Development of Disinfecting Hand Care Product

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Abstract & Introduction

Recently, infection diseases like COVID-19, flu are spreading all over the world and it is becoming one of the big global issues. Therefore, we tried to develop the hand-gels which are able to prevent some infectious diseases and tried to disseminate them in our society. And we considered how we can make them used by many people and lessen the numbers of people who are suffering from being infected. In this study, we aimed not to use alcohol for the ingredients because it is one of the biggest causes of skin irritation. At first, we targeted to make sterilization hand-gels. However, through making studies, we met the company who supports our study and gives us some advice how to develop hand-gels, and they advised us to change our goal to make sterilization hand-gels into making the lotion which can disinfect and protect our skins from being rough. In addition, we made a promise to develop lotions and sell them with the company, *Suhada-Mirai-laboratory*. (すはだみらい研究所), Dejima, Nagasaki city.

Keywords

Hand care product　Infectious diseases　Skin irritation　Marketing　SDGs

1. Background

Recently, a new type of coronavirus infection (COVID-19) has been spreading around the world, and countermeasures against it have become a major issue worldwide (World Health Organization; hereinafter referred to as WHO, 2021). While the outbreak of the new coronavirus has raised awareness of hand washing and hand disinfection among people, the number of people suffering from rough hands and alcohol sensitivity is increasing due to frequent hand washing and use of alcohol and other products (WHO, 2009,)

2. Objective

Nowadays, because of the spread of many kinds of infection diseases, people always wash their hands and use hand sanitizer including alcohol. The purpose of this study is to develop the lotion which can disinfect and prevent our skin from skin irritation due to washing hands many times and using too much alcohol called Alcohol hypersensitivity. Also, we expect the lotion to be used not only for hands but also for bodies. Our final goal of this research is to spread the lotion we have developed to the society and to contribute

to the skin health of many people around the world.

3. Literature Review

3.1 Features of COVID-19

(1) Properties of coronaviruses

【gene】

(+)single-stranded RNA　27~32kb

【structure】

Diameter 120~160nm　・elliptical shape and polymorphous

Crown-like projection on the surface

Have envelope (Lipid bilayers)

This envelope is easily deactivated by rubbing alcohol and detergents

Coronaviruses which cause disease in humans

・Subfamily Ortho coronavirus

α coronavirus

HCoV-229, HCoV-NL63

β coronavirus

HCoV-HKU1, HCoV-OC43,SARS coronavirus, MERS coronavirus, COVID-19

Features of COVD-19

1. Infection route

   Cough, splash, exposure, mail

2. Symptoms

   Incubation period: 2~14 days

   Rhinitis, upper respiratory infection, diarrhea, high fever, pneumonia,

   Abnormal sense of taste and smell

   Mild and subclinical infections are possible.

   The virus is shed from the initial infection.

3. Anticipated future of coronavirus

   They are anticipated to entrench in human society. (Pandemic)

Dr. Okumura, Nagasaki University says that the ways of keeping up with COVID-19 are to increase the number of PCR tests, to commercialize vaccines and therapeutics, and we should change our style of behaviors and adopt the new way of life.

3.2 The information of main three ingredients of the hand-lotion and their properties

1. Electrolytic-reduction ion water.

This is used by the base of our lotion. It has a negative electric charge to the lacuna and forms the electric-bilayer which is strong in the surface of the skin. The surface tension of water is 72mN/M(25℃), but this water's surface of tension is only 56mN/m(25℃) so it can give the skin moisture. Another important characteristic of Electrolytic-reduction ion water is its pH. It is the soft Base alkalinity which shows pH12.0±0.5, and the alkaliphile bacteria which like alkalinity can live only in ph10.5. Under the environment of this ion water, it is impossible for the germ to propagate. Therefore, we need not to use alcohol but can make the lotions with disinfectant properties.

Here is the graph which shows the effect of Electrolytic ion water.

