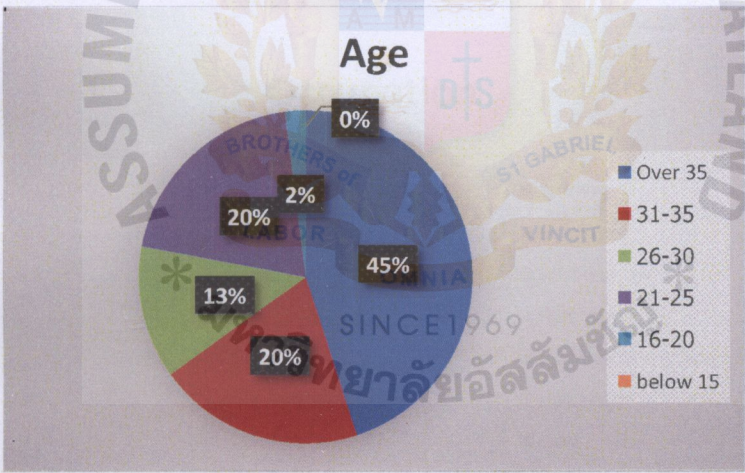


Fig *Age*

From the pie chart, the result showed that most of the consumer was the consumer at age over 35 years old with 45%. The consumer at age 31-35 and 21-25 was 20%, 13% of consumer was 26-30 years old, 2% of consumer was 16-20, and no consumer that age below 15 years old.

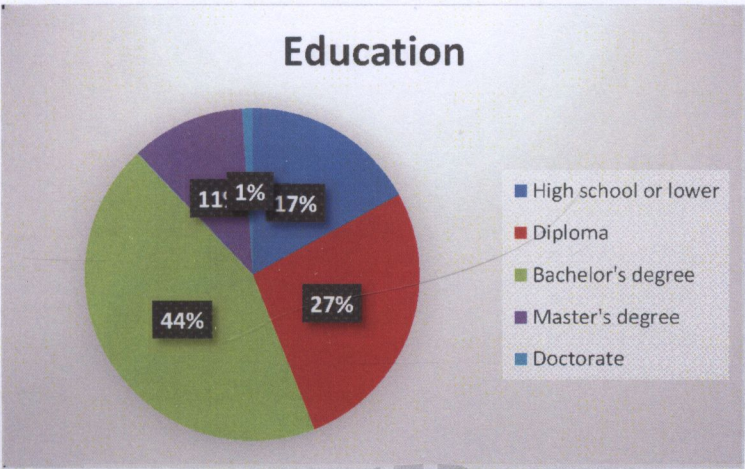


Fig *Education*

The chart showed that most of the consumer has Bachelor's Degree with 44%. 27% of consumer has Diploma, 17% was high school or lower, 11% was Master's degree and 1% of consumer was Doctorate.

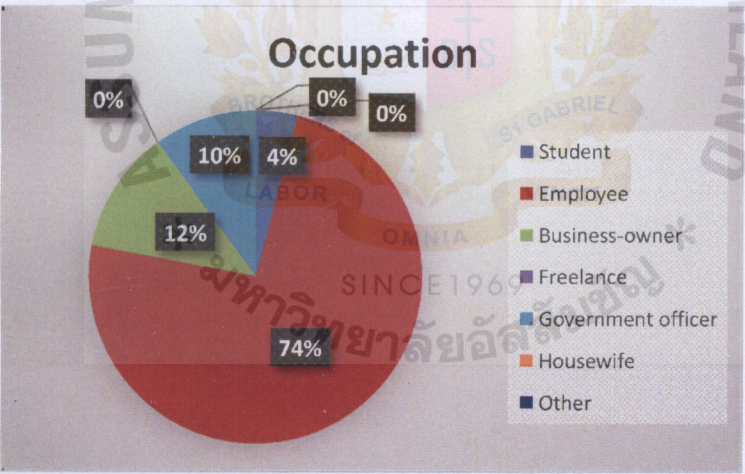


Fig *Occupation*

Pie chart shown that 74% of the panels were employee because this research area was Sumrong hospital and most of the panel was nurse.

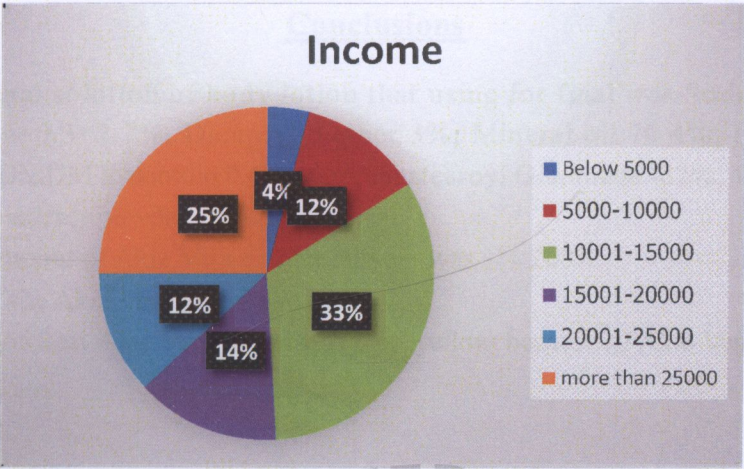


Fig *Income*

The chart shown that 33% of consumer has income around 10001-15000 Baht. 25% of consumer has income more than 25000 Baht.

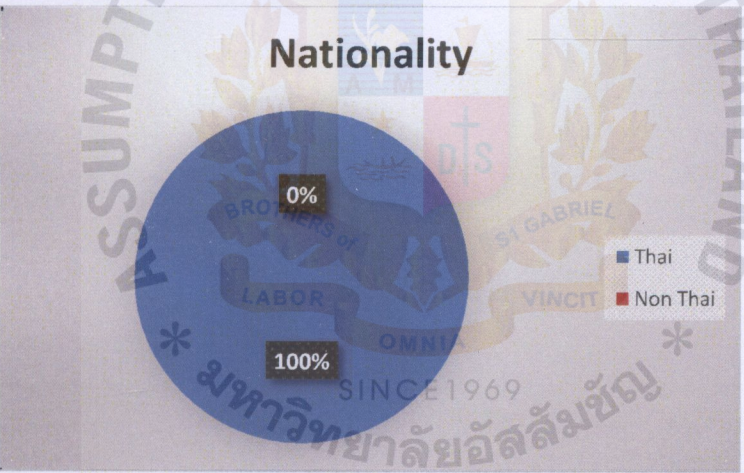


Fig *Nationality*

The pie chart shown that all of 100 consumers were Thai nationality.

Conclusions

- The original solution of body lotion that using for final was Sodium polyacrylate $0.8 \times 3 = 2.4 + 0.3 = 2.7\%$, Dicaprylyl ether 3%, Mineral oil 70 4%, Propylene glycol $4 \times 2 = 8\%$, DMDM hydantoin 0.6%, Sodium stearoyl Glutamate 0.2%, Water 81.5%, and Aloe Vera extract powder 200x 1%.
- Suitable amount of Aloe Vera extract powder was 1% 200X.
- The pH of the Aloe Vera lotion was 5.66.
- The color of final Aloe Vera lotion was light yellow because of Aloe Vera powder.



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Budget

The budget or price of each list is approximately value.

Lists	Price(Baht)
1. HH Lotion	775.00
2. Water	60.00
3. Questionnaire paper	220.00
Total (approximately)	1055.00



Timeline (Schedule)

Month	Schedule
August 2014	<ul style="list-style-type: none">• Learning and understanding about the project.
September 2014	<ul style="list-style-type: none">• Researching the formula from HH lotion
October-November 2014	<ul style="list-style-type: none">• Surveying for the best thickener amount
December 2014	<ul style="list-style-type: none">• Researching and surveying for the basic body lotion solution
January-February 2015	<ul style="list-style-type: none">• Re-Researching and Surveying to find better basic body lotion with 35 consumers
February-April 2015	<ul style="list-style-type: none">• Improvement of method and formula in basic body lotion with variation of aloe Vera extract powder
April-May 2015	<ul style="list-style-type: none">• Surveying the preferences between two different amount of aloe Vera extract powder
May-June 2015	<ul style="list-style-type: none">• Consumer acceptance of product between commercial and Aloe Vera body lotion using survey of 100 consumers.
June-July 2015	<ul style="list-style-type: none">• Collecting data and analyzing result.
July-August 2015	<ul style="list-style-type: none">• Preparing report and project presentation.

Appendix

The questionnaire for sensory analysis of body lotion by using Just about right and 9 point hedonic scale

Sensory Analysis of Body Lotion

การทดสอบทางประสาทสัมผัสของผลิตภัณฑ์โลชั่นสำหรับผิวกาย

Instructions

1. Please wipe your hand and arm with baby wipe paper and dry with tissue paper.
(ถูมาเช็ดแขนและมือด้วยกระดาษเช็ดแบบเปียก และเช็ดให้แห้งอีกครั้งด้วยกระดาษเช็ดมือ)
2. Take two full spoon of sample and apply on one side of your forearm.
(ทาครีมลงบนแขน จำนวน 2 ช้อน ลงบนแขนข้างใดข้างหนึ่งของท่าน)
3. Rate the sample by using 9-point hedonic scale.
(ให้คะแนนตามความชอบ ตามเกณฑ์คะแนนด้านล่างในแต่ละหัวข้อ)