Antimicrobial-activity test of S-100

Test bacteria	The test fluid	beginning	1 minute later	2 hours later	3 hours later	4 hours later	6 hours later
E. coli	S-100	6.1×10^5	<10	*****	<10	*****	<10
	purified water	6.1×10^5	*****	*****	6.3×10^5	*****	4.4×10^5
E. coli (O157:H7)	S-100	4.3×10^5	<10	*****	<10	*****	<10
	purified water	4.3×10^5	*****	*****	4.4×10^5	*****	3.9×10^5
Salmonella	S-100	2.2×10^5	<10	*****	<10	*****	<10
	purified water	2.2×10^5	*****	*****	4.5×10^5	*****	3.7×10^5
Pseudomonas aeruginosa	S-100	3.7×10^5	<10	*****	<10	*****	<10
	purified water	3.7×10^5	*****	*****	6.2×10^5	*****	4.9×10^5
Vibrio parahemolyticus	S-100	2.8×10^5	<10	*****	<10	*****	<10
	purified water	2.8×10^5	*****	*****	1.7×10^5	*****	1.6×10^5
Legionella bacteria	S-100	7.5×10^5	<100	*****	<100	*****	<100
	purified water	7.5×10^5	*****	*****	1.2×10^5	*****	9.6×10^5
MRSA	S-100	2.1×10^5	4.1×10^5	*****	1.1×10^3	*****	20
	purified water	2.1×10^5	*****	*****	1.2×10^5	*****	1.7×10^5
Trichophyton	S-100	2.5×10^5	2.1×10^5	*****	2.7×10^4	*****	2.1×10^3
	purified water	2.5×10^5	*****	*****	1.8×10^5	*****	1.9×10^5
Herpes simplex virus 2 type	S-100	1.5×10^5	<100	<10	*****	<10	<10
	purified water	1.5×10^5	1.5×10^5	1.5×10^5	*****	1.6×10^5	1.4×10^5
Chlamydia trachomatis	S-100	1.5×10^5	<10	<10	*****	<10	<10
	purified water	7.7×10^5	7.5×10^5	7.5×10^5	*****	7.6×10^5	7.4×10^5
P.acnes	S-100	3.8×10^5	<10	<10	*****	<10	<10
	purified water	3.8×10^5	3.5×10^5	3.4×10^5	*****	3.6×10^5	2.8×10^5

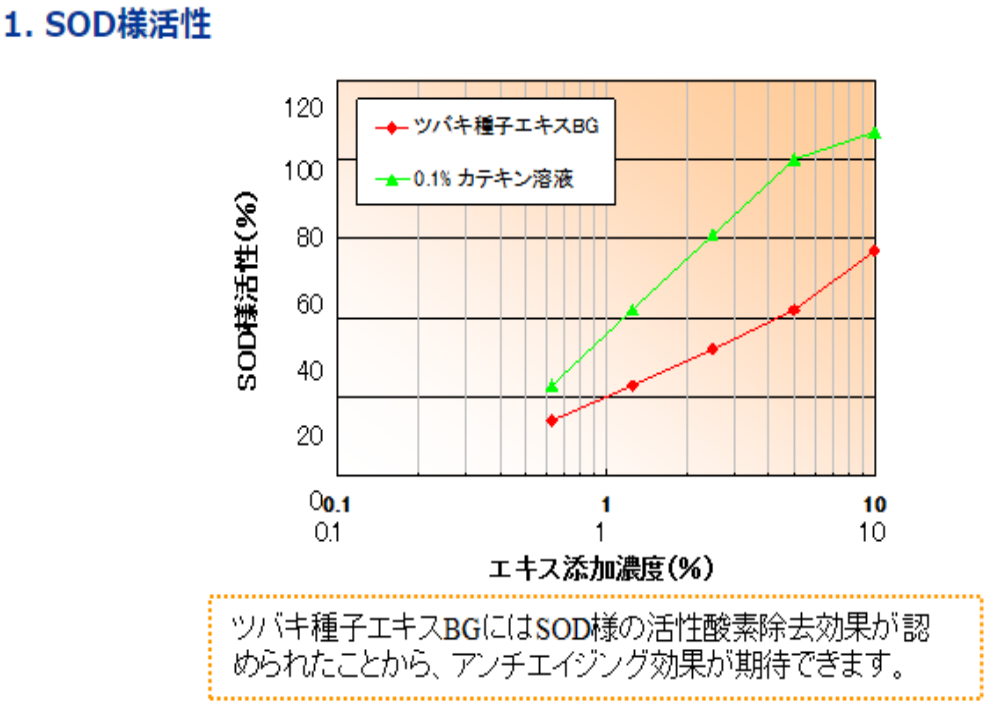
<10, <100 : Undetected **** : Not measure

(This table shows the number of tested bacteria under Electrolytic ion water, S100 time to time)

2. Camellia seed extract made in Goto, Nagasaki

The feature of this extract is its antioxidant effect so it can keep the skin healthy and stop skin aging from the oxidation of cell membranes in the body. The reason why we use Camellia seed extract made in Goto is that we are trying to use local product and

contribute to the local society. Here is the document of the effect of the extract.