1=Dislike extremely (ไม่ชอบมากที่สุด)

2=Dislike very much (ไม่ชอบมาก)

3=Dislike Moderately (ไม่ชอบปานกลาง)

4=Dislike slightly (ไม่ชอบเล็กน้อย)

5=Neither like nor Dislike (เฉยๆ)

6=Like slightly (ชอบเล็กน้อย)

7=Like moderately (ชอบปานกลาง)

8=Like very much (ชอบมาก)

9=Like extremely (ชอบมากที่สุด)

*****Please rate the sample according to the sample's sensory property except the scent of the sample.*****

*** (การทดสอบนี้ ไม่พิจารณาคุณลักษณะของกลิ่น) ***

Sample code: _____

Attribute

Overall Liking (ความชอบโดยรวม) _____

DURING APPLY (ระหว่างการใช้ผลิตภัณฑ์)

Viscosity (ความหนืด)

☐ ☐ ☐ ☐ ☐
 Much too thin Somewhat too thin Just right Somewhat too thick Much too thick

Ease of spread (ความง่ายในการกระจายตัว)

☐ ☐ ☐ ☐ ☐
 Much too easy Somewhat too Just right Somewhat too Much too hard

easy

hard

Ease of absorb (ความง่ายในการซึมลงสู่ผิว)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Much too easy	Somewhat too easy	Just right	Somewhat too hard	Much too hard

AFTER APPLY (ภายหลังการใช้ผลิตภัณฑ์)

Stickiness (ความเหนียวเหนอะหนะ)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Much too low	Somewhat too low	Just right	Somewhat too high	Much too high

Skin moisturizing (ความชุ่มชื้นของผิว)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Much too low	Somewhat too low	Just right	Somewhat too high	Much too high

Skin smoothness (ความเรียบลื่นของผิว)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Much too low	Somewhat too low	Just right	Somewhat too high	Much too high

Comment(ความคิดเห็น)

Question for sensory analysis of body lotion using 9 point hedonic scale with preference test

Sensory Analysis of Body Lotion
การทดสอบทางประสาทสัมผัสของผลิตภัณฑ์โลชั่นสำหรับผิวกาย

Instructions

- 1. Please wipe your hand and arm with baby wipe paper and dry with tissue paper.
(ถูจนเช็ดแขนและมือด้วยกระดาษเช็ดแบบเบบี๋ และเช็ดให้แห้งอีกครั้งด้วยกระดาษเช็ดมือ)
- 2. Take two full spoon of sample and apply on one side of your forearm.
(ทาครีมลงบนแขน จำนวน 2 ช้อน ลงบนแขนข้างใดข้างหนึ่งของท่าน)
- 3. Rate the sample by using 9-point hedonic scale.
(ให้คะแนนตามความชอบ ตามเกณฑ์คะแนนด้านล่างในแต่ละหัวข้อ)

- 1=Dislike extremely (ไม่ชอบมากที่สุด)

2=Dislike very much (ไม่ชอบมาก)

3=Dislike Moderately (ไม่ชอบปานกลาง)

4=Dislike slightly (ไม่ชอบเล็กน้อย)

5=Neither like nor Dislike (เฉยๆ)

6=Like slightly (ชอบเล็กน้อย)

7=Like moderately (ชอบปานกลาง)

8=Like very much (ชอบมาก)

9=Like extremely (ชอบมากที่สุด)

Please rate the sample according to the sample’s sensory property except the scent of the sample.

*** (การทดสอบนี้ ไม่พิจารณาคุณลักษณะของกลิ่น) ***

Attributes	697	923
Overall liking(ความชอบโดยรวม)		
During Apply(ระหว่างการใช้ผลิตภัณฑ์)		
Viscosity(ความหนืด)		
Ease of spread(ความง่ายในการกระจายตัว)		
Ease of absorb(ความง่ายในการซึมลงสู่ผิว)		
After Apply(ภายหลังการใช้ผลิตภัณฑ์)		
Stickiness(ความเหนียวเหนอะหนะ)		
Skin moisturizing(ความชุ่มชื้นของผิว)		
Skin smoothness(ความเรียบลื่นของผิว)		

Please indicate your preference by circling one of the following four answers:

- 697

923

No preference (ชอบทั้งสองตัวอย่างหรือไม่ชอบทั้งสองตัวอย่าง)

Comment (ความคิดเห็น)

THANK YOU



Question for consumer test of body lotion using consumer's behavior with product acceptance and demographic information

Consumer Test Questionnaires

Product concept:

Aloe vela lotion is the lotion that contains aloe vela extract powder to develop the moisturizer in the lotion. Aloe vela lotion makes skin moisture and also healing the skin that burnt from the ultra violet.