(translation)

Camellia seed extract BG has been shown to have SOD-like active oxygen removal effects, which can be expected to have anti-aging effects.

The red line of the graph shows SOD-like activity of BG

The green one shows the SOD-like activity of Catechin solution.

3.3 The negative sides of using alcohol and washing hands

The reason why skin irritation and alcohol sensitivity happen is that the barrier of skin is destroyed by hand washing using soap and alcohol. Stratum corneum on the surface of the skin has the barrier function which keeps our skin moisture. However, when it is damaged by sterilization, this function cannot work.

If you have rough skin and you cannot sanitize your skin enough because of pains, it is easy for viruses and bacteria to increase. If there are fine wounds on the skin, Staphylococcus aureus and other bacteria will form a biofilm, and this biofilm lessens the effect of hand washing.

3.4 Marketing strategies especially in our study

According to Fumisa Takahashi, the Associate Professor of Nagasaki University Faculty of Economics, there are three steps to marketing. First is to decide the target of the product. The criteria of deciding the targets are for example, age, sex, income, academic background, and region. If you do not focus on your target, the product's appeal will be weak. The second step is to find the characteristics of the product. It is important to make things which are still not being sold. And, the way of finding what to appeal is to see and study some products which is sold in the market. The last step of marketing is to think about how to sell the product. To be more specific, thinking about the price, design, advertisement, and distribution of the product. Price is not always important. It needs to be changed depending on the target. To say about advertisement, it cost too much to do that so it is important to advertise the product where its targets can see it.

Our lotions aimed to be sold all over the world, but the needs of the customers are different depending on their national and local culture, so it is difficult to market them in the field of the world. Therefore, it is necessary to determine which country and which people to target.

In our study, we target all ages and both sexes though it is difficult to market it because our purpose is to contribute to the skin health of many people all around the world. And, we are going to sell our lotions mainly on the internet so a lot of people can buy our products.

3.5 SWOT analysis

SWOT analysis is a framework of marketing. This can analyze the external environment and the internal environment in terms of strengths, weakness, opportunities, and threats of our lotion. The external environment is, such as market trends. The internal environment is, for example, brand power, price, and quality of our product. Then, combined these factors to see the greatest opportunity or greatest threat, and clarify strategies for selling our products and solutions to our problems.

3.6 Perceptual design of brand value

Perceptual design of brand value is one of the marketing strategies. It is a way to think about the brand target, core value, and benefits of our product, and insight of customers to convey what is different from products of other stores. This strategy makes it possible to create products that customers want.

4. Method

① Making samples of hand cream

We made samples of hand cream which is thought to have disinfecting effect by using Beeswax, jojoba oil in hot water, and essential oils. We made four samples mixed with lemon oils, thyme oils, and green tea because they are said to be highly effective in disinfecting and the plain one.

② Examine the effect of our hand cream

Conducted the experiment to examine the effect of the creams. We made nutrient agar, coated it with natto bacillus to see how the bacillus spread and to see if blocking circles appear on the ager.

③ Do survey (About hand gel)

Conducted to the 234 students of Nagasaki Higashi high school's 2nd grade to see what is needed in hand care products.

④ Go fieldwork

We decided to do fieldwork at research institutions and a company that develops hand creams in order to break through the situation that we could not find the way to make the effective creams. In this research, we visited Nagasaki University institute of tropical medicine, the faculty of economics at Nagasaki University, and *Suhadamirai* Laboratory in Dejima, Nagasaki city. The fieldworks were conducted in October 6th and November 12th and 13th, 2020.

⑤ Do SWOT analysis

⑥ Decide the perceptual design of brand value

⑦ Decide the package of product

⑧ Determine the name of product

⑨ Advertise the product

4.1 Experiments

①Make the samples of hand cream

Ingredients

・Lemon oil , Time oil (a drop per one cream)

・Green tea (Brew 5g of tea leaves with 50ml of 89°C water for 3 minutes)　1cc

・Bees wax　6g

・jojoba oil　24cc

・distilled water for emulsifying　4ml

Process

1. Measure beeswax and jojoba oil into a beaker and boil it until whole bees wax melt.
2. Separate 6 cc of the melted beeswax and jojoba oil made process 1 for green tea.
   Add 1 cc of green tea and mix it well.
   For the remaining 18 cc of the base, add 4 ml of distilled water and mix well.
   Then the base cream is ready.
3. Divide the base cream into 4 g portions and place in cream containers.
4. Divide the mixture into four parts: a drop of lemon essential oil, a drop of thyme essential oil, green tea and the base.

(For lemon and thyme, add a drop each after dividing the base into 4g portions, and mix well with a bamboo skewer.

②Examine the effect of our hand cream

First time

Tools used in the experiment

・Ager powder 4g
・Sucrose 3g
・One pack of natto
・Distilled water for natto water 100ml
・Distilled water 300ml
・Alcohol for disinfecting
・Hand cream made above (Lemon, Time, Green tea, Plain)
・Petri dishes 16 plates
・Incubator

Process

1, Make nutrient agar
 Add 3g of sucrose and 4g of ager into 300ml of distilled water and boil.
2, Divide nutrient ager into 16 plates of petri dishes.
   (Ten for experiment and six for spare)
3, Sterilize these 16 plates of nutrient agar with high temperature and pressure.
4, Make natto bacillus water
 Add a pack of natto into 100ml of distilled water.
5, Coat natto bacillus water onto 6 plates of nutrient ager
6, Plant the 4 kinds of creams (lemon, thyme, green tea, and plane) in the nutrient agar.

Cream－ : natto＋ 1 / natto－ 1

Cream＋ : natto＋

Lemon 1/ Time 1/Green tea 1/Plain 1

natto－

Lemon 1/ Time 1/Green tea 1/Plain 1

7, Put these plates of nutrient agar in incubator set by 39℃ for 24hours to 48hours

Second time

Whole tools for the experiment and processes are as same as the first experiment except the set temperature. In this time, the set temperature was 37℃.

Third time

Tools used in the experiment

・Ager powder 8g
・Glucose 3g
・consommé 3g
・One pack of natto
・Distilled water for natto water 100ml
・Distilled water 600ml
・Alcohol for disinfecting
・Hand cream made above (Lemon, Time, Green tea, Plain)
・Petri dishes / 20 plates
・Incubator set by 37℃

Process

1, Make nutrient ager

① Consommé ager

Add 3g of consommé and 4g of ager powder into 300ml of distilled water and boil.

② Glucose ager

Add 3g of consommé and 4g of ager powder into 300ml of distilled water and boil.

2, Divide nutrient ager into 10 plates of petri dishes for each kinds of nutrient agers.

3, Use High Pressure Steam Sterilizer, Sterilize these petri dishes at high temperature and high pressure

4, Make natto bacillus water.

5, Coat natto bacillus water onto 10 plates of nutrient agers.

6, Make the culture medium

Cream－: glucose　　natto＋ 1/ natto－ 1
consommé　natto＋ 1/ natto－ 1

Cream＋:　glucose culture medium
natto＋
Lemon 1/ Time 1/ Green tea 1/ Plain 1　　total 4 plates
natto－
Lemon 1/ Time 1/ Green tea 1/ Plain 1　　total 4 plates

Consommé culture medium
natto＋
Lemon 1/ Time 1/ Green tea 1/ Plain 1　　total 4 plates
natto－
Lemon 1/ Time 1/ Green tea 1/ Plain 1　　total 4 plates

7,Put these plates of nutrient agar in incubator set by 37℃ for 24hours to 48hours

4.2 Do survey

【Question 1】
Which strength of the fragrance do you like?
【Question 2】
Which fragrance do you like?
【Question 3】
Which texture do you like?

4.3 Fieldworks

1. *Suhadamirai* Laboratory

Before visiting this laboratory, we have already decided to develop hand care products together. In this fieldwork, we asked the president *Oshima* following these two questions.

① How to make effective hand care product, especially hand creams?
② What is required when sell the hand care product which we made?

2. Nagasaki University Institute of Tropical Medicine

We had a talk with a Prof. Okumura who specialized in epidemiology about COVID-19 and other infectious diseases, which gave us a hint on how to make our hand gels. These are the questions which we asked.

①What is COVID-19?
②What is concerned when the new lifestyle is permeated?
③How to improve our hand care product?

3. The Faculty of Economics at Nagasaki University

We got some advice about how to spread hand gels to society from an assistant Prof. Takahashi who specializes in marketing at the faculty of Economics. The questions which we asked are as follows.

①What is marketing?
②How to spread our hand care products all over the world?
③What the package of our hand care product should be?

5. Results

5.1 Experiments

①Make the samples of hand cream

The hand cream which we aimed to create was able to make.

②Examine the effect of our hand cream

Through the experiments which see the effect of the hand cream, it was clarified that the creams have no disinfectant effect, so we asked *Suhadamirai* laboratory develop a hand care product with us. As mentioned above, we got a lot of advice about development of hand gels. As the result of many discussions, we ended up being involved in developing hand lotion of the company. There are a lot of bacteria on our hands. Also, human's largest organs are skin. Therefore, we decided to develop hand lotion which can do not only disinfect, but also moisturizing to promote people skin health.