Instruction: Please √ in () that comply with your opinion

Part 1: Consumer's behavior

1. Have you ever use the lotion? (If no skip to part2)
☐ yes ☐ No
2. What brand of body lotion you regularly use? (choose only 1 brands)
☐ Citra ☐ Vaseline ☐ Nivea
☐ Jergens ☐ Johnson& Johnson ☐ Mistine
☐ soap and glory
☐ Other _____
3. How often that you use body lotion?
☐ every day ☐ 1-2 per week ☐ 3-4 per week
☐ Other _____
4. Where do you buy body lotion?
☐ Supermarket ☐ Hypermarket ☐ Watson
☐ Boots ☐ 7-11 ☐ Other _____
5. What is the most expected properties of using the lotion? (can answer more than 1)
☐ Moisturizing ☐ Whitening
☐ Protection skin from UV light ☐ Anti-aging
☐ Other _____
6. If there is an herbal lotion available, would you be interested?
☐ Yes ☐ No
7. Please √ in () about the factor affecting on purchasing “ body lotion”

Factor	Level of importance				
	Most important	Very important	Important	Slightly important	Not important
Scent (กลิ่น)					
Color (สี)					
Ingredients (ส่วนประกอบ)					
Quality (คุณภาพ)					
Packaging (บรรจุภัณฑ์)					
Price(ราคา)					
Brand(ยี่ห้อ)					
Others					

Part 2: Product Acceptance

Instructions

1. Please wipe your hand and arm with baby wipe paper and dry with tissue paper. (ถูข้อมือและแขนด้วยกระดาษเช็ดมือแบบเปียก และเช็ดให้แห้งอีกครั้งด้วยกระดาษเช็ดมือ)
2. Take two full spoon of sample and apply on one side of your forearm. (ทาครีมลงบนแขน จำนวนชั้น2 ลงบนแขนข้างใดข้างหนึ่งของท่าน)
3. Rate the sample by using 9-point hedonic scale. (ให้คะแนนตามความชอบ ตามเกณฑ์คะแนนด้านล่างในแต่ละหัวข้อ)

- 1=Dislike extremely (ไม่ชอบมากที่สุด)
- 2=Dislike very much (ไม่ชอบมาก)
- 3=Dislike Moderately (ไม่ชอบปานกลาง)
- 4=Dislike slightly (ไม่ชอบเล็กน้อย)
- 5=Neither like nor Dislike (เฉยๆ)
- 6=Like slightly (ชอบเล็กน้อย)
- 7=Like moderately (ชอบปานกลาง)
- 8=Like very much (ชอบมาก)
- 9=Like extremely (ชอบมากที่สุด)

Attributes	593	627
Overall liking(ความชอบโดยรวม)		
During Apply(ระหว่างการใช้ผลิตภัณฑ์)		
Viscosity(ความหนืด)		

Ease of spread(ความง่ายในการกระจายตัว)

Ease of absorb(ความง่ายในการซึมลงสู่ผิว)

After Apply(ภายหลังการใช้ผลิตภัณฑ์)

Stickiness(ความเหนียวเหนอะหนะ)

Skin moisturizing(ความชุ่มชื้นของผิว)

Skin smoothness(ความเรียบตื้นของผิว)

Please indicate your preference by circling one of the following four answers:

593

627

No preference (ชอบทั้งสองตัวอย่างหรือไม่ชอบทั้งสองตัวอย่าง)

1. Do you accept this Product? Please give the reason

Because:

2. If this product is launched in market, will you buy this product?

() will buy

because.....

.....

() will not buy

because.....

.....

☐ Not sure

because.....

.....

3. What should be the suitable price of this body lotion of this showing package (300ml)?

() Less than 100 Baht

☐ 100 - 200 Baht

() 201- 300 Baht

☐ 301 – 400 Baht

☐ more than 400 Baht

Part 3: Demographic information

- ## 1. Gender

☐ Male

☐ Female

- ## 2. Age

- ☐ below 15 years ☐ 16-20 years ☐ 21 – 25 years
☐ 26-30 years ☐ 31-35 years ☐ over 35 years

3. Education

- ☐ High school or lower ☐ Diploma ☐ Bachelor's degree
☐ Master's degree ☐ Doctorate

4. Occupation

- ☐ Student ☐ Employee ☐ Business-owner
☐ Freelance ☐ Government officer ☐ Housewife/house
☐ Other (please specific)

5. Income monthly

- ☐ Below 5,000 baht ☐ 5,000- 10,000 baht ☐ 10,001 – 15,000 baht
☐ 15,001 – 20,000 baht ☐ 20,001 – 25,000 baht ☐ more than 25,000 baht

6. Nationality

- ☐ Thai
☐ Non Thai (please specific).....