Experiment1

No blocking circles were found in any of the agars 24 and 48 hours after. The cause of this result was thought to have set the preset temperature too high which killed bacillus natto, too much nutrients in agers, and storing nutrient agers in an unsterilized refrigerator for a day.

Experiment2

Change preset temperature by 39℃to 37℃ to see if the set temperature affects the spread of natto bacillus, however no blocking circles were found in any of the agar. They got the same result of the first experiment. Therefore, the temperature was not matter.

Experiment3

After 24 hours, no blocking circles were found in glucose agar. In consommé agar, natto bacillus was spread, however blocking circles were not appeared. Also, they got the same result 48 hours after.

The results of the experiment are shown in the following Table 1.

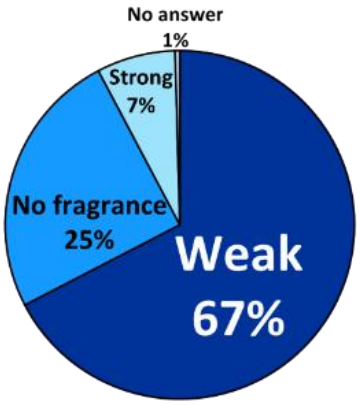
（Table 1）Experimental conditions and results

Item					Experimental conditions			Experimental results											
					First time (39°C)	Second time (37°C)	Third time (37°C)	First time				Second time				Third time			
								Blocking circle		Spread of bacillus		Blocking circles		Spread of bacillus		Blocking circles		Spread of bacillus	
								After 24H	After 48H	After 24H	After 48H	After 24H	After 48H	After 24H	After 48H	After 24H	After 48H	After 24H	After 48H
Medium condition	With cream	With natto bacillus	Sucrose	Lemon	+	+	-	-	-	+	+	-	-	+	+				
				Thyme	+	+	-	-	-	+	+	-	-	+	+				
				Green Tea	+	+	-	-	-	+	+	-	-	+	+				
				Plane	+	+	-	-	-	+	+	-	-	+	+				
			Glucose	Lemon	-	-	+									-	-	-	-
				Thyme	-	-	+									-	-	-	-
				Green Tea	-	-	+									-	-	-	-
				Plane	-	-	+									-	-	-	-
			Consommé	Lemon	-	-	+									-	-	+	+
				Thyme	-	-	+									-	-	+	+
				Green Tea	-	-	+									-	-	+	+
				Plane	-	-	+									-	-	+	+
		No natto bacillus	Sucrose	Lemon	+	+	-	-	-	-	-	-	-	-	+				
				Thyme	+	+	-	-	-	-	-	-	-	-	-				
				Green Tea	+	+	-	-	-	-	-	-	-	-	-				
				Plane	+	+	-	-	-	-	-	-	-	-	-				
			Glucose	Lemon	-	-	+									-	-	-	-
				Thyme	-	-	+									-	-	-	-
				Green Tea	-	-	+									-	-	-	-
				Plane	-	-	+									-	-	-	-
			Consommé	Lemon	-	-	+									-	-	+	+
				Thyme	-	-	+									-	-	+++	+++
				Green Tea	-	-	+									-	-	++	++
				Plane	-	-	+									-	-	+	+
	No cream	With natto bacillus	Sucrose	-	+	+	-	-	-	-	-	-	-	-	-				
			Glucose	-	-	-	+									-	-	-	-
			Consommé	-	-	-	+									-	-	-	-
		No natto bacillus	Sucrose	-	+	+	-	-	-	-	-	-	-	-	-				
			Glucose	-	-	-	+									-	-	-	-
			Consommé	-	-	-	+									-	-	-	-

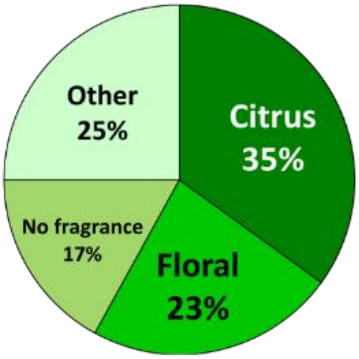
5.2 Survey

Here is the result of the survey.

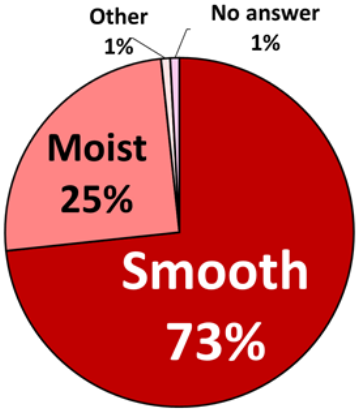
【Question 1】



【Question 2】



【Question 3】



In the first question, 67% of the respondents said that they prefer weak fragrance. Second, it shows Citrus, floral and no fragrance are preferred. Number of respondents who answered that fragrance-free was the best was more than we expected. In the third question, 73% of the respondents said that they prefer smooth texture. Answer of first and third question was exactly what we expected.

5.3 Fieldworks

1. *Suhadamirai* Laboratory

①How to make effective hand care product, especially hand creams?

The samples of hand cream which we made was using beeswax which cause sticky and poor feeling of use. To make the effective hand care product, we have to use materials that have been shown to be highly effective for sterilization. The president *Oshima* suggested to use electrolytic-reduction ion water which has strong effect of sterilization. According to Mr. Oshima, it is needed to use anti-corrosion agents to make the product that can be stored for a long time. Phenoxyethanol and some kinds of essence can be used as anti-corrosion agents. The essences for example, plants essence which has anti-inflammatory effects, liquid shea butter and so on.

②What is required when sell the hand care product which we made?

It is very important to decide the concept of the product like fragrance, texture, design of package. It is also important to set the target of the product. According to President Oshma, if we set the target, chose about two targets and consider the scene of the use. If

not, it is better to develop the product which everyone can use by making the smooth and fresh texture, and develop the no fragrance version.

We learned about how cosmetics are made. The president of the laboratory, Mr.Oshima, evaluated our samples of the creams and gave us some advice. Then, we created another samples in the laboratory. We were then asked to cooperate in the development of the hand lotion.

2. Nagasaki University Institute of Tropical Medicine

①What is COVID-19?

This is written in the section 3.1,

②What is concerned when the new lifestyle is permeated?

To say about the habit of washing hands more times that before, aporio-neurosis is concerned when the new lifestyle is permitted. For example some people may not feel calm unless washing their hands or want to wash their hands as soon as they touch something.

③How to improve our hand care product?

The precise date and evidence of the product's effect should be examined. Washing hands is the best way to prevent infectious diseases therefore it is important to emphasize the importance of hand washing. Thinking about realistically, it is difficult to send the product to some developing countries because of anti-terrorism measures. It may be able do that if we cooperate with local institutions or schools.

3. The Faculty of Economics at Nagasaki University

①What is marketing?

This is written in section 3.4.

②How to spread our hand care products all over the world?

The needs of the products are different for each country or cultures so it is difficult to say the way of spreading the product all over the world. Therefore, it is needed to determine which countries and which kinds of people to make the target.

③What the package of our hand care product should be?

Professor. Takahashi advised to make the cartridge type package to be used many times and to be ecofriendly. Some company's products are ingeniously by making unique cases of the product.

5.4 The result of SWOT analysis

In the world, there are many products of same purpose, and the number of hand care products are increasing lately. As a result of thinking about how to sell our products in that situation, the following analysis was made.

The main opportunities we thought is infectious disease epidemic and our research. Also, High school students develop hand care product with company is uncommon, so this is best our strength. However, this is activity we do ourselves, so products we made is not well known. Therefore, our weakness is that our product is not well known.

The combination of these factors, our main solution is media promotion. Then, they advertised our product, and the plan to make it available as many people as possible.

＜External Environment＞

Opportunity

・Infectious disease epidemic

・Increased opportunities for hand washing

・Increase in the number of people suffering from hand irritation

Threat

・Other store's products

・Violation of the law

＜Internal Environment＞

Strength

・Developed by high school student

・Developed with company

・Skin friendly

・Prevent infection

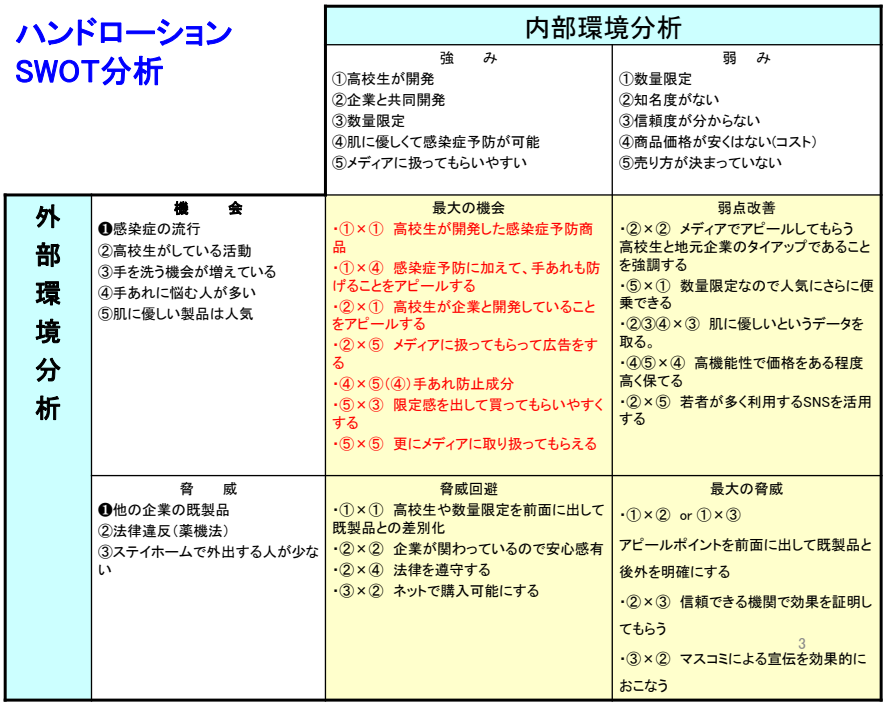
Weakness

・Limited in quantity

・Not well known

・High price

The image of the SWOT analysis we conducted is showed below.



5.5 The decided Perceptual design of brand value

These days, infectious diseases are spreading in the world. As a result, many people in the world are worried that they might get infected, and they do not want to be infected, so they disinfect with alcohol and surfactants. Therefore, many people become skin irritation. From these facts, the following insight of our customers, core value, benefit, and evidence of our product were considered.

Also, the brand target we considered on was young people. It's because young people often produce a daily trend, so they can convey importance of disinfection to the world.

＜Our hand lotion's perceptual design of brand value＞

Brand target

Young people

Insight

It is bother to wash and disinfect hands

Hands become dry and rough

Core value

Keep your skin clean anytime and anywhere

Benefit

Prevent infection

Protect the skin

Everyone can it

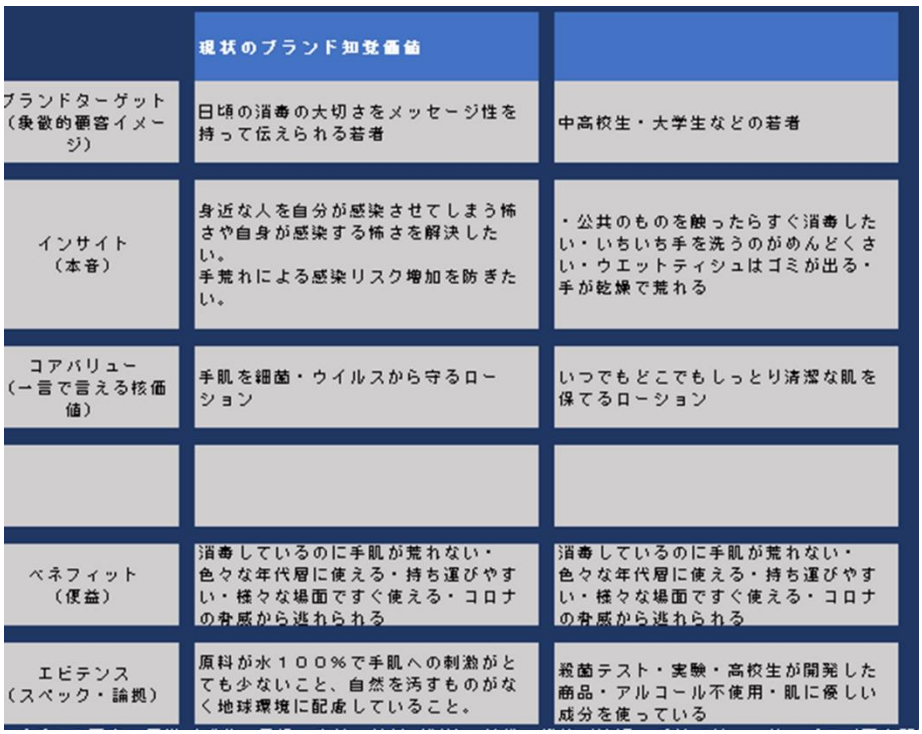
Use it in a variety of situations

Evidence

Without using alcohol and surfactants

Sterilization test.

This is the document which we used to make the perceptual design of brand value.



	現状のブランド知覚価値	
ブランドターゲット（象徴的顧客イメージ）	日頃の消毒の大切さをメッセージ性を持って伝えられる若者	中高校生・大学生などの若者
インサイト（本音）	身近な人を自分が感染させてしまう怖さや自身が感染する怖さを解決したい。 手荒れによる感染リスク増加を防ぎたい。	・公共のものを触ったらすぐ消毒したい・いちいち手を洗うのがめんどくさい・ウエットティシュはゴミが出る・手が乾燥で荒れる
コアバリュー（一言で言える核価値）	手肌を細菌・ウイルスから守るローション	いつでもどこでもしっとり清潔な肌を保てるローション
ベネフィット（便益）	消毒しているのに手肌が荒れない・色々な年代層に使える・持ち運びやすい・様々な場面ですぐ使える・コロナの脅威から逃れられる	消毒しているのに手肌が荒れない・色々な年代層に使える・持ち運びやすい・様々な場面ですぐ使える・コロナの脅威から逃れられる
エビデンス（スペック・論拠）	原料が水１００％で手肌への刺激がとても少ないこと、自然を汚すものがなく地球環境に配慮していること。	殺菌テスト・実験・高校生が開発した商品・アルコール不使用・肌に優しい成分を使っている

From these facts, we decided that two main points of our lotion. First, developed the product by high school students. Second, our lotion can prevent infection diseases and protect the skin without using alcohol and surfactants. Then, by emphasizing these main points, we advertise our products on media, and let many people know about it.

5.6 Package design

There are two purposes of our hand lotion. First, saving the world from fear of infectious disease. Second, prevent skin irritation from disinfection. These purposes were expressed in a package design with the following elements.

・Three drops：collaboration lotion
Thoughts of three high school students
・Globe and hands：saving the world
・Globe and color：SDGs
Sustained environment prevention
・Up and down lines：Skin layer
A place to save
・Color：Match the container

Here is images of the package.

5.7 Product name

“Limoas Hand Lotion”

This is our product name. This means saving more people. Limoas is named after the developer of this hand lotion. The reason why we decided to spell “Limoas” is that it looks better to see it for the first glance.

5.8 How to advertise the product

There are three main ways of advertisement. The first is school announcement. The product is sold at the school purchasing department. Advertising to students is essential and necessary. Therefore, the most effective way we think is announcement. Second is making paper advertising for parents, because it lets parents know about our hand lotion well. Third is using media. To spread the information of our product to other people can make the product's promotion.

6. Discussion

6.1 Experiments

Through one experiment to make the sample of hand cream and three experiments of examining the effect of cream, it is concluded that the cream which we created don't have much disinfecting effect. It is expected that the environment of conducting these experiments doesn't sterilized enough which cause inaccurate results. Also, nutrients of agers were too much that occur the other bacteria spread on agers. The set temperature was thought to be one of the causes of inaccurate result. It is needed to examine which temperature is the best to propagate for natto bacillus.

6.2 Survey

From these results, they show that no fragrance is the best to sell more and more people because preference of fragrance is varying from person to person. Moreover, smooth texture is the most popular. The reason why the result came in we think is that if their hands is moisture, they are hard to touch many things. Therefore, we decided to make products which have such features.

6.3 Way of spreading hand lotion

In order to sell it to plenty of people, considering how to advertise our lotion is very essential points. Therefore, online discussion with company was held a number of times. Many other companies have sold hand care products which can disinfect already. It is important to appeal points which are different from other hand care products. There are two points.

First, the package is made from bio plastic, which is environmentally friendly.

Second, our hand lotion don't contain surfactant and alcohol. Therefore it won't cause skin irritation.

The lotion is sold at the school purchasing department. It is produced 576 bottles and 6 bottles are used as sampling inspection. 70 bottles are used as testers. In fact, it is sold

in a limited edition of 500.
The pricing is 1500 yen. It can be expected that there will be leftovers, because it is too expensive for students to buy. Therefore, it will give a discount for students.

7. Conclusion

This research activities enabled us to learn about marketing, bacteriology, and epidemiology. In our study, we could sell the lotion only in Japan, and could not sell to the world. Therefore, we would like juniors to continue our study to make our product spread wider and wider.

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＊It cannot be showed the retreaters of Electrolytic-reduction ion water and Camellia seed extract which we used in this research paper because of corporate secret of *Suhadamirai laboratory.*